Ken Foxe FOI 2020/0341

Ken Fox	Ken Foxe FUI 2020/0341			
No.	Date of Record	Brief Description Gr	Grant/Part Grant/Withhold	Relevant Sections of the Act
4	12/10/2020	Attachment to Record 3 - to email 20/10/09 Gr	Grant	
		1340		
29	31/10/2020	Attachment to Record 28 - EY 1GC DOT Update G	Grant	
		and Confirmation 29 Oct 2020 v1		
34	04/11/2020	Attachment to Record 33 - 1GC Data Group Gi	Grant	
		Meeting 5 Nov 2020 v0.1		
37	04/11/2020	Attachment to Record 36 - 1GC Governance 4 Gi	Grant	
		Nov 2020 v0.7		
38	04/11/2020	Attachment to Record 36 - 1GC Data Group G	Grant	
		Meeting 5 Nov 2020 v0.7		
41	06/11/2020	Attachment to Record 40 - EY 1GC DOT Update 2 G	Grant	
		Deck 6 Nov 2020 v1.3		
42	06/11/2020	Attachment to Record 40 - 1GC Insights Issue 1 - Grant	rant	
		6 Nov	5	
47	09/11/2020	Attachment to Record 46 - 1GC Analysis	Part Grant	Section 37(1) – Personal Information*
		Direction 9 November 2020 v1 DRAFT		
53	12/11/2020	Attachment to Record 51 - 1GC Weekly	Grant	
	100	Programme Report Weeks 1-3 09112020		
58	12/11/2020	Attachment to Record 57 - Attachment 1GC P:	Part Grant	Section 37(1) – Personal Information*
		Analysis Direction 11 November 2020 v1.1 from		
		email 201111 1151		
62	16/11/2020	Attachment to record 61 - 1GC Priority Use G	Grant	
		Cases v1.1 from email 201116 1259		
67	16/11/2020	Attachment to Record 66 - EY 1GC DOT Update 3 Part Grant	art Grant	Section 37(1) – Personal Information*
		Deck 13 Nov 2020 v1	-	
69	16/11/2020	Attachment to Record 68 - Priority Use Cases 16 Grant	rant	
		Nov 2020 v1.2 from email 201116 1518		

	N 7	Analysis 16 November 2020 v1 from email 201116 2254		
17/11/2020)OT Interim	Part Grant	Section 37(1) – Personal Information*
19/11/2020		Attachment to Record 78 - 1GC DOT Interim Pupplate	Part Grant	Section 37(1) – Personal Information*
20/11/2020		nent to Record 89 - Confidentiality	Withhold	Section 36 (1) (b) and (c) - Commercially sensitive
	6 7	Agreement DOH and EY Final for review from email 201120 1112		information
22/11/2020		Attachment to Record 94 - 1GC DOT Update 5	Part Grant	Section 37(1) – Personal Information*
1 2	N) [Deck 23 Nov 2020 v0.2 Draft Issued from email 201121 1808	The second secon	
22/11/2020		Attachment to Record 94 - 1GC DOT Update 5 PDRAFT Deck 23 Nov 2020 v0.4 shared	Part Grant	Section 37(1) – Personal Information*
23/11/2020		Attachment to Record 97 - 1GC DOT Update 5	Part Grant	Section 37(1) – Personal Information*
		Deck 23 Nov 2020 v0.9 Shared from email 1135		
23/11/2020	I I I I I I I I	Attachment to Record 97 - 1GC DOT Update 5 P	Part Grant	Section 37(1) – Personal Information*
104 24/11/2020	II C C RESE X	Attachment to Record 103 - Midterm Analysis 23 P Nov 2020 v1 Shared	Part Grant	Section 37(1) – Personal Information*
109 25/11/2020		Attachment to Record 108 - C-19 Data Analytics P Insights to Date 25 Nov 2020 v1.6 from email at 0900	Part Grant	Section 37(1) – Personal Information*
111 25/11/2020	NI I I SHAE GRO	Attachment to Record 110 - Confidentiality V Agreement DOH and EY Final For Signature from email 201120 1712	Withhold	Section 36 (1) (b) and (c) - Commercially sensitive information
112 25/11/2020	ş	Attachment to Record 110 - Confidentiality Agreement DOH and EY Final PP Signature from	Withhold	Section 36 (1) (b) and (c) - Commercially sensitive information

	Grant	Attachment to Record 135 - 1GC Analysis of PUP Impact DRAFT 24 Nov 20	30/11/2020	136
information	VVI CITION	Actacriment to record 131 - Conndentiality Agreement DOH and EY Final for review (EY mark up 2) from email 201130 0825	30/11/2020	133
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information	e D	Agreement DOH and EY Final PP Signature 2		
Section 36 (1) (b) and (c) - Commercially sensitive	Withhold	Attachment to Record 131 - Confidentiality	30/11/2020	132
domain - https://assets.gov.ie/99307/c14f50b5- 926c-4b57-8a6f-e5c905db33e0.pdf	1 1 8	Insights to Date 26 Nov 2020 v2.1 (Core)	9	n
Section 15(1)(d) - Information already in the public	Withhold	Attachment to Record 127 - C-19 Data Analytics	28/11/2020	128
		Insights to Date 26 Nov 2020 v3 Display Only		
Section 37(1) – Personal Information*	Part Grant	Attachment to Record 124 - C-19 Data Analytics	26/11/2020	125
	1000 1000 1000 1000 1000 1000 1000 100	Insights to Date 25 Nov 2020 v1.11 from email 201126 1440		
Section 37(1) – Personal Information*	Part Grant	Attachment to Record 122 - C-19 Data Analytics	26/11/2020	123
		Insights to Date 26 Nov 2020 v3 Final		
Section 37(1) – Personal Information*	Part Grant	Attachment to Record 120 - C-19 Data Analytics	26/11/2020	121
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		Insights to Date 25 Nov 2020 v1.8 from email		
Section 37(1) – Personal Information*	Part Grant	Attachment to Record 115 -C-19 Data Analytics	26/11/2020	117
		201125 1918		
		Insights to Date 25 Nov 2020 v1.7 from email		0
Section 37(1) – Personal Information*	Part Grant	Attachment to Record 115 - C-19 Data Analytics	26/11/2020	116
		mark up) from email 201125 1734		
information		Agreement DOH and EY Final for review (EY		
Section 36 (1) (b) and (c) - Commercially sensitive	Withhold	Attachment to Record 110 - Confidentiality	25/11/2020	114
		mark up) 2 from email 201125 1734		
information		Agreement DOH and EY Final for review (EY		
Section 36 (1) (b) and (c) - Commercially sensitive	Withhold	Attachment to Record 110 - Confidentiality	25/11/2020	113

	Grant	Attachment to Record 223 - Daily RAG 22 DEC 2020 Shared	22/12/2020	224
Section 28(1) Meetings of the Government	Withhold	Attachment to Record 217 - C-19 Data Analytics Insights SC2 21 Dec 2020 v1 Submitted	21/12/2020	218
Section 28(1) Meetings of the Government	Withhold	Attachment to Record 212 - C-19 Data Analytics Insights - selected data 21 Dec from email 1131 201221	21/12/2020	213
	Grant	Attachment to Record 210 - 1GC Week 9 Level 5 and now health metrics from email 201218 1748	21/12/2020	211
	Grant	Attachment to Record 208 - 1GC Weekly Programme Report 20201218 DRAFT v0.2	18/12/2020	209
Section 37(1) — Personal Information*	Part Grant	Attachment to Record 206 - WEEK 9 1GC FINAL DECK (FRI 18 DEC) Final 3	18/12/2020	207
	Grant	Attachment to Record 191 - WEEK 8 1GC DECK FINAL (FRI 11 DEC)	14/12/2020	192
	Grant	Attachment to Record 188 - 1GC Weekly Programme Report 20201211 DRAFT v0.2	11/12/2020	189
	Grant	Attachement to Record 183 - WEEK 8 1GC INTERIM DECK FINAL (THURS 10 DEC)	11/12/2020	184
	Grant	Attachment to Record 157 - 1GC Priority Use Cases WC0412	07/12/2020	158
	Grant	Attachment to Record 152 - WEEK 7 FINAL1GC DECK WEEK 7 (4 DEC)	07/12/2020	153
	Grant	Attachment to Record 150 - 1GC Weekly Programme Report	07/12/2020	151
https://pubmed.ncbi.nlm.nih.gov/32835199/	1	in Shenzhen, China: a modelling study using mobile phone data	-	
Section 15(1)(d) Information already in the public domain -	Withhold	Attachment to Record 140 - Effects of human mobility restrictions on the spread of COVID-19	01/12/2020	141
	Grant	Attachment to Record 137 - 1GC Priority Use Case Analysis	30/11/2020	138

2	Uttacillistic to vecola 250 - paily two 30 pec	20/ 12/ 2020	107
Grant	Attachment to Record 229 - Daily RAG 30 DEC Grant	20/12/2020	221
Grant	Attachment to Record 227 - Daily RAG 29 DEC Grant	29/12/2020	228
	1140		
	Data Analytics Insights 23 DEC FINAL from email		
Grant	Attachment to Record 225 - WEEK 10 1GCC-19 Grant	23/12/2020	226

^{*} Information redacted on this ground relates to outbreak data at county level in specific settings on a specific date, thereby potentially identifiable.

Roinn an Taoisigh Department of the Taoiseach



26 October, 2021

Mr Ken Foxe ken@righttoknow.ie

Our ref: FOI/2020/0341

Dear Mr Foxe,

I write in relation to your Freedom of Information request received by this department for:

- a record of how much was paid to EY Consulting for advice/research relating to the Covid-19 pandemic.
- a copy of the tender or contractual documents relating to the provision of that service by EY for the Department.
- a copy of the business case, brief or guidelines prepared for EY relating to the provision of that service for the Department.
- copies of all emails between the individual with oversight for this research project and EY with regard to their work/research.

Please find attached a revised schedule and records for release. 25 additional records are being released in full and a further 17 records are being partially released.

Please note that a number of records contain a range of proposals on how the 1 Government Centre (1GC) project could run - including on oversight structures, data sources and uses and stakeholders. These early records were introductory, showing the breadth of data sources available and how they are being used in other geographies. This does not mean they were considered for Ireland. These documents were a springboard for a frank discussion on establishing the operational role of the 1GC project. Not all avenues outlined in the documents were agreed upon or actioned, and were tabled for the purposes of debate only. The records should be read in this context.

Specifically, record 4 shows the 1GC working principles and state a "Default assumption that 1GC only has access to aggregated and not citizen data". This principle of using aggregate data was applied for all 1GC use cases, e.g.:

- Covid-19 case data is at an aggregate county and LEA level, similar to that shared on Geohive
- Garda fine data is at an aggregate by fine type and the same as shared on the Dept of Justice website
- Dublin footfall and road vehicle data is a count per major street and similar to that shared on the respective government websites

• Banking payments data was at a "by type" level, similar to what is shared by the periodic central bank reports

The records also reference a potential Social Distance Index for Ireland, which looked to identify locations with a high congregation of people. This use case was not progressed.

Throughout the pandemic, restrictions have been introduced and eased, as appropriate, to address the public health risk at a given time taking account of public health, social and economic impacts. As part of this process, and to inform decision-making, information from a variety of sources is used. Government considers carefully all of the information and facts obtained with a view to making its decisions. Therefore, the insights produced do not provide a complete picture of the considerations of Government in its decision making. At times they remained a work in progress and did not capture all the relevant data available and insights may have been interim/incomplete or still in draft form. Insight reports were accompanied by oral briefings providing clarifications and context not captured in the records. The records should be read in this context.

Records 47, 58, 67, 75, 79, 95, 96, 98, 99, 104, 109, 116, 117, 121, 123, 125, 207

These records are being partially granted as they contain personally identifiable information. Specifically, where there are references to outbreaks/cases of fewer than 5, identified in a single county, setting type and week, this has been redacted. While the data only includes a count and not any personal details, you could still feasibly identify the setting and therefore possibly the individuals involved in this report. Therefore, any outbreak data involving fewer than 5 outbreaks/cases has been redacted.

Records: 90, 111, 112, 113, 114, 132 and 133

These records are considered exempt under section 36 as they contain: commercial or other information whose disclosure could reasonably be expected to result in a material financial loss or gain to the person to whom it relates; and information whose disclosure could prejudice the conduct or outcome of negotiations of the organisations to whom they relate.

The records withheld under this ground refer to drafts of the confidentiality and non-disclosure agreement signed by EY and the Department of Health for the sharing of data by the Department of Health with EY. The drafts would reveal information about the negotiations between the parties. The Department of the Taoiseach was not a party to this or included in the agreement. The sharing of these documents from the Department of Health to this Department does not negate the sensitivity of the material contained within or the confidential nature of the records.

In assessing the application of Section 36 (3), the public interest factors that were considered in favour of release of these records were:

- the need for openness and transparency about the work of the Department which is envisaged under the FOI Act;
- COVID-19 has had, and continues to have, a very significant impact on the social and
 economic life of the country and the people who live here and the need for the public
 to have access to information in the possession of Government Departments in relation
 to matters which affect them;
- the need for the public to be well informed about information held by Government Departments to stimulate public debate and commentary on important public policy issues;
- the need to provide accountability regarding expenditure of public funds, the work of public officials and the work of companies engaged by Government Departments to assist them.

The public interest factors that were considered against release of these records were:

- the records relate to a contract between third parties i.e. the Department of Health and EY and the information contained therein would not provide any insights into the work of the Department or on any important public policy issues;
- the risk of a prejudicial effect on any future contractual agreements or arrangements that EY or the Department of Health may wish to enter in the future if the contents of this contract become public knowledge;
- EY's competitors becoming aware of the details of a contract it has and using this to their advantage in the future thus resulting in a negative effect on EY's business or competitive position;
- the FOI Acts itself recognises that the right to access records held by Government Departments is not unlimited and is subject to the exemption grounds specified.

I can confirm EY were consulted on these records and consider them to be commercially sensitive. Having taken the factors for and against release into account it is considered that the public interest would on balance be better served by refusing rather than by granting the request in relation to these records.

Should you have any questions or concerns regarding the above, please contact me at the email below

Yours sincerely,

Martina Shaughnessy Social Policy and Public Service Reform Division

C19 One Government Centre (1GC)

Discussion Document

October 2020



Setting the C-19 Restriction Level for Ireland; Balancing a broad and complex set of questions with inadequate data

What are the potential future C-19 population rates?

What is our current C-19 population rates?

Can we learn anything from other countries?

What is the impact on our society and economy?

GOVERNMENT C-19 RESTRICTION LEVEL SETTING

Broad, complex & interdependent set of questions Siloed, slow, incomplete and often manual data processes

What is the citizen mood and attitude to restrictions?

Where are we seeing non-compliance?

Where can we rapidly intervene to increase adherence?

What is the impact of (internal, border, international) travel?



C19 One Government Centre (1GC) providing a consolidated view of performance and directing activities

C19 1GC

A central team and platform integrating data and insights across a variety of internal and external sources to coordinate a whole of government approach to tackling the crisis

Improving visibility with a cross government and society view of Ireland's performance in tacking this crisis

SURVEILANCE

Use computer vision on CCTV to assess location compliance to social distancing. Direct enforcement activities to address

SENTIMENT

Use social media and select focus

groups to understand public mood and

to inform compliance activities

Access Complex

Private

CITIZEN MOVEMENT

Understand citizen social distancing and travel patterns through using mobile data

Access

Complex

INTERNATIONAL

Link in with NPHET and obtain

international research good practice to

identify learning opportunities

Private

ECONOMIC / SPEND

Combine national forecasts with sector and citizen credit and spend status to inform economic position

Access

Complex

rivate

TRANSPORT

Understand performance and compliance of public transport and private vehicles. Target higher risk flights

Access

Comple:

Private

TAX

Understand the impact on public purse. Specific focus on higher risk sectors. Quantify cross border implications

Access Complex Private

HEALTH

Incorporate HSE existing C19 track and trace and health capacity assessment information

Access Complex Private

WELFARE

Assess the changing impact on state welfare by citizen group and location. Add food bank ongoing demand

Access

Complex

Private

Directing the cross government response

NPHET Level Recommendations

Citizen Communications

Tax and Welfare Interventions

Compliance Enforcement

Education and Transport Policy

Targeted Eircode Interventions

There is a wealth of data available with varying ease to access and privacy concerns

PRIVATE SECTOR TRANSACTION

COLLECTION

OF

EASE

PUBLIC SECTOR AND SEMI-STATE DATA

MOBILE DEVICE

DATA

DATA

OPEN AND **PUBLICLY** AVAILABLE DATA

- Citizen location and movement
- Citizen app and service usage
- Location-based population density
- Card spend transactions by type and area
- Credit score and lending by customer type and region
- C-19 enquiries, tests, cases, admissions and mortality
- Detailed disease lab results
 - Health system capacity
- **GP** Referrals and appointments
- PCRS Pharmacy prescriptions
- Use of mental health and counselling
- GeoHIVE cases by electoral area, admissions, transmission mode categories
- Mobile operator macro level population movement by transport, retail, etc
- Social Medial sentiment

- Citizen social network and connections
- Location based population variations / movement
- Tourist flight and hotel details
- Retail point of sale information
- CCTV (private and public sector)
- Public transport usage, including road tolls
- Welfare Payments inc Emergency and tax payments
- Crime rates by region
- CBI CCR citizen debt levels
- Births, marriages and divorces
- Govt worker absenteeism
- DataGov with c 25 datasets covering C-19 and wider government data, e.g. traffic (inc border), emergency payments, etc
- C-19 cases, deaths and testing international benchmarks

C19 One Government Centre (1GC) providing a consolidated view of performance and directing activities

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Link in with NPHET and obtain

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identify learning opportunities

ECONOMIC / SPEND

Combine national forecasts with sector and citizen credit and spend status to inform economic position

TRANSPORT

Understand performance and compliance of public transport and private vehicles. Target higher risk flights

Private

TAX

Understand the impact on public purse. Specific focus on higher risk sectors. Quantify cross border implications

HEALTH

Incorporate HSE existing C19 track and trace and health capacity assessment information

WELFARE

Assess the changing impact on state welfare by citizen group and location. Add food bank ongoing demand

government response

Directing the cross

NPHET Level Recommendations

Citizen Communications

Tax and Welfare Interventions

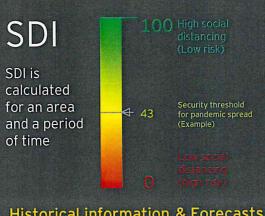
Compliance Enforcement

Education and Transport Policy

Targeted Eircode Interventions

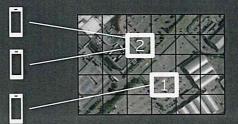
EY Social Distance Index (SDI) provides a rolling 15 minute assessment of social distancing adherence

Mobile data can help us understand citizen behaviours (social distancing, crowd hotspots and travel). Clearly, care is required to balance with citizen rights. EY completed a successful POV for London to assess social distancing using anonymised mobile data for registered citizens. We propose to start with an Irish Social Distance Index while exploring other opportunities with mobile operators.



Using app data to link to areas

Uses mobile data from citizens who have registered for specific apps to count phones in 25m tiles every 15 mins

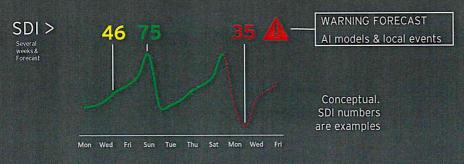


City SDI example during normal time

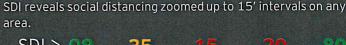


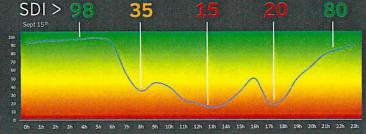
Historical information & Forecasts

Institutions can track SDI history and also anticipate potential concentrations that would need action to prevent pandemic spread.



Hourly Index







Social Distance Index London Demonstration





Combining C-19 prevalence and SDI at Eircode level to better target interventions and identify higher risk areas

Combining C-19 prevalence information with previous and current restrictions adherence (starting with Social Distancing) should inform disease spread and may help us get ahead of future outbreaks



Potential to also add "tile-level" location travel information from mobile operators to explain cross country spread



Other counties are using data and digital to manage their response to C-19 in different ways

Publishing detailed case location South Korea information to inform citizen decisions Spread Awareness and Requiring citizen verifications at specific Singapore Enforcement points to validate compliance Using apps and individual C-19 Status to China restrict access Using of AI to predict outbreaks and **Spread Prediction** California directing response / hospital capacity planning accordingly Using location aggregated mobile data Restriction Level Setting by Germany for population density and movement to area and Policy Design inform policy development Mandatory usage of tracking app for new **Tourist Compliance** Thailand arrivals into country



We propose a rapid one-week design phase to then begin to stand up 1GC in a series of two week agile sprints

1 week 4 weeks 2 week sprints

1. Design and Plan 1GC

2. Stand Up 1GC with Initial Insights

3. Expand and Iterate 1GC

- Run design session to confirm requirement and prioritise
- Shape related data / insight requests
- Meet with government and stakeholder organisations to explain the ask and plan delivery
- Meet with Ireland data teams (GeoHive, Open Data, etc) to confirm available data today and approach to integrating
- Meet with mobile operators and some banks to explain the ask and plan delivery
- Architect the 1GC MSFT Azure Insight Platform (inc data security)
- Define the 1GC people, process, segovernance, location and infrastructure requirements

- Stand up the 1GC location and insight platform
- Incorporate the initial data feeds (from government and social media)
- Stand up 1GC processes and establish formal connections across government and key stakeholders
- Mobilise the SDI Ireland team and confirm the detailed requirement
 - Confirm progress with mobile operators and banks to provide required data
 - Run first 1GC insight overview session to provide consolidated view across government
 - Validate priorities for next 1GC sprint

- Incorporate new (government, SDI, mobile operator, bank, etc) data and analysis into 1GC
- Consolidate into overarching 1GC viewpoint and run related insight sessions

Insight Platform

- Support specific government research requests and input to level recommendations
- Input to government communications approach
- Validate priorities for next 1GC sprint

Iterative and evolve direction with changes in Ireland and priorities, e.g. Christmas, Sporting Finals, winter flu, (hopefully) vaccine rollout, Brexit etc

9 October 2020

Proposed next steps



Validate the objectives and requirements



Engage to develop the detailed plan and (Government and EY) joint resourcing



Mobilise the team and start to stand up 1GC





October 2020



Agenda

- Key Questions to Answer
- Overview of Restriction and Insight Sources
- Phasing of Briefing Schedule and Alert Insights
- Agreement on DoT and wider Government Requirements to Deliver
- Immediate Next Steps

Appendix

- Progress Report
- Detailed Restriction to Insight Mapping
- Detail of Health Insights



Answer four key questions to support government decision making

Where and how is the disease spreading? More likely to come from other sources More likely to come from Health What restrictions are in What impact are the restrictions having? place? Are people complying?



Proposed insight to inform the status and impact for each Restriction

Page 4

31 October 2020

Key Source

LEVEL 5 RESTRICTION	HEALTH	GARDA	TRANSPORT	MOBILE	SURVEY	PAYMENTS	INSIGHT
Work from home							Citizen Disease Contact Drivers, Public Compliance Surveys, Stay at Home Index, Garda Enforcement
Travel < 5k							Garda Enforcement and Fines, Citizen Mobilit
Reduce Citizen Congregations By Type							Citizen Disease Contact Drivers, Garda Enforcement, Social Distance Index
Close Non Essential Businesses							Garda Enforcement and Inspections, Online V Instore Payments Activity
Take Away Food Only							Garda Inspections, Online Vs Instore Paymen Activity
Reduce Public Transport to 25%							Leap Card Usage by type
Wear a Mask							Garda Enforcement and Fines, Citizen Survey
Maintain Social Distance							Garda Enforcement & Fines, Public Compliance Surveys, Social Distance index
Wash Your Hands	Jet Fe					E 在位置	Public Compliance Surveys

C19 One Government Centre (1GC)

ARE HOUSE GATHERINGS DRIVING DISEASE SPREAD?

House Gatherings are responsible for 17% of all identified transmissions. This rises to 45% in Meath There is a strong correlation between House Gathering non-compliance measures and disease spread by small area

We are also seeing a deteriorating trend for disease spread in areas with house gatherings

Track and Trace identifying House Gatherings as key source of transmission Public Compliance Surveys showing Meath with higher cases not complying Mobile Insights showing higher movement and distancing in Meath

Garda Enforcement more active in higher rate areas, inc Meath Disease prevalence trend and early indicator increasing

THE EVIDENCE WOULD SUGGEST YES. MORE IS ALSO REQUIRED IN SPECIFIC CITIES COUNTIES TO ENSURE COMPLIANCE



Briefing Schedule Incorporating Restrictions and Health

Potential to Accelerate

Standing up regular briefings in Room 350 and alerts to update key stakeholders on current status and related insights

W3 BRIEFING (6 NOV) Leverage Existing Insights W5 BRIEFING (20 NOV) Incorporate New Insights

SUBSEQUENT BRIEFING Prioritise & Expand Insights

Adherence to and Impact of Restrictions Public Attitudes and Compliance Survey

Disease Prevalence and

Testing Rates

Stay at Home Index Citizen Movement Social Distance Index Testing Show No Show

Garda Enforcement

Industry Compliance (Pay Instore vs Online)

Garda Activity (TBC)

Garda Business Inspection and Fixed Notice

Disease Prevalence and Spread

Health Capacity Implications Country Comparisons (NI Detail) Citizen Disease Contact Drivers (Early Analysis) Citizen Positivity Drivers Disease Contact Drivers

Wider Societal Impact (Lower Priority)

Welfare and Public Service

Economic Impact Citizen Reported Symptoms (e.g. App, FB Survey)

Citizen Symptoms (Pharma, HSE Web Search)

Bus Usage (e.g. School kids) Public Sentiment (if required)

31 October 2020

C19 One Government Centre (1GC)

YE

Briefing Schedule By Restriction Type

LEVEL 5 RESTRICTION

Work from home

Travel < 5k

Reduce Citizen Congregations By Type

Close Non Essential **Businesses**

Take Away Food Only

Reduce Public Transport to 25%

Wear a Mask

Maintain Social Distance

Wash Your Hands

W3 BRIEFING (6 NOV) Leverage Existing Insights

W5 BRIEFING (20 NOV) Incorporate New Insights

Stay At Home Index

SUBSEQUENT BRIEFING Prioritise & Expand Insights

Public Compliance Survey

Garda Enforcement

Citizen Movement

Citizen Disease Contact Drivers (Early Analysis)

> **Payment** Instore Vs Online

Social Distance Index

Garda Inspections and Fines

Payment Insights

Bus and Transport Usage

Garda Enforcement Garda Inspections and Fines

Public Compliance Survey



What we need DoT and other government departments to deliver

REQUIREMENT	USE CASES	STATUS	DESCRIPTION
Align with NEPHT	All Health Related	For Discussion	 Requirement to understand health findings and rationale for recommendations Input to ongoing Use Case prioritisation Potential attendance at weekly briefing
Access to appropriate mobility data	 Social Distance Index Stay at Home Index Citizen Mobility 	Action Required by DOT	 DOH or other Government Dept to continue and expand 3mobile agreement Note the current agreement is limited (not including Social Distance) and expires soon Review and recommend whether to extend for other mobile operators after Week 5
Stand Up Appropriate Analytics Environment within HSE	Many	Team Priority to Resolve	 Making good progress with HSE Needs continued prioritisation and leveraging existing infrastructure to deliver within required timeframe
Access to Track and Trace detailed data	 Citizen Disease Contact Drivers Citizen Positivity Contact Drivers Citizen Test Show No Show Drivers 	Team Priority to Resolve	 Making good progress with HSE Proposed approach is for1GC Data Scientists to work directly T&T insight team to deliver
Access to public survey data	Public Attitudes and ComplianceCitizen Reported Symptoms	Team Progressing	 DOH to share Amárach public opinion survey University to gain access to detailed FB survey data
Financial Services companies create and share payment related Use Cases	Business Compliance by Industry (Instore Online)	Team Progressing	 AIB and VISA keen to support Confirming with CBI approach, including data sharing agreement
Government Departments to create and share specific Use Cases	Many 2020 C19 One Government	Team Progressing	 Already have access to GeoHive and CSO Confirming specific approach with various government departments, including any data governance and sharing

Next steps

- Deliver prioritised Use Cases (including with input from appropriate stakeholders)
- Stand Up Microsoft Azure insight Platform with HSE
- Stand Up Room 350 and MSFT Azure Hub
- Agree format and cadence for Room 350 Briefings and Alerts

WHAT ELSE IS MISSING?



Appendix

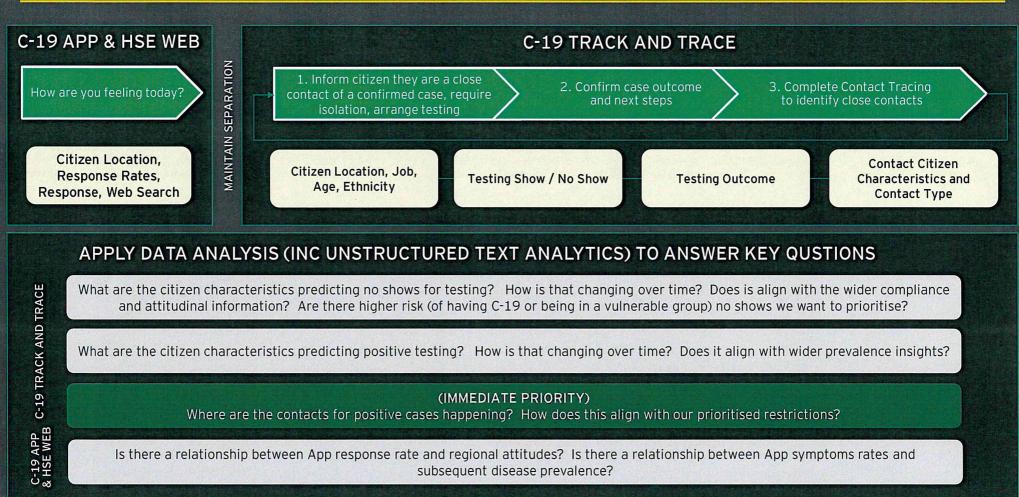


Update On Week 2 Progress

- Established and running PMO and governance
- Agreed SOW for first five weeks with HSE and now being signed
- Agreed and implementing related contract management approach with HSE
- Established Room 350 and Microsoft Hub delivered
- Agreed with DoT Room 350 attendance and C-19 compliance reporting approach
- Reviewed and Prioritised Use Cases versus each Restriction
- Met with Revenue, DEASP, Garda, CSO, HSE, DOH, OSI, CBI, VISA, AIB and 3mobile to confirm detailed requirements and shape approach to deliver
- Completing gap analysis and detailed definition for all priority Use Cases, covering the following data sources:
 - Aggregated Mobile and App data
 - Payments information
 - Public surveys
 - Public Sector information (included CSO and GeoHive)
- Completed detailed assessment of suitable data to use for Social Distance Index for Ireland
- Agreed draft governance approach with HSE and CSO for standing up Insight Platform
- Started workshops with HSE to validate solution architecture and rapid approach for delivering
- Completed first draft of C-19 Insight Register (and will now expand for additional government departments)
- Started to define briefings approach, including cadence with governance departments to receive related inputs



Building on existing HSE Insights to better understand drivers of C-19 spread by region, citizen type and contact type



EY

Phase 0 - insights aligned to restrictions

Restriction	Data Required	Source	RAG	Phase	Туре
People are asked to stay at home. People should work from home unless providing an essential service for which their physical presence is required	Mobile data	Three	High	Phase 0	
	Mobile data	Three	High	Phase 0	New New
	Corss border spend		nigii	Filase 0	INEW
People will be permitted to exercise within a radius of 5 km of their home	patterns	AID/ VISA/CDI	High	Phase 0	New
	Point of Sale	AIB/VISA/CBI	High	Phase 0	New
There will be a penalty for movement outside 5km of home, with exemptions to this for essential work and essential purposes	Mobile data	Three	High	Phase 0	New
	School outbreaks	HSE	- T - WALSEN BOOK - T	and the second of the second of	of the propagation of the same
Schools, early learning and childcare services will continue to remain open			High	Phase 0	Co-Develop
constant of the state of the st	Mobile phone data	Three			
Non-contact training and continue for calculated and shidten authors in a deef 45. All alteratives in the state of the sta	usage	godine Vyra par par menar es	High	Phase 0	New
Non-contact training can continue for school aged children, outdoors in pods of 15. All other training activities should be individual only, with some exemptions	Mobile data	Three	Subject to the		
with some exemptions	14-14-1-1	-	High	Phase 0	New
No social/family gatherings should take place, with the exemptions to this for weddings and funerals	Mobile data	Three	High	Phase 0	New
, , , , , , , , , , , , , , , , , , ,	Contact tracing	HSE	High	Phase 0	Co-Develop
	Mobile data	Three	High	Phase 0	New
It is possible to meet with one other household in an outdoor setting which is not a home or garden, such as a park, including for exercise	Contact tracing	HSE	High	III	DE YOUR SECOND SECOND
	Contact tracing	HSE	mign	Phase 0	Co-Develop
There should be no organised indoor or outdoor events	the transfer of the second second	HSE	High	Phase 0	Co-Develop
	Mobile data	Three	High	Phase 0	New
Essential retail and essential services will remain open	Mobile data	Three	High	Phase 0	New
Public transport will operate at 25% capacity for the purposes of allowing those providing essential services to get to work [School	Mobile data	Three			and the American said
transport unaffected)	to track the last term is a	da Veligios pero a mais de	High	Phase 0	New
In line with current NPHET advice in respect of Level 5, professional, elite sports and inter-county Gaelic games, horse-racing and	Mobile data	Three			
greyhound racing can continue behind closed doors		of the property	High	Phase 0	New
Bars, cafes, restaurants and wet pubs may provide take-away and delivery services only. Wet pubs in Dublin remain closed	Mobile data	Three	High	Phase 0	New
Hotels, guesthouses and B&Bs may remain open, but only to support provision of essential services	Mobile data	Three	High	Phase 0	New
Those aged over 70 and the medically vulnerable are advised to continue to exercise personal judgement. It is recommended that they	Mobile data	Three			
stay at home as much as possible, limit engagement to a very small network for short periods of time, while remaining physically	William Comment	g s mare e e e		William All	E 1
distanced. When taking exercise outdoors, it is important to maintain 2 metres distance from others and wash hands on returning home.					
It is recommended to shop during designated hours only, while wearing a face covering, and to avoid public transport	Lifter interest to the		High	Phase 0	New
Museums, galleries and other cultural attractions will remain closed Libraries will be available for online services only	Mobile data	Three	High	Phase 0	New
Libraries will be available for online services only	Mobile data	Three	High	Phase 0	New
	Mobile data	Three	High	Phase 0	New
Outdoor playgrounds, play areas and parks will remain open with protective measures	Contact tracing	HSE	High	Phase 0	Co-Develop
	Local community	HSE	A CONTRACT	Control (Manyor Chal-	Carlo de Agranda de Carlo de C
	outbreaks		High	Phase 0	Co-Develop
Visits to Long Torm Posidential Care facilities are supposed with the execution of visits required for all visits and the second of the second	Mobile data	Three	High	Phase 0	New
Visits to Long Term Residential Care facilities are suspended with the exception of visits required for critical and compassionate circumstances	Care facility cases /	HSE	CO TOWN COME OF	1492 2503 22-0.32	
CITCUITS CONTROL OF THE PROPERTY OF THE PROPER	outbreaks		High	Phase 0	Co-Develop



Phase 1 - insights aligned to restrictions

Restriction	Data Required	Source	RAG	Phase	Type
	Spend - PoS lunch	AIB/VISA/CBI	Medium	Phase 1	New
	Public transport usage. Leap Cards for Students	NTA	13/13/21		
People are asked to stay at home. People should work from home unless providing an essential service for which their physical presence is required		THE PARTY OF THE P	High	Phase 1	Curated
People are asked to stay at nome. People should work from nome unless providing an essential service for which their physical presence is required	Wage subsidy payments	DEASP	High	Phase 1	Curated
ka ilika ili boji. Bili jilak kuriyaya ne ili iliya ili akazita lagat a masa ili lilin iliya ili a gama sa masa sa a	Use of motorways and main roads (NTA)	NTA	High	Phase 1	Curated
	Internet usage at home	Three	High	Phase 1	New
	No. of breach notices	Garda	High	Phase 1	Curated
People will be permitted to exercise within a radius of 5 km of their home	Social distance index	Three	High	Phase 1	New
IN 2017 - 발생하는 사람들은 10대로 1대를 가입니다. 1대를 가입니다 한 경기에 되었다는 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그	Open data roads	TILES	High	Phase 1	Curated
There will be a penalty for movement outside 5km of home, with exemptions to this for essential work and essential purposes	Lunch spend	AIB/VISA/CBI	High	Phase 1	New
there will be a penalty for movement outside 5km of nome, with exemptions to this for essential work and essential purposes	No. of breach notices	Garda	High	Phase 1	Curated
Schools, early learning and childcare services will continue to remain open	Student Leap Card usage	NTA	High	Phase 1	Curated
There should be no visits to other people's homes or gardens	Close contact details	HSE	High	Phase 1	Co-Develop
Extended household for defined categories of individuals to support those at risk of social isolation and/or mental ill-health	Close contact details	HSE	High	Phase 1	Co-Develop
	Event plans and lists	Facebook	High	Phase 1	New
No social/family gatherings should take place, with the exemptions to this for weddings and funerals	Bookings of events, large bills at restaurants	AIB/VISA/CBI			
TO 100 TO	Event plans and lists	Facebook	High	Phase 1	New
It is possible to meet with one other household in an outdoor setting which is not a home or garden, such as a park, including for exercise	Event plans and lists	racebook	High	Phase 1	New
There should be no organised indoor or outdoor events	Event plans and lists	Facebook	High	Phase 1	New
	Credit / Debit card in city centres / shopping	AIB/VISA/CBI	TOWNER OF THE PERSON		7
The first that the fi	locations		High	Phase 1	New
Essential retail and essential services will remain open	Level of online shopping spend	AIB/VISA/CBI	High	Phase 1	New
	Use of motorways and main roads	TII	High	Phase 1	Curated
新聞, 4 x x x x x x x x x x x x x x x x x x	Use of public transport	NTA	High	Phase 1	Curated
	Public transport usage	NTA	- T		П
Public transport will operate at 25% capacity for the purposes of allowing those providing essential services to get to work [School transport unaffected]			High	Phase 1	Curated
	Spending information (Pointof Sales & ATM	AIB/VISA/CBI			
Programmer in the state of the free research of the first of the section of the s	withdrawls)		High	Phase 1	New
Bars, cafes, restaurants and wet pubs may provide take-away and delivery services only. Wet pubs in Dublin remain closed	No. of breach notices	Garda	High	Phase 1	Curated
Report of the article of the state of the st	Events plans and lists	Facebook	High	Phase 1	New
	Eat in vs takeaway spending	AIB/VISA/CBI	Medium	Phase 1	New
Those aged over 70 and the medically vulnerable are advised to continue to exercise personal judgement. It is recommended that they stay at home as	Use of senior travel passes	NTA	High	Phase 1	Curated
much as possible, limit engagement to a very small network for short periods of time, while remaining physically distanced. When taking exercise outdoors,	Card transaction locations relative to registered	AIB/VISA/CBI	- Ingi	i nose i	Caracca
it is important to maintain 2 metres distance from others and wash hands on returning home. It is recommended to shop during designated hours only,	address	rib, viori, coi			7.1
while wearing a face covering, and to avoid public transport	GW SOCK	AL 2	Medium	Phase 1	New
	Change in public transport patterns near locations	NTA			
Museums, galleries and other cultural attractions will remain closed	Digital Control of the Control of th		Medium	Phase 1	Curated
made and year less and other cultural districtions will remain closed	No. of breach notices	Garda	High	Phase 1	Curated
Market Control of the	Debit/ Credit Card activity near location	AIB/VISA/CBI	High	Phase 1	New
Libraries will be available for online services only	Card activity near location compared to pre	AIB/VISA/CBI	e tell leading in	-	- 1 V/V
and the state of t	restriction levels	100	High	Phase 1	New
Outdoor playgrounds, play areas and parks will remain open with protective measures	Credit / Debit card spend near location during	AIB/VISA/CBI			27 F 10
	working hours		Medium	Phase 1	New
Visits to Long Term Residential Care facilities are suspended with the exception of visits required for critical and compassionate circumstances	No. of breach notices	Garda	JE NO.		
	WASHINGTON TO THE PARTY OF THE		High	Phase 1	Curated
Citizen adherence and sentiment	Compliance symptom survey	Facebook	High	Phase 1	New
上中国大学的大学,在一个时间,但是自己的大学的大学的主义的主义的主义的主义的主义的主义的主义的主义的主义的主义的主义的主义的主义的	Sentiment analysis by region	Twitter	High	Phase 1	New



Phase 2 - insights aligned to restrictions

				-	
Restriction	Data Required	Source	RAG	Phase	Type
Schools, early learning and childcare services will continue to remain open	No. of students not at school	DES	Low	Phase 2	
Schools, early learning and childcare services will continue to remain open	No. of Absent Teachers	DES	Low	Phase 2	
Schools, early learning and childcare services will continue to remain open	No. of online classes	DES	Low	Phase 2	
Non-contact training can continue for school aged children, outdoors in pods of 15. All other training activities should be individual only, with some exemptions	GAA Return to Play details	GAA	Medium	Phase 2	
Non-contact training can continue for school aged children, outdoors in pods of 15. All other training activities should be individual only, with some exemptions	SportLomo details	IRFU	3 80 543 2	Phase 2	1, 30
Religious services will be available online	Number of online users for religious services	HSE	Low	Phase 2	Co-
Libraries will be available for online services only	Volumes of online users compared to pre- restriction	Libraries Ireland	Low	Phase 2	



C19 One Government Centre (1GC) Data Group Meeting Update

5 November 2020



Introduction to the C-19 One Government Centre (1GC)

OBJECTIVE

Helping improve visibility and decision making with a cross government and society view of Ireland's performance in tacking this crisis

NCLUDING

Providing updates of overall performance to Central Government

Adding Capacity to Select Departments for additional insights

Creating and Sharing Select New (Non-Health) Insights

EXAMPLE

e.g. Room 350 Briefing Room in Government Buildings e.g. Data Scientists to support HSE Contact Tracing Text Analytics e.g. Social Distance Index providing view of citizen congregation



An appropriate Governance structure to direct insight prioritisation and ensure appropriate data governance

1GC INSIGHT GOVERNANCE GROUP

- Senior cross government leaders providing direction to 1GC on future required insights
- Signs off related 1GC data requests (both 1GC accessing and sharing data)
- Participates in monthly 1 hour wavespace session to verify future requirement and confirm sign of

1GC INSIGHT WORKING GROUP

- Cross government data owners shaping and directing related insight priorities and requests for the Governance Group
- Responsible for actioning related data request when signed off by 1GC Insight Governance Group
- Specific monthly session the week before the above wavespace session to inform the requests

1GC INSIGHT TEAM

- Specific team focused on creating and sharing cross government insights
- Has overall responsibility for coordinating the 1GC insight Governance Group and Working Group and making the related data requests
- Only has access to specific data sets agreed by the 1GC Insight Governance Group



1GC Working Principles

Directed by the requirement to help senior government decision making

Collect once, use many times
Build from existing insights and capabilities wherever possible

Respect cross government decision governance 1GC only has access to data agreed by the Insight Governance Group

Regular engagement with each "Insight Owner" to ensure briefings are correct and aligned

Rigorous approach to compliance and security Default assumption that 1GC only has access to aggregated and not citizen data

Iterate and evolve requirements to meet changing nature of this crisis



Engaging with a breadth of Government and Private Sector Stakeholders to ensure a consistent and aligned approach (TBC)

ORGANISATION	DISCUSSION	CONTACTS
CSO		
OSI		
DOH		
HSE		
Revenue		
DEASP		
Garda		
СВІ		
TII		
NTA		
AIB		
VISA		
3 Mobile / CK Delta		

Overview of 1GC Briefing Schedule Incorporating Use Cases

Requires 3mobile Data. Confirming approach with Health Stakeholders and DOH for 3mobile contract

Standing up regular briefings in Room 350 and alerts to update key stakeholders on current status and related insights

W3 BRIEFING (6 NOV) Leverage Existing Insights W5 BRIEFING (20 NOV)
Incorporate New Insights

SUBSEQUENT BRIEFING Prioritise & Expand Insights

Adherence to and Impact of Restrictions Public Attitudes and Compliance Survey

Stay at Home Index Citizen Movement Social Distance Index Testing Show No Show

Garda Enforcement

Disease Prevalence and

Testing Rates

Industry Compliance (Instore vs Online)

Garda Activity (TBC) Public Transport and Car

Garda Business Inspection and Fixed Notice

Disease Prevalence and Spread

Health Capacity Implications

Country Comparisons Citizen Disease Contact Drivers and Super Spreaders (Early Analysis)

Citizen Reported Symptoms (e.g. App, FB Survey) Citizen Positivity Drivers Disease Contact Drivers

Citizen Symptoms (Pharma, HSE Web Search)

Wider Societal Impact (Lower Priority) Welfare and Public Service

Economic Impact

Bus Usage (e.g. School kids) Public Sentiment (if required)

EY

4 November 2020

C19 One Government Centre (1GC)

Social Distance Index (SDI) provides a rolling assessment of social distancing adherence

Mobile data can help us understand citizen behaviours (social distancing, crowd hotspots and travel). Clearly, care is required to balance with citizen rights. EY completed a successful POV for London to assess social distancing using anonymised mobile data for registered citizens. We propose to start with an Irish Social Distance Index while exploring other opportunities with mobile operators.

SDI is calculated for an area and a period of time 100 High social distancing (Low risk) Security threshold for pandemic spread (Example) Low social distancing photographic in the security threshold for pandemic spread (Example) Low social distancing strength of time Historical information & Forecasts

Using app data to link to areas

Uses mobile data from citizens who have registered for specific apps to count phones in 25m tiles every 15 mins



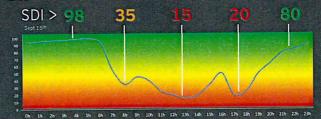
Institutions can track SDI history and also anticipate potential concentrations that would need action to prevent pandemic spread.



City SDI example during normal time



SDI reveals social distancing zoomed up to 15' intervals on any area.



Implementation approach for Ireland

- A detailed analysis of the same app data for Dublin and Cork showed specific quality issues for Dublin
- We have therefore been working with 3mobile to validate the same approach using mobile operator data
- 3 mobile have c 30% market penetration in Ireland and can provide every sub-container including 50 of their mobile phones
- We are completing a detailed assessment of a sample of this data. The initial findings are v positive. We also expect the SDI to be built and made available in GeoHive
- Detailed user requirements will then be defined in a working session with health and other stakeholders. Dublin and Cork will be the initial focus
- Note this is dependent on an extended contract with 3mobile



Next steps

- Work with appropriate government departments and private sector to deliver the prioritised Use Cases
- Confirm detailed requirements for Social Distance Index and input to DoH to deliver contract
- Stand Up stand alone Microsoft Azure Insight Platform with HSE environment
- Stand Up Room 350 and begin Government Briefing
- Agree format and cadence for Room 350 Briefings and Alerts
- Run the next 1GC Insight Governance Group and Insight Working Groups to confirm next priorities



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ORG	DISCUSSION	CONTACTS
CSO	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 	 Padraig Dalton, CEO Paul Morrin, Deputy CEO Kieran Culhane, Senior Statistician
DOH	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 3 mobile contract 	 Muiris O'Connor, Assistant Secretary Alan Cahill, Statistics and Analytics Service Sarah Glavey, Principal Officer
HSE	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 1GC Azure Set Up Data provision for initial Use Cased 	 Joe Ryan, National Director Helen Coughlan, CTO Yvonne Goff, Director, Transformation Programme Tom Laffan, OoCIO Emmett Carolan, Technology Lead
GeoHive	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 	 Lorraine McNerney, OSI CIO Justin Gleeson Maynooth University Eamonn Clinton, OSI Mick Byrne ESRI Ireland
Revenue	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 	Keith Walsh, Principal Officer, Statistics & Economic Research

ORG	DISCUSSION	CONTACTS
DEASP	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 	Dermot Corcoran, Principal Officer, Bl
Garda	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach 	 Andrew O'Sullivan, CIO Lois West, Deputy Head of Analysis Sara Parsons, Deputy Head of Analysis
СВІ	 Insight Governance Group and Insight Working Group Defining specific Use Cases and approach, including linking in with AIB and VISA 	Rory McElligott, Head of Statistics
NTA	Input to specific Use Cases and approach	Mark Stopes, Head Of Business Intelligence
AIB	Input to specific Use Cases and approach	Jonathan Duggan, Head of Data and Analytics Donnchadh MacAodha, Reg Relations
VISA	Input to specific Use Cases and approach	Chris Hulm, UKI Government Relations
3 Mobile / CK Delta	Input to specific Use Cases and approach	Ken McGrath, Government Lead, Cian Maher, Solution Architect, Will Thurley, CK Delta, Geoff McGrath, CK Delta

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C19 One Government Centre (1GC)

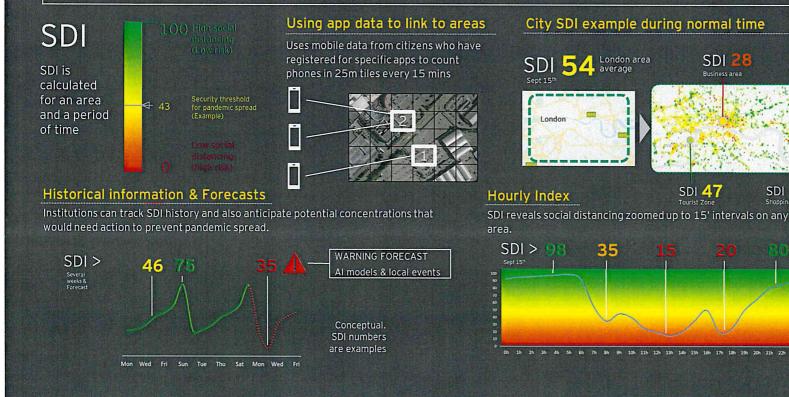
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1GC update - Week 3

Agenda





- Room 350 walkthrough
- Initial Dashboard review



Progress update



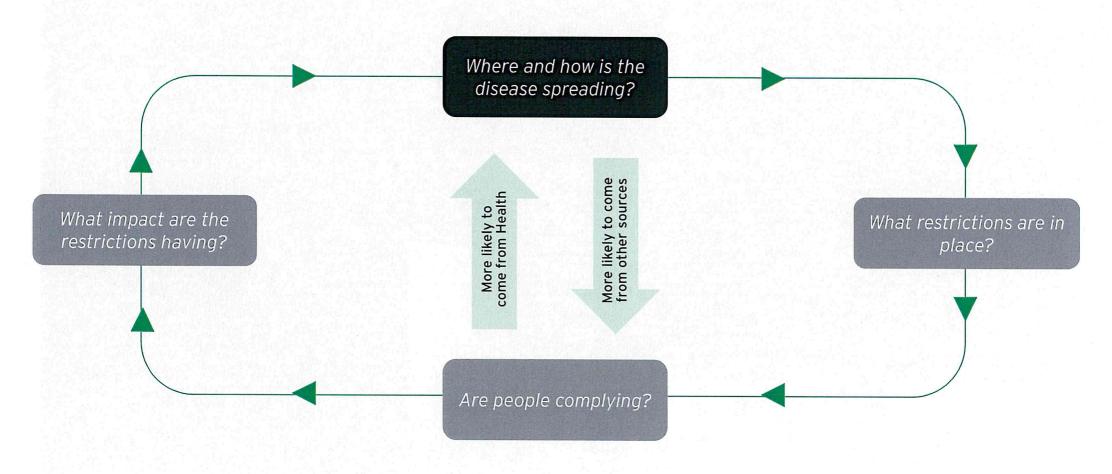
- Stakeholder update
- Briefing and Alert plans

1 GC Update

ROOM 350 walkthrough



Answer four key questions to support government decision making



Progress update

GOVERNANCE AND SET UP

- ▶ SOW complete and signed
- ▶ Onboarded Data Science team onto 1GC and expecting HSE logons today
- ► Continued detailed workshops with HSE to define 1GC Azure detailed architecture and delivery plan
- ► Delivered and configured two MSFT Hubs for Room 350
- ► Draft Room 350 Briefing and Alert Approach defined and for review today
- ► Decision Governance high level design defined and included in the appendix

USE CASE DESIGN

- Received Ireland county restriction detail now to be incorporated into impact analysis
- ► Meeting with DOH to introduce project and agree next steps re 3 mobile data
- ► Follow up meetings with CSO, AIB, 3 mobile, HSE, NTA and updates with Revenue, Garda, DEASP to progress Use Cases
- Agreed with AIB Use Case data request and expect to include insights next week
- ➤ Specific discussions with HSE to incorporate Disease Indicator metrics (App, Web Search)
- ► Completed detailed assessment of 3mobile sample data and in process of validating detailed Social Distance Index design with Covid19 Data Coordination Group and Garda

INSIGHT DEVELOPMENT

- Worked with HSE to define and deliver first Health "existing insights" Use Case, Data Request and Prototype for review today
- ► Complete initial analysis into FB Ireland compliance and included in briefing today
- ► Completed initial desktop research into C-19 restrictions and impact academic papers
- Completed initial analysis into peer country restriction impact to now be expanded
- ► Completed first 1GC Insight "coffee table" book, including summary of the above desktop research, and available in Room 350
- ► Added to TII transport insight distribution list and expect to include insights next week

Where we are with the key DoT and Government Dependencies

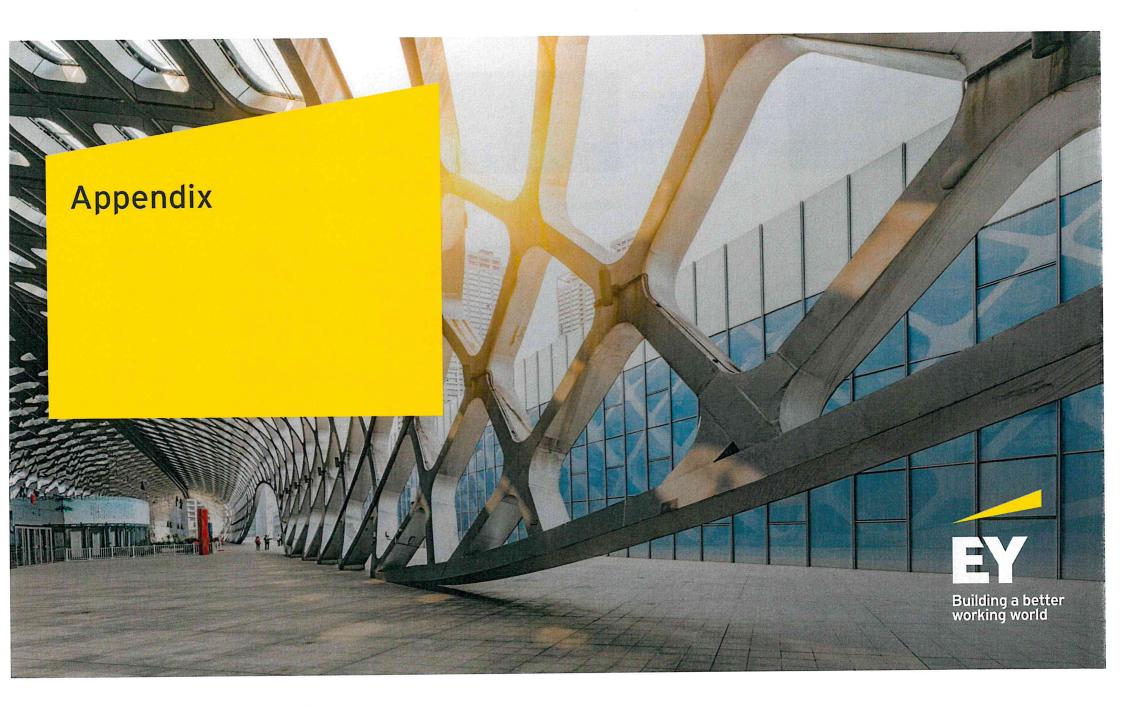
REQUIREMENT	USE CASES	STATUS	DESCRIPTION
Align with NEPHT	All Health Related	For Discussion	 Requirement to understand health findings and rationale for recommendations Input to ongoing Use Case prioritisation Potential attendance at weekly briefing Updates with C-19 Data Group and DOH this week
Access to appropriate mobility data	Social Distance IndexStay at Home IndexCitizen Mobility	Action Required by DOT	 Initial contract request went into DOH and now agreeing detailed definition with various stakeholders Review and recommend whether to extend for other mobile operators after Week 5
Stand Up Appropriate Analytics Environment within HSE	Many	Team Priority to Resolve	 Now in detailed definition with HSE to define Needs continued prioritisation and leveraging existing infrastructure to deliver within required timeframe
Access to Track and Trace detailed data	 Citizen Disease Contact Drivers Citizen Positivity Contact Drivers Citizen Test Show No Show Drivers 	Team Priority to Resolve	 Proposed approach is for 1GC Data Scientists to work directly T&T insight team to deliver Request now with HSE to grant access to identified individuals
Access to public survey data	Public Attitudes and ComplianceCitizen Reported Symptoms	Team Progressing	 DOH to share Amárach public opinion survey University to gain access to detailed FB survey data
Financial Services companies create and share payment related Use Cases	Business Compliance by Industry (Instore Online)	Team Progressing	 AIB now agreed to provide data and expected next week Will assess detail and extend to VISA as required
Government Departments to create and share specific Use Cases	Many	Team Progressing	 Already have access to GeoHive and CSO Confirming specific approach with various government departments, including any data governance and sharing

Briefing and Alerts

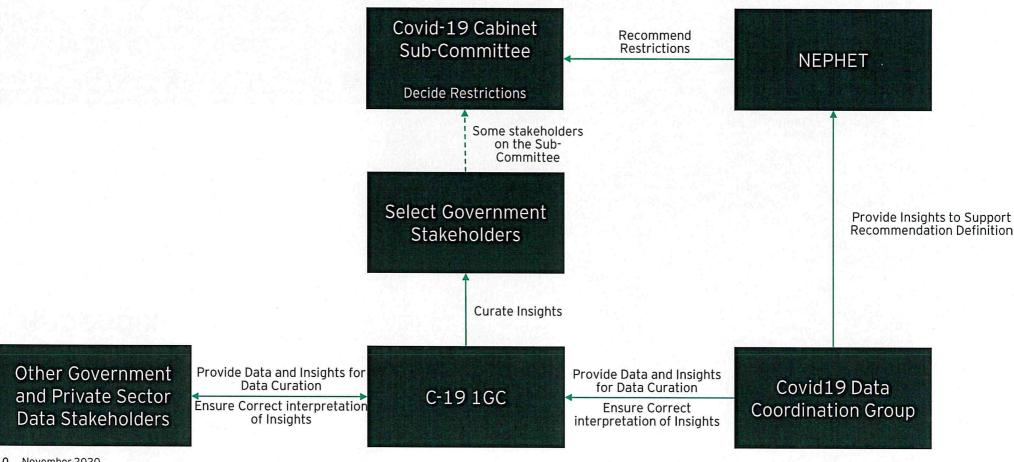
Briefings	Daily Briefings	8:15, Noon, 3pm Each Day Ad Hoc 8am to 6pm	 Regular briefing providing overview of status at country and priority counties and associated impact of Restrictions Expands with additional data insights being delivered. Also, highlights any new international / Irish research Potential to give country or insight specific versions to extended stakeholder list as requested
	Deep Dive Reports	Wed 1:30pm	 Deeper dive on specific agreed area with briefing delivered by 1GC and specific identified individual restrictions Includes specific restriction deep dive, vaccine rollout, etc
	Event Brief	As Required	 Ad hoc provision of specific briefing paragraph to senior government stakeholders providing context to a specific event
Alerts	Alert Update	As Required	 WhatsApp Update in the event of agreed specific criteria being breached. Criteria focused on case numbers accelerating or hospital approaching capacity As required, follow up quickly with short paper responding to specific issues

Next Steps

- Update Room 350 Use Case Design based on your feedback
- Expand Room 350 for new Use Case Insights (shown in room)
- Run Room 350 Briefings and Alerts as agreed
- Stand Up Microsoft Azure insight Platform with HSE and begin T&T detailed
- Agree detailed design of Social Distance Index and confirm DOH Contract



1GC curates the insights for senior government stakeholders with no impact on C-19 government decision governance



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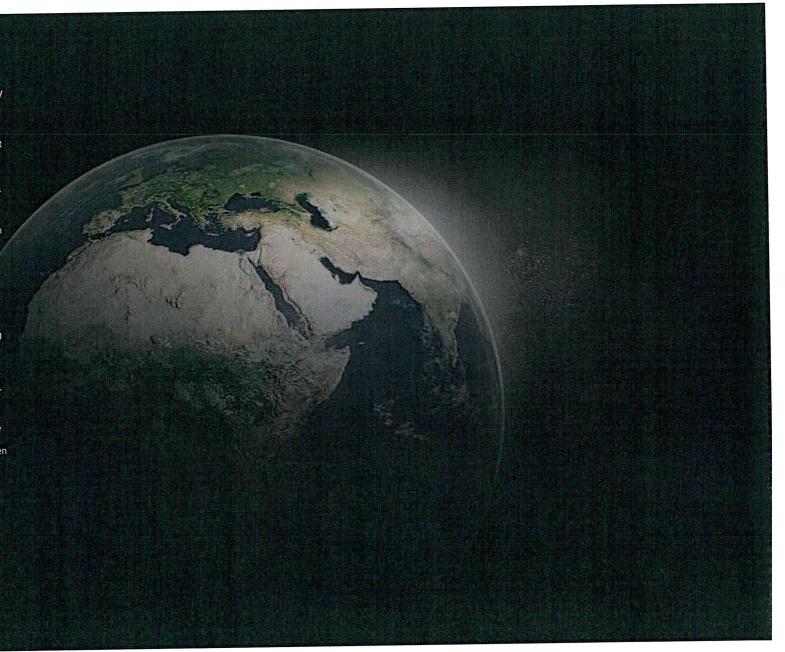
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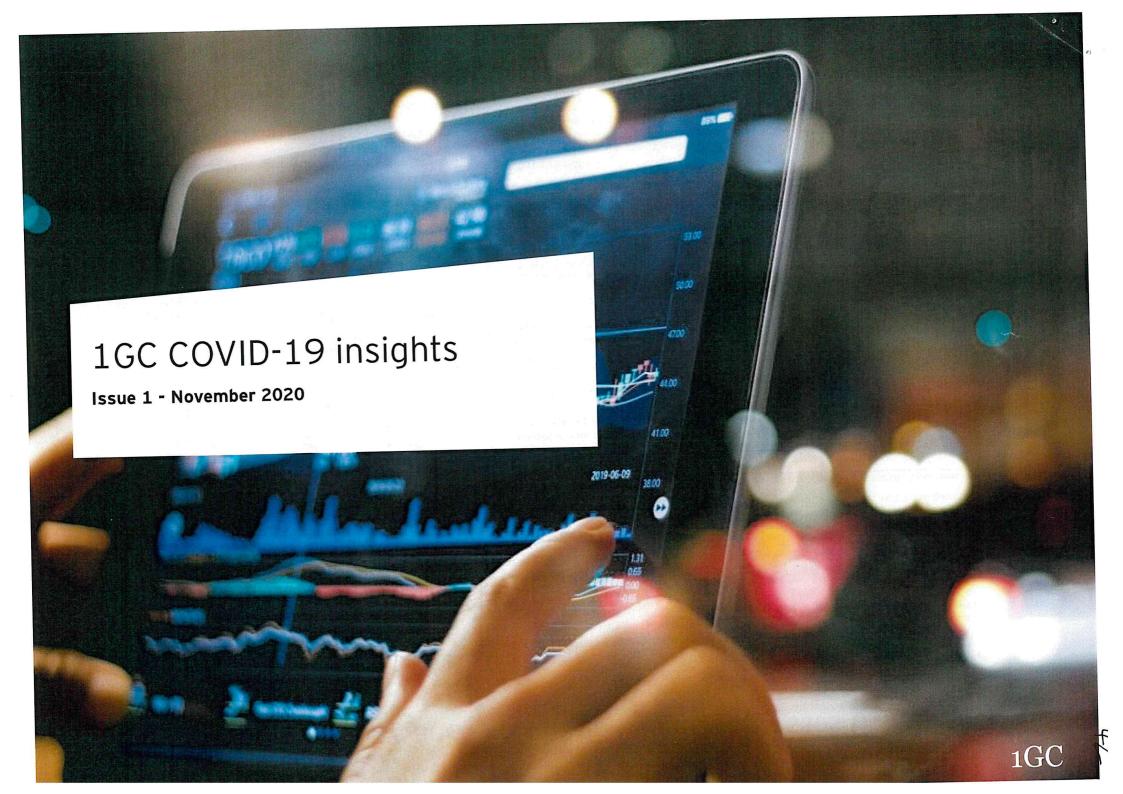
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Stopping super-spreaders and associated events supresses the spread of C-19

Super-spreaders and associated events can lead to a major increase in C-19 cases and can account for a large proportion of cases in a given region.

Limiting the capacity of events and banning others which are more suspectable to super-spreading, such as an indoor mass gatherings, can be effective in stopping spread.

Social characteristics identified

- Work in or visit crowded places often
- Travel to many places because of the nature of their work
- Jobs including; religious leaders, restaurant, hotel, or hospital staff
- Work or live in a confined space which increases the possibility of transmission
- Risk takers may wilfully disregard instructions to quarantine or intention to harm others
- Regularly attend public gatherings, often religious gatherings

(Indian Journal of Public Health, Issue 0019, 557X)

RO describes how many cases of a disease an infected person will go on to cause. This scenario outlined is RO=2.

Source: How Scientists Quantify the Intensity of an outbreak Like COVID-19

Clinical characteristics identified

- Tend to have a heavy dose of infection and shed more virus meaning they are more infectious
- May have more severe cough, thereby more likely to spread infection through droplets
- In most instances, have spread infection before they even know that they are infected which can lead to super-spreading events

(Indian Journal of Public Health, Issue 0019, 557X)

Super spreaders and super-spreading events

- Super-spreaders are individuals who generate a more-than-expected number of secondary cases
- Super-spreading events (SSEs) are where an unexpectedly large number of cases are generated from a single gathering
- Super-spreading events are not a new phenomenon and have been reported with other coronavirus outbreaks, including severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome
- Research has identified multiple bottleneck episodes, that are most likely associated with super-spreader hosts, explain COVID-19 pandemic to a large extent
- Prevention and mitigation of SSEs depends on quickly recognizing and understanding these events, particularly within healthcare settings. By better understanding the transmission dynamics of these events, it aids teams in effective prevention and control measures which work to help limit the spread of the disease

Source: Journal of Hospital Infection, Volume 105, Issue 4, August 2020, Genome Research doi: 10.1101, Emerging Infectious Diseases, Volume 26 - June 2020)

Case study in Georgia, USA

- Approximately 20% of all C-19 infections in the state of Georgia in the early stages of the COVID19 pandemic were proven to directly link to 2% of the confirmed cases
- The framework build on a model which was developed for modelling Ebola outbreaks during the epidemic in Western Africa
- The analysis used Georgia Department of Public Health Data between March 7 May 2020 and included both rural and urban areas

Source: <u>PNAS</u>, Characterizing superspreading events and age-specific infectiousness of SARS-CoV-2 transmission in Georgia, USA May 2020

Case study in Boston, MA

- Viruses carrying the characteristic mutation from the <u>BioGen conference in Boston at the end of February 2020 infected hundreds of people in the Boston area.</u> This studied nearly 800 coronavirus genomes, and was conducted by researchers at the Broad Institute, Massachusetts General Hospital, the Massachusetts Department of Public Health and several other institutions in the state. A further finding is that <u>victims could be traced as far away as Alaska</u>, Senegal and Luxembourg, showing the potential for super-spreading events to lead to outbreaks across many countries
- As of mid-July, the variant had been found in about one-third of the cases sequenced in Massachusetts and 3
 percent of all genomes studied thus far in the United States
- The study is probably the largest genomic analysis of any U.S. outbreak so far and is among the most detailed looks at how coronavirus cases exploded in the pandemic's first wave

Source: PubMed.gov, Phylogenetic analysis of SARS-CoV-2 in the Boston area highlights the role of recurrent importation and superspreading events, August 2020

Irish restrictions

- Research shows that limiting the numbers of people who can congregate limits superspreading events
- The Irish level 5 restrictions follow this guidance and approach

Next steps

- Analyse test and trace data to identify super spreader events
- Test hypothesis regarding super spreader events linked to certain job types
- Use analysis to help to inform potential restrictions on events and gatherings

C-19 Insights - Issue 1 - November 2020

The most at risk occupations for contracting C-19 are also those most at risk of severe outcomes

High-contact professions are at highest risk of contracting C-19. These occupations also have the highest risk of severe outcomes.

Additional consideration should be given to how infection risk can be mitigated e.g. adequate PPE, barriers, paid sick leave.

ESRI: key findings (Ireland)

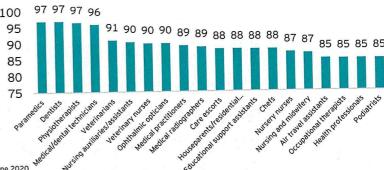
- There are differences in health and socio-economic status between occupations in Ireland
- Occupations at highest risk of severe outcomes are those deemed essential for running society. These tend to be lower-paid and less secure professions
- Consideration should be given to how infection risk can be mitigated in certain occupations e.g. adequate PPE, barriers/screens/contactless payments

Occupations at highest risk for COVID-19	COVID-19 chronic illness	% aged 50+	Live in deprived quintile
Housekeeping	34%	53%	27%
Caring personal services	22%	34%	28%
Welfare and housing professionals	19%	32%	25%
Road transport drivers	26%	47%	28%
Health, social services managers	16%	41%	18%
Agriculture and related	20%	63%	15%
Construction operatives	14%	35%	29%
Sales and retail assistants	13%	17%	25%
Cleaners	18%	28%	40%
Process plant occupations	23%	22%	28%
All workers	15%	28%	17%

Source: <u>ESRI</u>, Differences in risk of severe outcomes from COVID-19 across occupations in Ireland, July 2020

CSO: key findings (Ireland)

- In general, there was a correlation between 100 working in proximity to others and increased exposure to disease
- Paramedics, dental practitioners and physiotherapists ranked themselves as working in closest proximity to others
- Medical and dental technicians (including dental nurses) are again the group who rated themselves as being most exposed to disease while nursing and midwifery professionals are the second-highest ranked group for such exposure



Proximity by occupation, top 20 (100= max)

Case study - COVID transmission across six Asian countries

- ► The five occupation groups with the most cases were healthcare workers (22%), drivers and transport workers (18%), services and sales workers (18%), cleaning and domestic workers (9%) and public safety workers (7%)
- Possible work-related transmission played a substantial role in early outbreak (47.7% of early cases)
- Occupations at risk varied from early outbreak (predominantly services and sales workers, drivers, construction laborers, and religious professionals) to late outbreak (predominantly HCWs, drivers, cleaning and domestic workers, police officers, and religious professionals)
- Work-related transmission is considerable in early COVID-19 outbreaks, and the elevated risk of infection was not limited to healthcare workers. Implementing preventive/surveillance strategies for high-risk working populations is warranted Source: Work-related COVID-19 transmission in six Asian countries/areas: A follow-up study, May 2020

Case study - construction workers in Texas (US)

- Resuming construction work during shelter-in-place orders was associated with increased hospitalisation risks in the construction workforce and increase transmission in the surrounding community. Construction workers had a nearly 5fold increased risk of hospitalization based on data through to August 2020, compared with other occupational categories
- Enacting workplace safety policies and providing paid sick leave could protect essential workers in high-contact industries and prevent further widening of disparities in COVID-19 morbidity and mortality

Source: Research paper. Estimated Association of Construction Work With Risks of COVID-19 Infection and Hospitalization in Texas, October 2020

ECDC: key findings (EU/EEA and UK)

- Most exposed workers are those who are in close physical proximity to others, particularly when working indoors, sharing transport or accommodation, in the absence of mitigation measures
- Aside from healthcare, large numbers of clusters occurred in the food packaging and processing sectors, factories and manufacturing and offices
- Occupations are commonly linked to socio-economic status which can also affect the individual's risk of COVID-19
- Increased focus on testing for COVID-19 in workplace settings, combined with robust polices on physical distancing, hygiene and cleaning, appropriate use of PPE and hand hygiene will help prevent further outbreaks. Robust surveillance and contact tracing are essential, as are clear protocols on how to address outbreaks when they are detected Source: ECDC, COVID-19 clusters and outbreaks in occupational settings in the EU/EEA and the UK, August 2020

Next steps

I► Evaluate the trends in COVID-19 cases and outcomes by occupational group to inform future interventions by sector

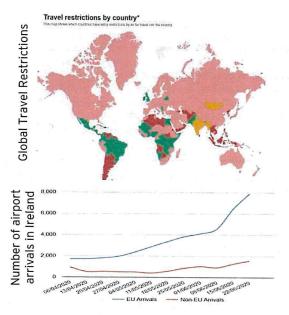
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Countries employing more stringent travel restrictions have seen lower number of cases per capita

There is a strong correlation between the number of cases per million and the level of travel restrictions across countries.

Travel restrictions can play a valuable role in slowing the growth of cases and are most effective when utilised with quarantine and observation procedures.

- Ireland and the UK are in have employed fewer C-19 restrictions with regards to air travel than some of their European counterparts. Ireland's Chief Medical Officer stated that there is a "substantial risk associated with international travel" and will play an important role in keeping figures low once brought under control on a national level. A correlation can be seen between the application of strict restrictions and a the number of cases per million
- A number of studies concluded that travel bans/restrictions can play a valuable role in slowing the growth of cases [1][2] and are most effective when utilised with quarantine and observation procedures. It is worth noting that one of these studies looked at a travel ban from China during initial outbreak where the ban would have been most effective in delaying an early spike in cases



IS.	Completely closed: Only citizens,
	residents returning home, or people
	in other special circumstances may
	enter the country - 51 countries
W.	Partially open: Entrance into the
	country may depend on the
	traveller's citizenship, point of
	origin, or other specific regulations

Reopening soon: The country has announced a specific date for reopening, but certain entry requirements may still apply - 5 countries

- 97 countries

No restrictions: The country has no formal restrictions on entry by air, but is still monitoring the situation and may have other travel policies in place - 67 countries

There was significant growth in the number of arrivals into Ireland between April and June, however, this is substantially less than June 2019 as overseas arrivals fell 97%.

CSO reporting of data related to the number of arrivals into the country ceased in June. We intend to incorporate this data into our regular insights.

Detail of	border control measures for selected countries (*denoting island nation)	Cases/ m	Deaths /m
New Zealand*	Border closed to most visitors; all arrivals are tested and quarantined for 14 days	335	5.1
South Korea	All arrivals must submit a health declaration form, install a mobile phone app, have temperature screening, testing, and 14-day quarantine	525	9.1
Hong Kong	Border closed to visitors; all arrivals must submit a health declaration form online, have temperature screening and testing on arrival, and serve a 14-day quarantine	717	14.2
Japan*	All arrivals are subject to 14-day quarantine, and travellers from selected countries are denied entry or, if allowed for exceptional reasons, subject to testing	813	14.1
Australia*	Borders are currently closed for most international visitors, and a 14 day quarantine is required for those able to travel	1,083	36.3
Norway	Reopened borders to specified Nordic regions with low rates of transmission; arrivals from outside these regions are subject to 10-day quarantine	3,935	53.1
Germany	People entering or returning to Germany from a country designated as a risk area are tested and required to quarantine	6,688	128.7
Denmark	Arrivals from 'banned' countries are required to provide a 'worthy' purpose to enter and must provide proof of a negative test taken no more than 72 hours prior to entry	8,562	124.9
Singapore *	Border closed to most visitors; all arrivals must submit a health declaration form, serve a 14-day Stay Home Notice, and be tested	9,918	5.0
reland	Arrivals from non-green regions are requested to restrict movement for 14 days. All Arrivals must complete a Public Health Passenger Locator Form prior to arrival	12,768	392
England	Arrivals from particular countries must provide their journey and contact details, and self-isolate at home for 14 days	15,617	733.1
Spain	Fully reopened borders to all countries from July 1, 2020 (inbound travellers will not be quarantined)	26,935	776

Next steps

- Further investigation to determine the full impact of travel restrictions on the overall prevalence of C-19
 cases
- Provide insight into the prospective 'value' for Ireland in implementing greater restrictions, by comparing potential reduction of case numbers against economic cost

Sources: [1] The effectiveness of full and partial travel bans against COVID-19 spread in Australia for travellers from China during and after the epidemic peak in China , [2] Travel-related control measures to contain the COVID-19 pandemic: a rapid review , [3] NTA, [4] Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe, <u>Kayak Travel Restrictions</u>, <u>Financial Times</u>

Rise in cases does not appear to be solely linked to return to schools

The return of children to school in Ireland has coincided with a second wave of C-19 cases. Trends in other European countries indicate that schools may not be to blame for the increase.

Studies from the US suggest that appropriate testing and quarantine measures can prevent clusters occurring in school settings.

The rise in cases in wave 2 in Europe does not appear to be solely related to schools re-opening

- Only considering trends in Irish C-19 cases, it would appear that reopening schools contributed heavily to the initiation of a second wave of cases - aligning with a study by the University of East Anglia
- However, when also considering countries such as Denmark, France and Belgium, where a
 phased return to school took place between 15 April and 31 July, a similar spike in cases is not
 observed in the following period, making the link between students returning to school and
 greater cases less clear
- The rise in cases may be attributable to reduction in school compliance due to reduced concern by young people, combined with a return to school and therefore an increase in close contacts

The coming weeks are a critical indicator for schools

With the rest of the country in lockdown, we should be able to evaluate the impact of schools on the overall spread of C-19 within Ireland, inform key decisions moving forward

Case study - C-19 outbreak in summer camp in Maine (US)

A camp in Maine implemented a multi-layered detection and isolation strategy, and managed to identify and isolate three asymptotic cases, preventing an outbreak in its 1,022 attendants. Using two-week quarantines before the camp started, limiting indoor interactions and staggering dinner times, this camp was successfully able to control C-19 spread

Sources: Preventing and Mitigating SARS-CoV-2 Transmission – Four Overnight Camps, Maine, June-August 2020

Case study - C-19 outbreak in school retreat - Wisconsin (US)

 A camp in Wisconsin had an outbreak when a student, who had tested negative one week prior to the camp, developed C-19. The camp did not have the means to quarantine the student for the necessary 14 days, and this case lead to led to 116 camp attendees (76%) being diagnosed with C-19

Source: COVID-19 Outbreak at an Overnight Summer School Retreat — Wisconsin, July-August 2020,

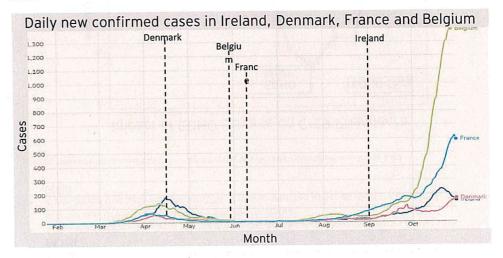
C-19 testing and schools reopening

While these examples show that rigorous screening and testing help to control C-19 spread in children, implementing this approach in schools may not be realistic. With students travelling to and from school each day, required levels of quarantining and isolation cannot be guaranteed. Furthermore, most reopening plans instead focus on screening for C-19 symptoms and an estimated 40% of Covid-19 cases are asymptomatic, and 50% of transmissions occur from asymptomatic persons. Testing in schools will be difficult, but random testing could help. After its teachers union threatened to strike over safety concerns, New York City added monthly random screening testing for 10-20% of staff and students, with more frequent testing in hot spots

Despite challenges, there are significant implications to closing schools again. A survey conducted in Ireland found 4% of adult males and 17% of adult females may have to give up work if primary schools close again while 36% of adults with a secondary school student had a child that was worried about having fallen behind due to school closures in Spring



Source: Social Impact of COVID-19 Survey August 2020: The Reopening of Schools



Source: FT Coronavirus tracker: see how your country compares

Next steps

- Monitor the rate of change in daily cases over the coming weeks to understand the degree of impact schools have on case numbers
- Further investigate impacts of compliance and public sentiment to understand the effects on case numbers

Source: The Missing Piece - SARS-CoV-2 Testing and School Reopening,

Opening restaurants and bars has been linked to a rise in C-19 cases. However, evidence suggests operating with restrictions may not significantly increase spread

Opening restaurants has generally coincided with considerably increased levels of C-19. However, caution should be taken as a willingness to eat out may indicate more relaxed attitudes to C-19, and coincides with countries having less restrictions.

More detailed analysis is required to better understand the impact of restaurants on C-19 spread.

Case study: Impacts of restaurants (USA)

- Adults with positive C-19 test results were twice as likely to have reported dining at a restaurant than those who did not
- The difficulty in maintaining social distance in restaurants and the need to remove masks during eating were cited as two major issues with keeping restaurants open

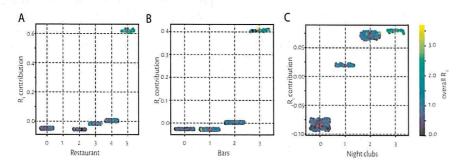
Source: Community and Close Contact Exposures Associated with COVID-19, July 2020

Case study: Impact of bars, restaurants and nightclubs (Switzerland)

*Study not yet peer reviewed

- Opening restaurants, bars and night clubs rose the reproduction ratio in the country by 0.03, 0.05 and 0.25 respectively
- The below graph shows the impact on the reproduction ratio (Rt) opening restaurants, bars and night clubs at different levels of lockdown (with 0 representing complete closure) across 26 cantons in Switzerland. Restaurants and bars operating with higher levels of restrictions (social distancing, restricting numbers) have little effect on Rt. However, with no restrictions, Rt rises significantly in each case. This indicates that restaurants and bars can be reopened with some restrictions without greatly increasing the reproduction ratio of C-19

Source: How Policies on Restaurants, Bars, Nightclubs, Masks, Schools, and Travel Influenced Swiss COVID-19 Reproduction Ratios, October 2020

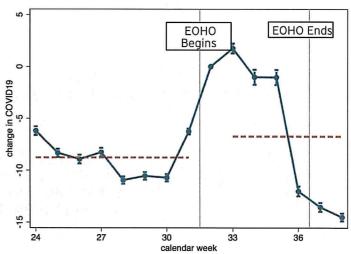


Case study: Eat out to help out (UK)

- Areas with higher take-up of the scheme (3 31 August) aimed at boosting the restaurant sector, saw a notable increase in new C-19 infection clusters within a week of its introduction. They also saw a deceleration in infections within two weeks of the programme ending
- Areas that exhibited notable rainfall during the prime lunch and dinner hours on days the scheme was active recorded lower infection incidence
- It was found that between 8% and 17% of newly detected infection clusters could be linked to EOHO

Source: Subsidizing the spread of COVID19: Evidence from the UK's Eat-Out-to-Help-Out scheme, October 2020

Impact of EOHO Scheme on C-19 Prevalence



Next steps

- Analyse the impact of restaurants on C-19 spread, including social distancing and other proactive measures in place
- Help to inform the analysis on reopening restaurants, pubs and other social activities and the level of restrictions that must be in place to do this successfully

Compliance with mobility and social restrictions are key to preventing new cases

A high correlation has been found between mobility and the growth rate of cases in the US, and low levels of mobility help reduce the spread of C-19. Irish mobility levels during level 5 have not fallen to the same rates as March/April indicating lower compliance with restrictions in place.

- It is clear that C-19 has affected mobility levels throughout the country. Even during the period of lower restrictions during the summer months, levels of mobility, especially walking and transit travel, remain considerably lower than pre lockdown levels
- Despite restrictions implemented during the second wave of C-19, mobility levels in Ireland did not drop to the levels seen during the first lockdown in March. With restrictions during both waves curtailing travel, this indicates that compliance during wave 2 has been lower than during wave 1
- During the first wave, there were many unknowns about the virus details such as full symptoms and mortality rate. This may have contributed to greater public compliance with restrictions
- During wave 2, public understanding of C-19 has been higher, with more known about the virus. The death rates, severity of sickness and recovery time are better understood, and this likely leads to less public fear of catching the virus, especially in younger people who are far less likely to be seriously or fatally ill
- This issue may also be exacerbated by lockdown fatigue, nearly eight months into the pandemic

Case study - Association between mobility and C-19 transmission (US)

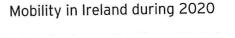
- Mobile data was used to examine the impact of mobility on C-19 growth rates. The study found a strong correlation between growth rates and mobility for 20 of the 25 counties analysed. This indicates that levels of mobility are a key indicator in the spread of C-19 in many cases
- ► No distinction was made between low and high risk trips (with no indication of journey length or the number of stops made), however, mobility was nevertheless found to be highly significant when attempting to prevent the spread of C-19
- Whilst Irish analysis has not yet taken place, the higher levels of mobility during the second C-19 wave relative to the wave 1, coupled with the higher number of daily cases seen shows that such a relationship is worth investigating

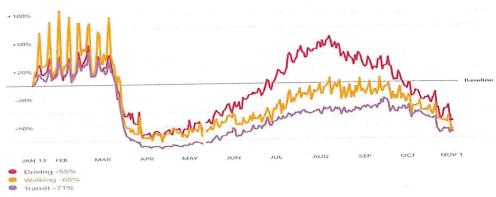
Source: Association between mobility patterns and COVID-19 transmission in the USA: a mathematical modelling study

Mobility and compliance with restrictions in Ireland

- Higher mobility indicates a lower level of compliance with level 5 restrictions, acting as further evidence for lower willingness to comply with government measures during the second wave of C-19
- Compliance with self-oriented measures such as washing hands, social distancing when queueing and using hand sanitizer has risen since March, according to the Amárach public opinion survey (2/11). However, social compliance measures, such as staying at home and contacting older relatives and friends, remain considerably lower than March, April and even May. This indicates that compliance both in terms of mobility and social measures were lower during the second wave of C-19

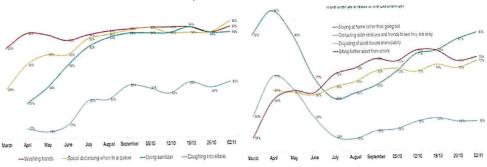
Source: Amárach Public Health Survey (02/11)





Source: Covid-19 Apple Mobility

Ireland public compliance surveys



Source: Amárach Public Health Survey (02/11)

Next steps

 Further investigate the levels of mobility throughout Ireland at a more granular level to better understand levels of travel and compliance on a county-by-county basis

1GC Priority Analysis (DRAFT TO BE UPDATED)

#	Area	Summary of points
1	The impact of restrictions	 There are a number of county examples, including Dublin, Cork, where there are interesting differences of the timing of restriction versus the impact. Noted that we now have 'control groups' for certain measures based on activity over the summer (Rol). Additional evidence and control groups from measures in NI. For example, the impact of Level 3 (pubs versus no pubs in different parts of the country) Level 3 + versus Level 5. the curve seems to be turning a corner on basis of Level 3+ rather and Level 5. Action deeper analysis on the restriction (level by level, disaggregated measures) versus impact for control groups. Consider a county by county analysis, and then group by theme. In addition, assess if any useful information from NI restrictions/impact (public data)
2	The impact of key events <u>versus</u> overall trends	 Hypothesis is that the sharp rise in many counties has been caused by events / noncompliance / behaviours rather level of restrictions not having desired impact A potential example is the county final wins in Cavan and Meath contribute significantly. Another potential example is celebrations in pubs, house parties Basic analysis on Cavan based on GeoHive local electoral area, strong correlation between county final winner location and strong disease incidence rate. Would also be helpful to look at this by age profile for these outbreaks and how they differ from the wider county and country age profile. It is not necessarily the player cohort that are the offenders Action county by county analysis to identify trends versus key events causing disease spread. This includes considering the time of GAA finals and their potential relationship with specific outbreaks.
3	The different dynamics (Laois V Offaly V Kildare)	 Useful to look at Kildare, Laois and Offaly. All 3 counties went into the same county level hard restrictions due to meat plant outbreaks The disease incidence curves for each county differs. Offaly and Laois appeared to recover more quickly. Action linked to (3) above, deeper county level analysis required for this cohort of counties

#	Area	Summary of points
4	The impact of improved communications on reducing your close contacts	 Deliberate change in communications re your number of close contacts on [18 Oct check date]. Prof Philip Nolan simple messaging on "halving your close contacts" Perception that this simple messaging landed well and had desired impact. Action perform analysis to investigate if this is a consistent trend.
5	Precision of location information available	 The analysis was currently at county level based on the location of testing Deeper analysis at local electoral area was being made available weekly through GeoHive Objective is to get Eircode home address for each person being testing. Would facilitate linking across numerous state datasets through CSO (welfare, revenue). This can only improve our contact tracing intelligence. HSE has been asked to progress this but not clear what current status is. Discussed that it should be possible to ascertain Eircode from address. The options discussed which need to be progressed by 1GC team. This level of analysis is critical for set of briefings: Understand the coding of the GeoHive data. Some is already translating this to local electoral area. Obtain data if helpful Understand the current status of geocoding with the HSE, what progress have they made and when will this be ready Look for alternative approaches e.g. we know that GP referral system SWIFTQ has the addresses, we know we have mobile numbers of citizens could they be reveres looked up, etc
6	Contact tracing process and data limitations	 The detailed Track and Trace data is worth further consideration. This included dashboards showing number of close contacts by county and transmission source from contact tracing There are limitations with this data, as current contact tracing system is under pressure with large volume of cases (light touch on many cases, versus deep intelligence) 1GC team to review how to present this information and do additional analysis on the contact tracing information. Action as already planned, do additional analysis on contact tracing data. Is this telling us anything further, important to link this to 5 above 1GC team to consider if alternative CT approach on a particular county would be helpful

#	Area	Summary of points
7	The impact of cross border, specific discussion on Donegal	 There is undoubtedly a cross border effect and the situation in NI is worrying given the latest trends Cross border movement is having an impact. Most likely that this is being caused by ROI movement over border and bringing disease back (as restrictions lower in NI for a period) Donegal used as an example and disease incidence in Ballyshannon Vs Donegal Town Vs Letterkenny / Buncranna (likened to "suburbs of Derry" in terms of social activity etc). Numbers increase dramatically as get close to border Action as per (2), (3), (5) deeper analysis required by local electoral area. Addition of mobility data critical to understanding cross border activity.
8	Impact of alcohol	 Generally accepted that there is a link to alcohol for many spread events. This is not just pub but also off licence sales The previous restriction where €9 meal was required intended to reduce potential for large amounts of alcohol to be consumed in pub environment Concern that this is simply shifting to off licence and house party environment. Consideration being given to restrictions / limits on alcohol sales / curfews. Action is it possible to engage with multiples to get access to alcohol sales data
9	Additional data to be included dashboards for reference	 Whilst other health, research and economic data is available and being analysed separately, it would be very helpful to bring all of this into the same place This is particularly important for briefings with politicians 1GC team to action the following specific datasets and incorporate into the county / LEA analysis: Cases / Hospitalisations / Deaths Excess mortality analysis performed by CSO Hospitalisations Median age of deaths Economic factors such as small business claims, PUP
11	Mobility data	 Getting mobile data is of key importance Currently with DOH but contract not yet finalised 1GC requested that this needs to be in place and data flowing by end of this week (13 Nov) if we are to include any of this analysis in upcoming restriction discussions. Aim to also get Stay at Home index from March if possible Analysis around stay at home index versus social distance index to be separated. The latter will take longer to do Action DOH to finalise contract this week

#	Area	Summary of points
		 1GC team to continue to monitor and push. Action 1GC team to consider additional requests to other mobile companies
12	Considerations for Christmas restrictions	 The current early stage thinking is that the next set of restrictions likely to be Level 3 + "Christmas package" The level of restrictions is likely to be Level 3 with some things allowed from Level 2 and some things not allowed from Level 4. There is a need to understand our typical behaviours at Christmas versus the types of events that have caused us problems versus the potential restriction measures that could be implemented. This will help inform the decision on restriction measures. The analysis to be performed by 1GC important to help with which specific measures to be implemented It is unlikely that the Government would impose localised restrictions as communication is difficult and risk of social tourism Action as per (1), understand for each of the levels what is different and what do we know to help inform upcoming restriction discussions

Next steps and alignment with key Government meetings

Specific actions are noted in the table above. The next 10-15 days will be critical as the numbers fall and continued focus on the impact on Christmas. Key points to note:

- Level 5 restrictions are scheduled to expire 1 December 2020. Current thinking is that we will
 continue at Level 5 for full 6 weeks to help drive disease incidence down
- The key NPHET and cabinet covid sub committee meetings will be 26 or 27 November. These
 meetings will decide the next restriction levels.
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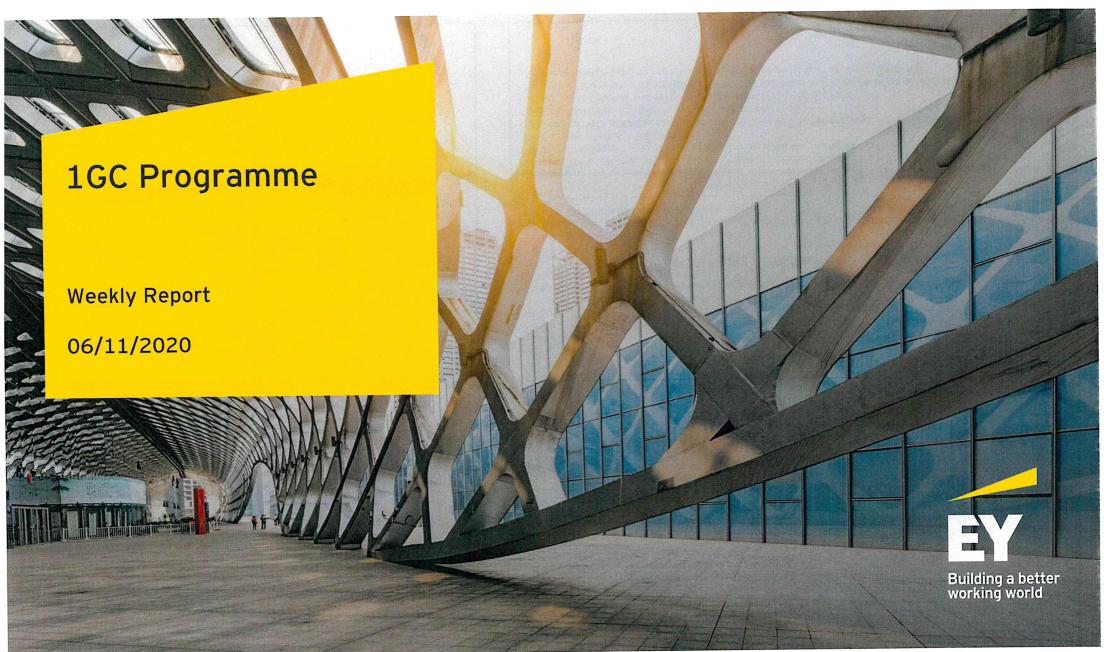
For discussion with team, key focus areas:

- National and county by county review of evidence on compliance and impact of restrictions retrospective
 - What have the various control groups told us about specific restrictions / easing of restrictions
 - There are specific reasons for high cases in many counties that deviate from national average, evidence needed e.g. gaa, border crossings, super spreader, etc as this is an important part of story
 - Better location and mobility information required to help assess compliance and correlation to key events
- Anticipating where pressure will come from in the immediate term and consideration for what this means restrictions:
 - The key pressure will come from non-essential retail, church gatherings, pubs, restaurants. In particular Christmas is a critical trading period for many of these sectors.

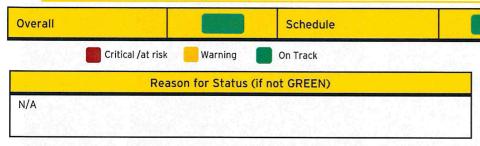
- o In addition, from a wider public perspective culturally there are many things that we like to do at Christmas (house visits, large family gatherings, mini breaks, etc)
- Need information to help navigate decisions around next round of restrictions
 - [E.g. 1 illustrative example we have seen from the summer that indoor social house gatherings caused significant spread and there is a tendency to see increased house visiting / gatherings at Christmas, so we need to continue with a restriction on family only visits]
 - E.g. 2 illustrative example social gatherings in wet pubs involving alcohol (no food) remain a concern, and we know that Christmas is a time when we gather socially with people we haven't seen for a long time, so we can only open pubs that serve food and impose a time limit of]

Creating holistic view

- To help support decision making, 1GC needs to create a holistic view of the health and non-health data.
- o This rounded view will be particularly important for politicians



1GC Status Report (06/11/2020)



Milestone	Status	Date Last Period	Due Date
Confirm Phase 1 Use Case Priorities		N/A	29/10
Complete all 1GC Data Requests		N/A	03/11
Establish 1G Briefing Room		N/A	05/11
Complete 1GC Briefing: Existing Insights		N/A	06/11
Complete Initial Restriction Analysis		N/A	13/11
Receive 3 Mobile Data / Commence SDI Build		N/A	16/11
Deploy Azure Environment		N/A	ТВС
Complete 1GC Briefing: Expanded Insights		N/A	20/11

Highlights / Risks / Issues / Decisions DoH contract with Three Mobile

Key Achievements

Cost

▶SOW complete and signed by HSE

Scope

- Continued detailed workshops with HSE to define 1GC Azure detailed architecture and delivery plan
- ▶ Completed initial desktop research into C-19 restrictions and impact academic papers
- ▶ Completed first 1GC Insight "coffee table" book, including summary of the above desktop research, and available in Room 350
- Delivered and configured two MSFT Hubs for Room 350
- Draft Room 350 Briefing and Alert Approach defined and for review today
- •Worked with HSE to define and deliver first Health "existing insights" Use Case, Data Request and Prototype for review today
- ▶Completed initial analysis into peer country restriction impact to now be expanded
- Follow up meetings with CSO, AIB, 3 mobile, HSE, NTA and updates with Revenue, Garda, DEASP to progress Use Cases
- Added to TII transport insight distribution list and expect to include insights next week
- Completed detailed assessment of 3mobile sample data and in process of validating detailed Social Distance Index design with relevant stakeholders
- Made first formal request to DOH summarising 3 mobile contract data requirements to be validated with the above group plus Garda
- Delivery team mobilised
- Set up physical space (i.e. a dedicated room / demonstration environment within Government Buildings) which was ready for the first briefing on Friday 6th November

Planned Activities / Forward Look

- •Continue the workshops with the HSE to finalise the detailed architecture for the 1GC Azure platform
- Focus on building out use cases analysing the impact of the restriction levels implemented to date across Ireland for Covid-19 e.g. Level 2,3, 3+, 5 etc.,
- ▶ Hold session with relevant stakeholders for the Stay at Home Index and the Social Distancing Index
- ▶Prepare November 13th briefing content and presentations
- •Get access to GeoHive and assess use cases currently in the platform
- Build out of the product documentation including the initial development of the product backlog
- ► Continue formalising data requests and begin to receive data from sources e.g. AIB

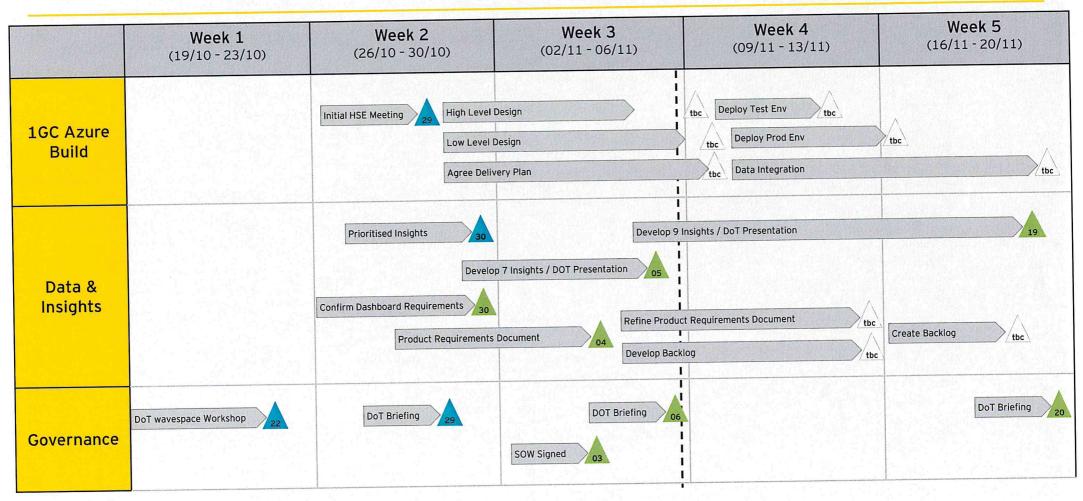
1GC Detailed Update

Area	Achievements	Forward Look
Governance	Achievements SOW complete and to be signed by HSE Delivered and configured two MSFT Hubs for Room 350	Forward Look • Formalise request for Three Mobile to progress the contract with the DoH
1GC Azure Build	Achievements • Continued detailed workshops with HSE to define 1GC Azure detailed architecture and delivery plan	 Forward Look Continue the workshops with the HSE to finalise the detailed architecture for the 1GC Azure platform Finalise the data ingestion model that will be used for the 1GC Azure Platform Explore additional areas of consideration e.g. access rights, user role management etc
Data & Insights	 Achievements Completed initial desktop research into C-19 restrictions and impact academic papers Completed first 1GC Insight "coffee table" book, including summary of the above desktop research, and available in Room 350 Draft Room 350 Briefing and Alert Approach defined and for review today Worked with HSE to define and deliver first Health "existing insights" Use Case, Data Request and Prototype for review today Complete initial analysis into FB Ireland compliance and included in briefing today Completed initial analysis into peer country restriction impact to now be expanded Received Ireland county restriction detail now to be incorporated into impact analysis Meeting with DOH to introduce project and agree next steps re 3 mobile data Follow up meetings with CSO, AIB, 3 mobile, HSE, NTA and updates with Revenue, Garda, DEASP to progress Use Cases Added to TII transport insight distribution list and expect to include insights next week Agreed with AIB Use Case data request and expect to include insights next week Specific discussions with HSE to incorporate Disease Indicator metrics (App, Web Search) Completed detailed assessment of 3mobile sample data and in process of validating detailed Social Distance Index design with relevant stakeholders Made first formal request to DOH summarising 3 mobile contract data requirements to be validated with the above group plus Garda 	 Forward Look Focus on building out use cases analysing the impact of the restriction levels implemented to date across Ireland for Covid-19 e.g. Level 2,3, 3+, 5 etc., Confirming the Art of the Possible with Three Mobile with regard to the Stay at Home Indiand the Social Distancing Index Hold session with relevant stakeholders for the Stay at Home Index and the Social Distancing Index Prepare November 13th briefing content and presentations Get access to GeoHive and assess use cases currently in the platform Build out of the product documentation including the initial development of the product backlog Engage with the an Garda Siochana, Revenue, DESAP, NTA, TII on the data requirements and requests for use cases to be delivered over the coming weeks Collect and analyse citizen spend data from AIB (i.e. spend per sector, online vs. In-store and branch footfall)

1GC Resource Tracker

ea	Team Member	Role	Last 3 Week (Days)	Next Week Forecas (Days)
	Paul Pierotti	Responsible Executive	15	5
Governance	Emmanuel Adeleke	Programme Manager and Stakeholder Engagement Lead	15	5
	Emma O' Sullivan	Programme Office	14	5
1GC	Nigel Foley	Delivery Lead	14	5
Azure Build	Paul Browne	Cloud Engineer	5	5
	Cillian Leonowicz	Insight Design Lead	15	5
	Rory Herron	Insight Design Consultant	15	5
	Nikunj Maheshwari	Data Scientist	2	5
	Graham Catchpole	Senior Data Analyst	3	3
	Ross Morrison	Data Engineer	0	5
Data & Insights	Rory Murphy	Data Analyst	14	5
Data & Ilisignts	Fiona Murphy	Data Scientist	10	5
	Eve Bannon	Senior Data Analyst	10	5
	John Hallahan	Op Model Design Manager	9	5
	Cillian Bisset	Data Analyst	14	5
	Nitin Goutham	Data Scientist	6	5
	Kenny Hazlett	Data Engineer	7	5
	Helena O'Dwyer	wavespace Lead	3	1
Strategic Design	Donal Browne	wavespace Manager	1	1
	Daniel Murphy	wavespace Manager	1	1

1GC Plan on the Page





























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1GC Priority Analysis

#	Area	Summary of points
1	The impact of restrictions	 There are a number of county examples, including Dublin, Cork, where there are interesting differences of the timing of restriction versus the impact. Noted that we now have 'control groups' for certain measures based on activity over the summer (Rol). Additional evidence and control groups from measures in NI. For example, the impact of Level 3 (pubs versus no pubs in different parts of the country) Level 3 + versus Level 5. the curve seems to be turning a corner on basis of Level 3+ rather and Level 5. Action deeper analysis on the restriction (level by level, disaggregated measures) versus impact for control groups. Consider a county by county analysis, and then group by theme. In addition, assess if any useful information from NI restrictions/impact (public data). Priority for this week
2	Considerations for Christmas restrictions	 The current early stage thinking is that the next set of restrictions likely to be Level 3 + "Christmas package" The level of restrictions is likely to be Level 3 with some things allowed from Level 2 and some things not allowed from Level 4. There is a need to understand our typical behaviours at Christmas versus the types of events that have caused us problems versus the potential restriction measures that could be implemented. This will help inform the decision on restriction measures. The analysis to be performed by 1GC important to help with which specific measures to be implemented It is unlikely that the Government would impose localised restrictions as communication is difficult and risk of social tourism Action as per (1), understand for each of the levels what is different and what do we know to help inform upcoming restriction discussions Priority this week
3	The impact of key events <u>versus</u> overall trends	 Hypothesis is that the sharp rise in many counties has been caused by events / noncompliance / behaviours rather level of restrictions not having desired impact A potential example is the county final wins in Cavan and Meath contribute significantly. Another potential example is

#	Area	Summary of points
		 Basic analysis on Cavan based on GeoHive local electoral area, strong correlation between county final winner location and strong disease incidence rate. Would also be helpful to look at this by age profile for these outbreaks and how they differ from the wider county and country age profile. It is not necessarily the player cohort that are the offenders Action county by county analysis to identify trends versus key events causing disease spread. This includes considering the time of GAA finals and their potential relationship with specific outbreaks. Priority for this week
4	The different dynamics (Laois V Offaly V Kildare)	 Useful to look at Kildare, Laois and Offaly. All 3 counties went into the same county level hard restrictions due to meat plant outbreaks The disease incidence curves for each county differs. Offaly and Laois appeared to recover more quickly. Action linked to (3) above, deeper county level analysis required for this cohort of counties Priority for this week
5	The impact of improved communications on reducing your close contacts	 Deliberate change in communications re your number of close contacts on [18 Oct check date]. Prof Philip Nolan simple messaging on "halving your close contacts" Perception that this simple messaging landed well and had desired impact. Action perform analysis to investigate if this is a consistent trend. Priority for this week
6	Precision of location information available	 The analysis was currently at county level based on the location of testing Deeper analysis at local electoral area was being made available weekly through GeoHive Objective is to get Eircode home address for each person being testing. Would facilitate linking across numerous state datasets through CSO (welfare, revenue). This can only improve our contact tracing intelligence. HSE has been asked to progress this but not clear what current status is. Discussed that it should be possible to ascertain Eircode from address. The options discussed which need to be progressed by 1GC team. This level of analysis is critical for set of briefings: Understand the coding of the GeoHive data. Some is already translating this to local electoral area. Obtain data if helpful

#	Area	Summary of points
		 Understand the current status of geocoding with the HSE, what progress have they made and when will this be ready Look for alternative approaches e.g. we know that GP referral system SWIFTQ has the addresses, we know we have mobile numbers of citizens could they be reveres looked up, etc
7	Contact tracing process and data limitations	 The detailed Track and Trace data is worth further consideration. This included dashboards showing number of close contacts by county and transmission source from contact tracing There are limitations with this data, as current contact tracing system is under pressure with large volume of cases (light touch on many cases, versus deep intelligence) 1GC team to review how to present this information and do additional analysis on the contact tracing information. Action as already planned, do additional analysis on contact tracing data. Is this telling us anything further, important to link this to 5 above 1GC team to consider if alternative CT approach on a particular county would be helpful Priority for this week
8	The impact of cross border, specific discussion on Donegal	 There is undoubtedly a cross border effect and the situation in NI is worrying given the latest trends Cross border movement is having an impact. Most likely that this is being caused by ROI movement over border and bringing disease back (as restrictions lower in NI for a period) Donegal used as an example and disease incidence in Ballyshannon Vs Donegal Town Vs Letterkenny / Buncranna (likened to "suburbs of Derry" in terms of social activity etc). Numbers increase dramatically as get close to border Action as per (2), (3), (5) deeper analysis required by local electoral area. Addition of mobility data critical to understanding cross border activity. Priority for this week
9	Impact of alcohol	 Generally accepted that there is a link to alcohol for many spread events. This is not just pub but also off licence sales The previous restriction where €9 meal was required intended to reduce potential for large amounts of alcohol to be consumed in pub environment Concern that this is simply shifting to off licence and house party environment. Consideration being given to restrictions / limits on alcohol sales / curfews.

#	Area	Summary of points
		 Action is it possible to engage with multiples to get access to alcohol sales data Priority to get the data this week. Analysis next week
10	Additional data to be included dashboards for reference	 Whilst other health, research and economic data is available and being analysed separately, it would be very helpful to bring all of this into the same place This is particularly important for briefings with politicians 1GC team to action the following specific datasets and incorporate into the county / LEA analysis: Cases / Hospitalisations / Deaths Excess mortality analysis performed by CSO Hospitalisations Median age of deaths Economic factors such as small business claims, PUP Initial updates this week. Focus on expanding next week
11	Mobility data	 Getting mobile data is of key importance Currently with DOH but contract not yet finalised 1GC requested that this needs to be in place and data flowing by end of this week (13 Nov) if we are to include any of this analysis in upcoming restriction discussions. Aim to also get Stay at Home index from March if possible Analysis around stay at home index versus social distance index to be separated. The latter will take longer to do Action DOH to finalise contract this week 1GC team to continue to monitor and push. Action 1GC team to consider additional requests to other mobile companies Priority defining and positioning the contract this week

Next steps and alignment with key Government meetings

Specific actions are noted in the table above. The next 10-15 days will be critical as the numbers fall and continued focus on the impact on Christmas. Key points to note:

- Level 5 restrictions are scheduled to expire 1 December 2020. Current thinking is that we will
 continue at Level 5 for full 6 weeks to help drive disease incidence down
- The key NPHET and cabinet covid sub committee meetings will be 26 or 27 November. These
 meetings will decide the next restriction levels.
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Creating holistic view

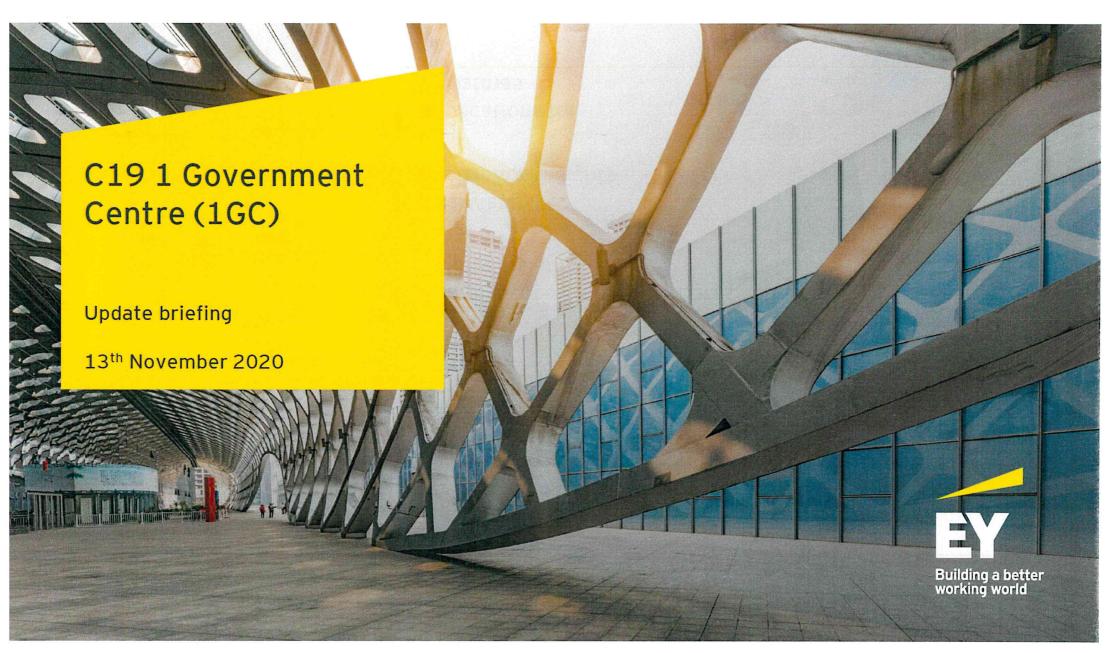
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1GC Priority Use Case Analysis Based on Briefing Session 13 Nov 2020

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDEN CY	OWNER
Ireland Restriction Impact	Retrospective Analysis of introduction and removal of restrictions in Ireland to seek to isolate individual value. Informs future restrictions decisions	 Complete sensitivity analysis for 7-15 days outcome Add university opening and going online Add NI restrictions for Border Counties Complete Restriction Analysis Confirm and if yes complete multivariate analysis 	VERY HIGH	None	Graham and Fiona
International Restrictions Impact	Retrospective Analysis of introduction and removal of restrictions in Europe to seek to isolate individual value. Informs future restrictions decisions	 Increase to 12 countries Add additional identified restriction data Complete Restriction Analysis Confirm and if yes complete multivariate analysis 	VERY HIGH	None	Nitin and Nik
Current Increase Explanation	Understand the recent slowing / reversal of cases reduction	 Understand the recent changes by LED Overlay most recent outbreak data, e.g. funerals, etc Overlay with recent mobility data, e.g. TII, Google, Apple Compare with May decline to see what is different 	VERY HIGH	None	TBC
Track and Trace Text Analytics	Detailed analysis of contact explanations to better understand causes of outbreaks	 Complete analysis for "communion parties", "hotels" and "schools/universities" Quantify positivity rate for each category and compare versus average around the same time Add Roscommon final to GAA analysis 	HIGH	None	Kenny
Christmas Disease Rates	Understand disease growth and restrictions implications over Christmas	 Incorporate Christmas Disease Forecast Estimates from NEPHET to understand impact of Christmas period by county / LED Inform related restrictions analysis accordingly 	HIGH	None	ТВС
Facebook Survey Tool	Create Excel showing Facebook Survey compliance by county and restriction	 Add all "compliance" self reporting metrics, e.g. mask wearing, hand washing, social distancing, etc Create front end allowing user to select and compare counties over time and with restriction milestones highlighted 	MED	None	TBC
County Analysis	Detailed LED level analysis per county showing key drivers of spread	 Complete for Cork, Waterford, Galway, Limerick and Carlow Complete specific comparison for all border county LEDs and confirm relationship with geographic proximity 	MED	None	TBC

1GC Priority Use Case Analysis Based on Briefing Session 13 Nov 2020

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDEN CY	OWNER
Impact of Alcohol	Understand the impact of alcohol sales on outbreaks to better inform related restriction setting	 Get AIB data (dependency) Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting AIB Data	Manny
Dashboard Enhancements	Create an interactive dashboard to support senior government stakeholder briefings	 Create view for politicians summarising counties: Cases / Hospitalisations / Deaths Excess mortality analysis performed by CSO Hospitalisations Median age of deaths Economic factors such as small business claims, PUP 	MED	None	Graham and Fiona
Senior Briefings	Prepare briefing plan and story board for senior government stakeholders	 Enhance our county and national analysis as outline above, bring all analysis up to date Improve the restriction impact analysis Integrate measures of compliance, particularly trending in the last number of weeks Integrate wider sources such as deaths, excess mortality, etc 	HIGH	None	Eve, Manny
Christmas Briefing	Our ability to monitor compliance will be critical for December	Consider an enhanced daily analysis snapshot and briefing schedule	MED	None	Eve
Impact of Working From Home	Understand the impact of working from home on outbreaks to better inform related restriction setting	 Get Stay at Home Index from 3 mobile (dependency) Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting 3 Mobile Data	John
Impact of Social Distance	Understand the impact of social distancing on outbreaks to better inform related restriction setting	 Get Social Distance data from 3 mobile (dependency) Create Social Distance Index for Dublin Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting 3 Mobile Data	John

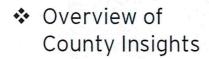


1GC update - Week 3

Agenda













Progress update



Stakeholder update

2 November 2020

Summary of Initial Findings

The additional LED data helps explain change in C-19 spread into three broad categories;

- 1. Driven by proximity to the border
- 2. Driven by a specific outbreak events
- 3. Following national restriction trend change.

The Irish and international research is confirming the view that:

- 1. Some restrictions are effective at managing disease spread
- 2. Some restrictions help target extreme outbreak events
- 3. More work is to be done to prove the case for some restrictions.

While accepting small samples, a detailed analysis of Track and Trace confirms that:

- 1. Increases in LED cases are driven by single specific events
- 2. Super-spreaders are four years younger, more likely to have caught the disease in a social setting and have far higher close contacts.

Overview of county performance



Overview of Incident Rate Per Capital Per County

Average Two Weekly Incident Rate Per 100k	06 Aug	13 Aug	20 Aug	27 Aug	03 Sep	10 Sep	17 Sep	24 Sep	01 Oct	08 Oct	15 Oct	22 Oct	29 Oct	05 Nov	12 Nov
Carlow	0	0	0	0	0	2	17	34	35	41	72	179	238	176	81
Cavan	18	16	7	13	17	20	22	24	60	175	553	923	752	355	116
Clare	6	9	18	20	20	21	23	29	49	122	233	268	211	151	72
Cork	2	4	6	8	8	8	12	35	80	123	209	320	332	256	126
Donegal	6	11	11	11	11	13	45	124	215	319	377	339	324	298	171
Dublin	16	21	27	38	49	66	105	145	167	173	203	269	286	233	124
Galway	4	6	6	6	6	15	23	38	71	100	180	324	362	245	102
Kerry	1	2	4	5	7	11	16	19	25	65	141	239	263	182	101
Kildare	36	97	141	122	80	67	59	66	71	91	173	255	241	156	69
Kilkenny	1	12	38	61	54	35	27	23	27	46	97	170	173	133	82
Laois	2	2	15	32	34	33	36	27	24	83	134	169	187	152	90
Limerick	15	25	40	45	55	64	56	47	52	136	230	296	322	249	131
Longford	0	0	0	2	2	1	5	4	17	39	53	183	254	171	85
Louth	4	9	13	13	13	27	73	100	89	99	169	311	336	231	115
Mayo	7	7	2	2	3	4	16	28	31	43	96	204	255	207	116
Meath	5	8	12	13	12	14	20	32	51	89	215	466	498	289	125
Monaghan	2	6	13	15	12	16	17	45	139	232	347	483	429	224	87
National	11	18	26	32	33	39	56	76	98	130	197	293	305	224	112
Offaly	28	66	73	65	54	50	70	75	78	115	168	209	203	141	63
Roscommon	4	2	7	10	16	17	23	40	102	156	154	208	240	197	110
Sligo	9	11	6	0	3	30	59	63	64	120	299	515	524	326	129
Tipperary	2	1	24	48	43	32	19	12	22	48	72	95	107	111	71
Waterford	6	19	46	60	50	52	86	106	80	65	113	212	279	243	124
Westmeath	9	10	10	12	22	35	60	70	85	135	238	404	398	255	126
Wexford	7	11	8	15	24	24	26	24	30	62	151	285	259	120	42
Wicklow	1	3	9	22	27	30	44	43	48	72	87	110	116	88	47

County View - Cavan

Total Confirmed Cases

7 Trend vs. National

Summary

Border County

- As a border county Cavan has witnessed high rates of infection in particular in the Cavan-Belturbet LEA
- Challenge of cross-border variance in restriction levels and their application

Private House Outbreaks

"Private House" outbreaks in late September grew significantly

GAA Football County Final

- Crosserlough (LEA Ballyjamesduff) win County Final for the first time in 48 years
- Reports of celebrations and "lock ins"

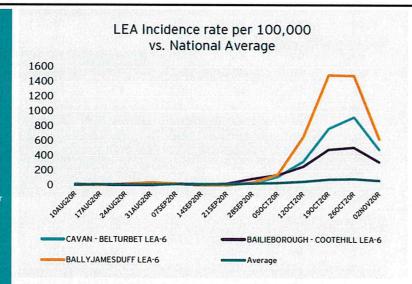
Additional ______, 22 in school and 18 in the community

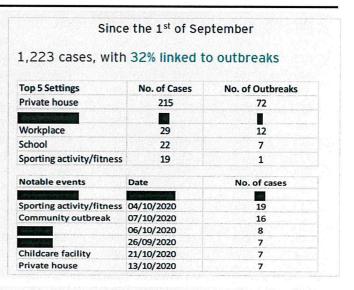
Commentary on Restrictions

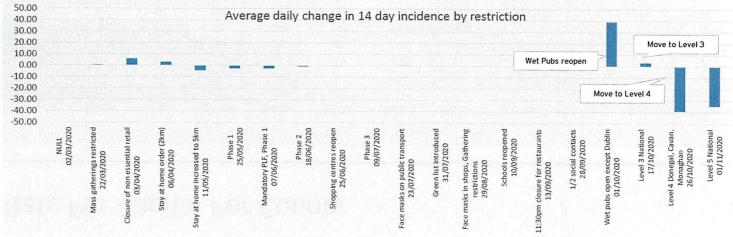
- Case incidents increase appear to coincide with easing of restrictions and events above
- Level 4 appears to have desired impact of reducing incident rate
- Level 5 further accelerates case incident reduction

Employment Summary

- Cavan had c.47% of its workforce on PUP or TWSS (15k) at the peak in early May. The numbers on PUP have risen back to peak levels (5k) in recent weeks
- Manufacturing, retail and health are the largest employing sectors (c.39% of employment). These are all sectors that are unable to work from home, have been more negatively impacted and more at risk from C-19 (CSO, EY 2019 employment estimates).







County View - Donegal

Total Confirmed Cases

Trend vs. National



Border County

 Incidence rates in LEAs bordering Northern Ireland were consistently higher than other areas in the county

Mask Compliance

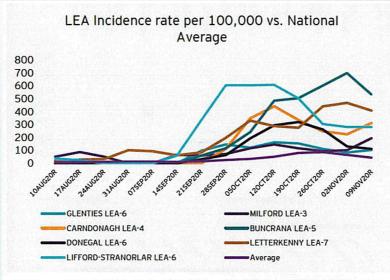
 Mask compliance in Donegal reduced (against national and previous Donegal trend) with Level 4 restrictions

Commentary on Restrictions

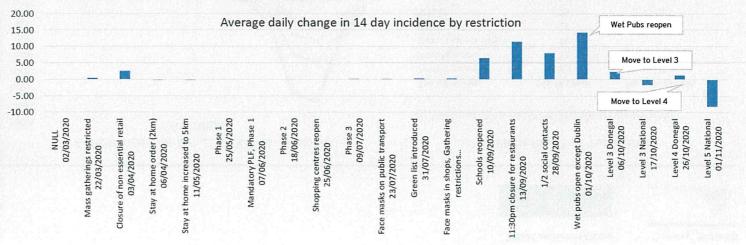
- Outbreaks in hospitals and nursing homes lead to 100+ cases
- Private Household attributable to 67% of outbreaks in the county since September
- Low association between outbreaks and sporting activities.
- County Football Championship Final was cancelled

Employment summary

- Donegal had c.49% of its workforce on PUP or TWSS (30k) at the peak in early May. The numbers currently on PUP remain significantly lower than peak (12k versus 23k)
- Retail, education and health are the largest employing sectors (c.35% of employment). Donegal has the second highest concentration in accommodation and food employment (8%) in Ireland after Galway (CSO, EY 2019 employment estimates).



Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	579	208
Workplace	145	25
Extended family	95	16
BOOK STORY		I
Notable events	Date	No. of cases
	DISTANCE OF THE PARTY OF THE PA	
Workplace	23/09/2020	55
Facilities of	CONTRACTOR OF THE PARTY OF THE	
Social gathering	24/10/2020	20
Other	25/09/2020	14

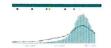


County View - Meath

Total Confirmed Cases

Trend vs. National

3,131



Summary

Outbreak

- Private homes leader in outbreaks with 61% of total.
 3.2 cases per outbreak on average
- A Nursing Home outbreak with 33 cases
- · One significant community outbreak of 29 cases

GAA Football County Final

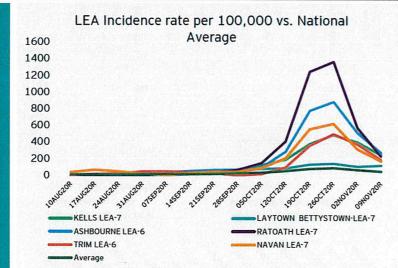
- In the week following Ratoath's Senior Football Championship victory (October 4th), cases in the Ratoath LEA rapidly spiked
- This was followed by a rise in incidences throughout the rest of the county

Commentary on Restrictions

- In the days following level 3 restrictions in Meath, cases began to stabilize and fall.
- Level 5 restrictions helped to accelerate this decline in cases, bringing Meath's incidence rate down from nearly double the national rate in mid-late October to both levels being nearly equal by November.

Employment summary

 Meath had c.42% of its workforce on PUP or TWSS (40k) at the peak in early May. The numbers currently on PUP remain slightly lower than peak (13k versus 15k) and remains just below national average levels (CSO, EY 2019 employment estimates).



Since the 1st of September 2,299 cases, with 27% linked to outbreaks **Top 5 Settings** No. of Cases No. of Outbreaks Private house 392 121 **Nursing home** 52 9 Community outbreak 45 4 Workplace 35 16 25 School 10 Notable events Date No. of cases **Nursing home** 33 Community outbreak 10/10/2020 29 Community outbreak 13/10/2020 12 Workplace 19/10/2020 11 10 **Extended family** 13/10/2020



County View - Laois, Offaly and Kildare

Total Confirmed Cases

Trend vs. National

Summary

Summer Outbreaks

- · Increasing case number trend emerges in July
- Outbreaks concentrated in food and meat processing plants
- Highest numbers in Offaly in Edenderry (93 of 103 cases) in two weeks preceding August 17th, with Kildare largely focussed in Athy/Newbridge (134/85 of 266)

Commentary on Restrictions - Laois & Offaly

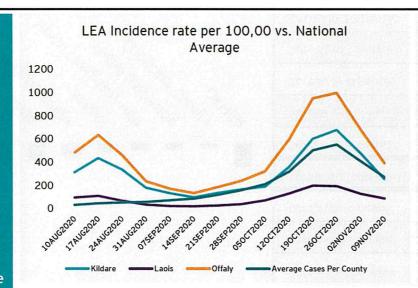
- County lockdowns for Laois, Offaly and Kildare from August 8th
- Offaly and Laois leave lockdown on 21st August and the following week cases begin to rise in Offaly with minimal decrease in Laois

Commentary on Restrictions - Kildare

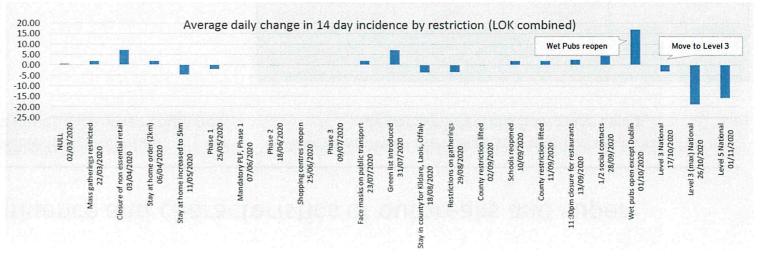
- · Kildare lockdown extended for an additional 10 days
- Case numbers fall however prevalence appears to shift from the south and middle of the county (Athy. Kildare Town, and Newbridge) to the north of the county (Naas, Maynooth and Celbridge)
- As cases increase in North Kildare from October a similar trajectory of case growth appears in Dublin

Employment summary

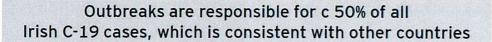
- These counties had c.40% of its workforce on PUP or TWSS (73k) at the peak in early May. The numbers currently on PUP remain significantly lower than peak (24k versus 73k)
- Retail is the largest employer in all three counties (CSO, EY 2019 employment estimates).



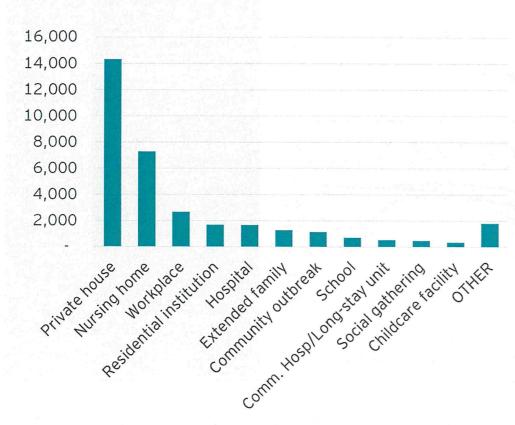
Since the 1st of September 2,644 cases, with 47% linked to outbreaks Top 5 settings No. of cases No. of outbreaks Private house 609 242 **Nursing home** 183 13 13 Hospital 97 83 22 School Extended family 59 Notable events Date No. of cases Nursing home 52 47 Nursing home 35 **Nursing home** 34 Hospital 29/09/2020 19 **Extended family**



Understanding the influence and characteristics of outbreaks and superspreaders



Track and Trace identifies 12% of all cases being driven by people infecting 5 or more cases



Spreader Category	Positive Cases	Infected People	% Infected
Spread to 1 person	2025	2025	100%
Spread to 2 people	733	1466	65%
Spread to 3 people	313	939	39%
Spread to 4 people	154	616	23%
Spread to 5 people	72	360	12%
Spread to 6 people	19	114	5%
Spread to 7 people	10	70	3%
Spread to 8 people	9	72	2%
Spread to 9 people	4	36	1%
pread to 10 people	1	10	0%
pread to 11 people	1	11	0%

SOURCE:CIDR

SOURCE: TRACK AND TRACE TOTAL CASES AT 15 OCT

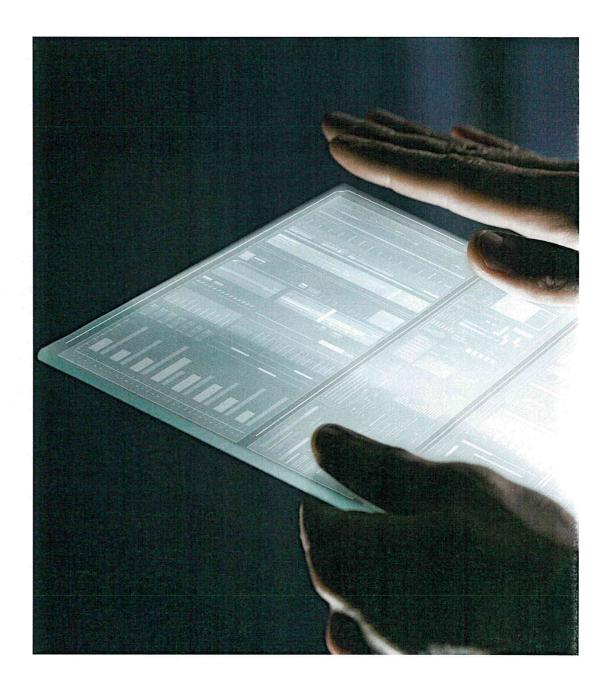
Super spreaders characteristic overview

	NON SUPERSPREADER	SPREADER (1-4 contacts)	SUPER SPREADER (>=5 contacts)
GENDER	Female - 54%	Female - 52%	Female - 52%
MEDIAN AGE	38	36	34
GREATER DUBLIN	32.7%	29.9%	31.8%
BORDER COUNTY	Cavan - 2.8% Donegal - 3.7% Louth - 2.5% Monaghan - 1.5%	Cavan - 2.7% Donegal - 4.7% Louth - 2.3% Monaghan - 2%	Cavan - 1.5% Donegal - 4.5% Louth - 1.5% Monaghan - 0%
NUMBER OF CLOSE CONTACTS	Mean - 0	Mean - 1.6	Mean - 5.8
Household - 54.1% CONTACT TYPE Social - 26.8% Work - 11.3%		Household - 49.7% Social - 28.9% Work - 12%	Household - 43% Social - 33.1% Work - 12.1%

"Half your contacts" does appear to have worked with the Level 3 restrictions (18-21 Oct)

COUNTY	NUMBER OF CONTACTS ONE WEEK BEFORE 18 OCT	NO OF CONTACTS TWO WEEKS AFTER 18 OCT	% CHANGE	DIRECTION
Meath	16.33	4.83	-70%	
Laois	12.00	er i Trick	-100%	and the state of t
Clare	10.33	9.88	-4%	
Galway	8.50	8.50	О%	
Waterford	8.00	6.33	-21%	
Kerry	7.67	4.50	-41%	
Dublin	7.25	3.33	-54%	1
Louth	7.00	4.40	-37%	
Cork	6.50	4.73	-27%	
Offaly	6.33	13.00	105%	
Carlow	6.00	1.00	-83%	
National	6.54	4.69	-28%	1

Restrictions, Contacts & Setting Analysis



Summary of select international research into C-19 restrictions

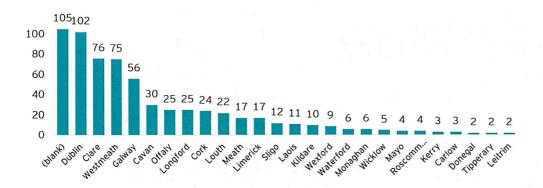
Restriction	Impact Assessment	International Evidence		
Work from home	Moderate	A reduction in Rt of 0.2-0.4 if those capable of working from home do so [1]		
Travel < 5k	Moderate to High	Travel restrictions help to reduce seeding in lower risk areas but provide limited impact if the disease is already widespread. [1]		
Reduce Citizen Congregations By Type	Moderate to High	Contact with +1 household predicted substantial increase of transmission rates. Large events can result new outbreaks within communities, but less responsible for overall transmission. [1		
Close Non Essential Businesses	Moderate (Varies Per Type)	Gyms and leisure centres present higher risk than non-essential retail. Close-contact services have high risk of transmission but lower impact on total transmissions due to infrequency [1]		
Take Away Food Only	Moderate to High	The UK 'eat out to help out' scheme saw an increase in cases over its duration demonstrating a link between restaurants and cafes and the spread of C-19. Transmission in bars, pubs likely [1]		
Reduce Public Transport to 25%	Moderate	Demand for public transport is lower. Limitation of public transport capacity has a lower impaction than other restrictions. [1]		
Wear a Mask	Moderate to High	Most beneficial when social distancing is difficult or building ventilation is poor. Evidence from UK healthcare body suggest universal masking helped bring hospital outbreaks under control [1]		
Maintain Social Distance	High	Where countries implemented social distancing measures quickly there is a marked decrease ir disease prevalence [2]		
Wash Your Hands	High	Hand washing has been linked to significant reduction in risks related to contracting C-19 and is most effective when actioned based on events rather than at fixed times [3]		

Analysis of positive contact types - some insights gained but issues with data quality

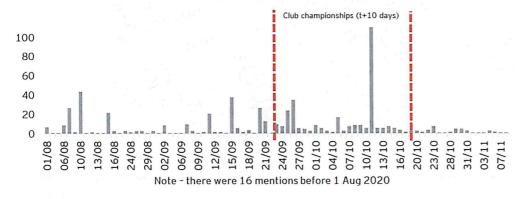


GAA-related events generated clusters of contacts, but absolute levels remain low GAA-related terms mentioned 653 times since March

GAA and related terms mentioned in free text (by county)



GAA and related terms mentioned in free text (over time)



Key message: GAA events and celebrations appear to have generated incidences of high numbers of contacts with positive individuals. However, overall levels appear low.

Clare

24 GAA contacts on 7 Aug 33 GAA contacts on 10 Aug

End of July start for club games in Clare as master fixtures committee recommend new formats

Westmeath
52 GAA contacts on 11 Oct
GAA related

Football senior finals on 27 Sep

Galway

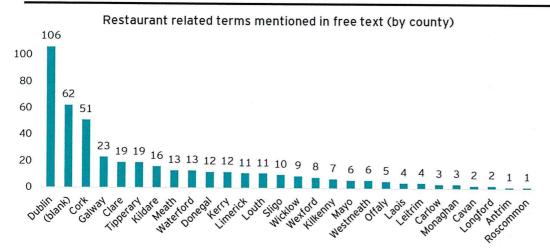
34 contacts on 15 Sep Mention a specific GAA team

Dublin 17 contacts on 15 Aug Mention a specific GAA camp

Camps took place between 22 July and 23 Aug

Source: Contact tracing analysis Terms searched: terms 'GAA', 'Gaelic', 'County Final', 'County Championship', Hurling' and 'Football' Football and hurling championships took place between 13 Sep and 9 Oct 2020

Contacts generated in restaurant settings, however overall levels remain low Restaurants mentioned 439 times since March



Key message: Restaurants generated contacts, however absolute levels remain relatively low given data available.

Dublin

18 contacts relating to a coffee chain 17-19 Aug

5 contacts relating to Dublin restaurant chain 24-25 Sep

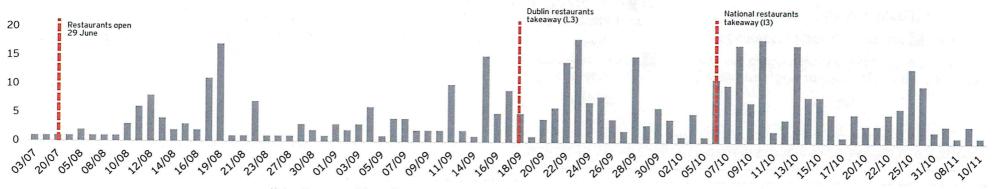
Cork

5 contacts relating to a restaurant chain 28 Sep

4 contacts relating to one restaurant

4 contacts relating to a fast food chain 9-10 Nov

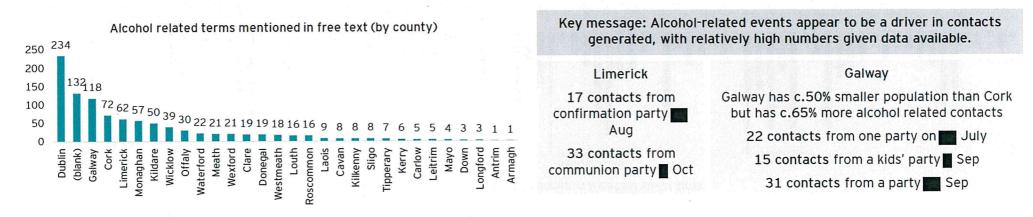
Restaurant related terms mentioned in free text (over time)



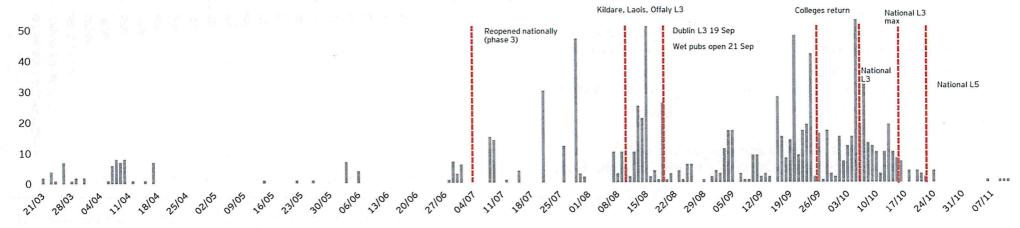
Note - there were 18 mentions before 1 July 2020

Source: Contact tracing analysis Terms searched: Restaurant, eating out, out for a meal, and a list of all national chains in Ireland

Alcohol and social gatherings generated contacts with positive individuals Alcohol and party-related terms mentioned 1,017 times since March

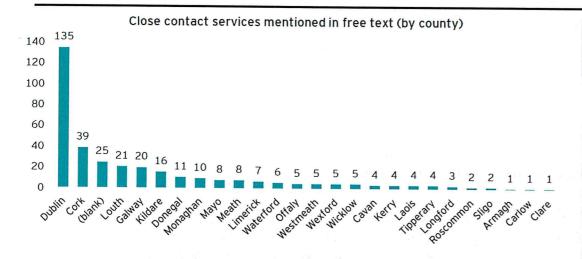


Alcohol related terms mentioned in free text (over time)



Source: Contact tracing analysis
Terms searched: alcohol', 'drink', 'party', 'celebration', 'booze', 'beer', 'wine', 'cans', 'pint

Close contact services generate a low number contacts in majority of counties close contact personal services (hairdressers, beautician, barber etc.) mentioned 352 times since March



Key message: Close contact personal services generated a relatively low number of contacts, given data available. Contacts appear to be generated from a small number of occurrences.

Dublin

7 contacts from one hairdresser 3 Sep

8 contacts from salon likely to be in the same location 30 Sep

8 contacts from salon 15 Oct

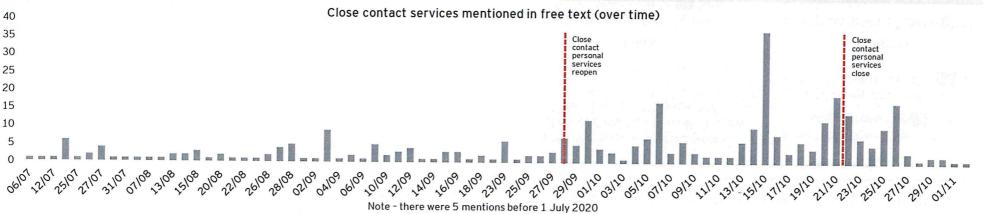
Cork

11 contacts from one hairdresser 21-22 Oct

3 contacts from hairdresser/barber (not necessarily linked) 23 Oct

Louth

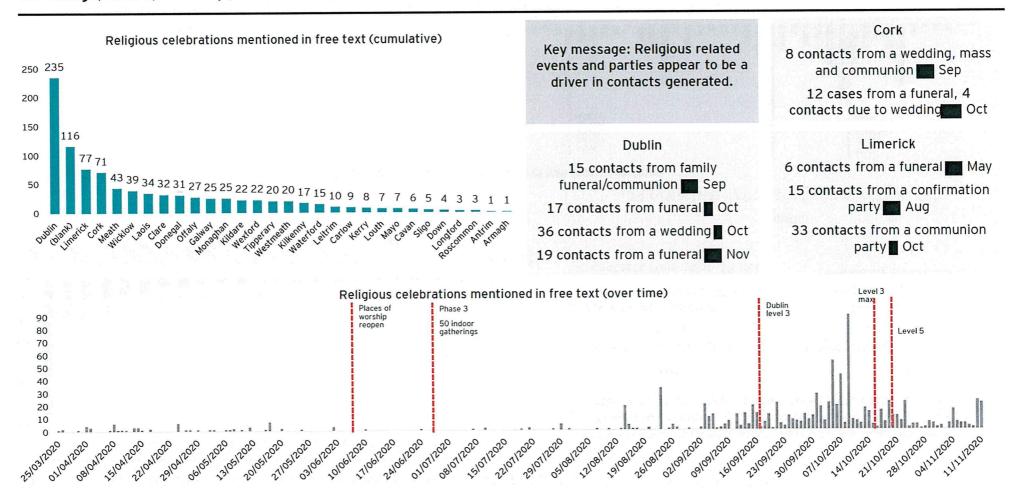
14 contacts likely from one hairdresser 21-22 Oct



Source: Contact tracing analysis Terms searched: 'hairdresser', 'salon', 'nail bar', 'beauty bar', 'tanning', 'beautician', 'tattoo'.

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Traditionally religious* celebrations account for high number of contacts Weddings, mass, worship, funeral related terms mentioned 935 times since March, spike seen in Autumn months



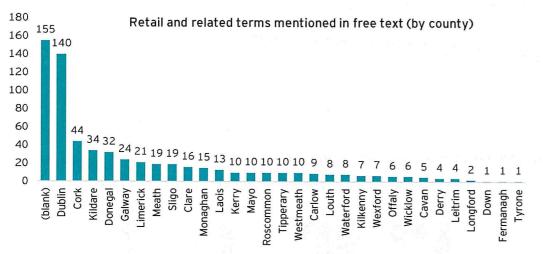
Source: Contact tracing analysis

Terms searched: 'mass, church, worship, communion, funeral, wedding, confirmation service, confirmation party, temple, synagogue, mosque and prayers

*Terms include weddings and funerals which may not be religious services

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Retail generates contacts with positive cases, but low overall incidences recorded Retail and related terms account for 651 contact circumstances with positive individuals



Retail store cases appear to be driving by smaller outbreaks rather than large clusters

Dublin

No large clusters, largest number of contacts on a single day was 5

5 contacts in supermarket 18 May

Kildare

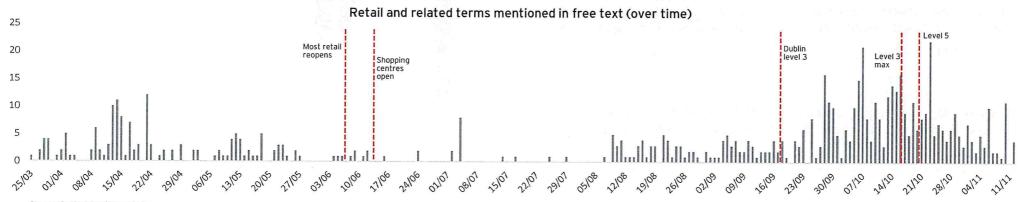
No large clusters, largest number of contacts on a single day was 3

2 contacts in shop 19 Oct

Cork

No large clusters largest number of contacts on a single day was 5

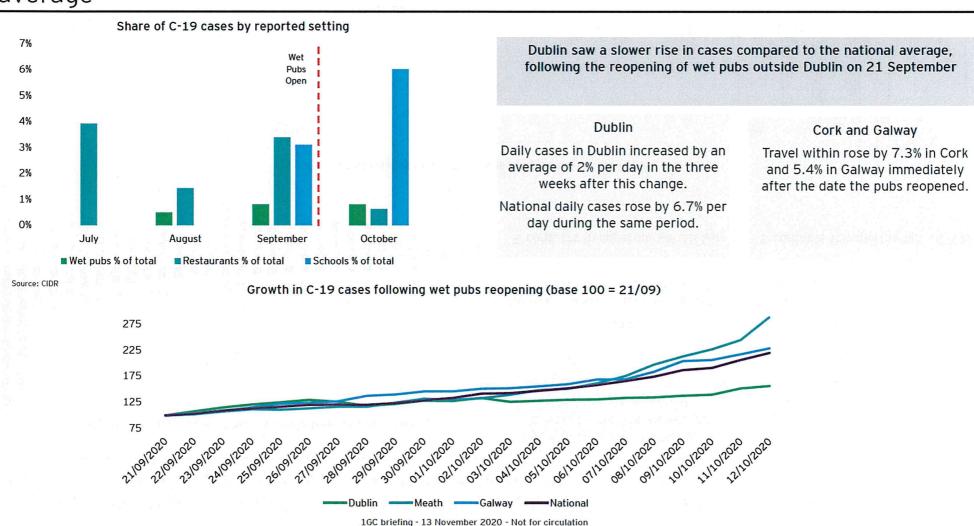
5 contacts in supermarket 10 Nov



Source: Contact tracing analysis
Terms searched: shop, SuperValu,Lidl,Tesco,Aldi,Dunnes Stores,Eurospar,Iceland,Marks & Spencer, Donnybrook Fair, Joyces,Fresh, Spar,Centra,Londis,Mace,Gala,Daybreak,Costcutter,Applegreen, Newsagent

1GC briefing - 13 November 2020 - Not for circulation

Wet pubs reopening - growth in cases in Dublin slower than the national average



Planning for Christmas?



Potential implications for Christmas for discussion (and focus for next week)

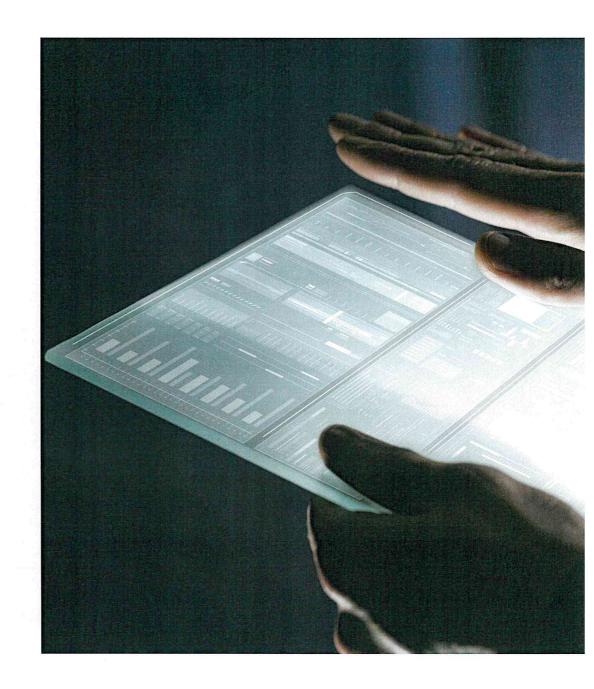
Christmas Activity	Mitigations	Comment					
Bars and Restaurants	Limit on customer numbers, 2m apart, cashless payments, €9 food purchase, time-limit, outdoor service	Transmission in bars likely due to lack of masks/long term exposure/loud talking / poor ventilation					
Nationwide Visits/ Christmas Dinner	Domestic travel restrictions, disposable cutlery, doors and windows open, no buffet style meals	High risk of transmission in households due to airborne droplets and shared surfaces					
Sporting Events	As with current restrictions	GAA training and celebrations are linked to a number of outbreaks across counties					
House Gatherings / Parties	As with current restrictions	High risk of transmission in households due to airborne droplets and shared surfaces. Wet pub contagion. Link to LED outbreaks					
Christmas Shopping	Click & collect, queueing systems, masks, possible booking in shopping centres (Kildare Village), cashless payments	Retail outlets linked to smaller number of outbreaks					
Christmas Plays/Concerts/ Mass	As with current restrictions	Large events can cause new outbreaks within communities but are less responsible for overall transmission					
Travel Home to Ireland	Safeguards in place for high risk countries , EU traffic light system, quarantine period after arrival	Travel restrictions help reduce spread in lower risk areas					
City Breaks Abroad	Safeguards in place for high risk countries, EU traffic light system, quarantine period after arrival	Travel restrictions help reduce spread in lower risk areas					
Visits to Santa	With safeguards such as masks, hand sanitizer stations, 2m apart, drive-in Santa (RDS), virtual Santa (Already organised in some schools)	Staying 2m apart reduces the chance of being exposed from respiratory droplets emitted by others					
Hotel Breaks in Ireland	No buffet style meals, 2m apart, domestic travel restrictions may apply	Travel restrictions help reduce spread in lower risk areas					
Charitable Events	2m apart, limit on number allowed at gatherings, virtual events, outdoor events	Large events can cause new outbreaks within communities					
Christmas Markets	Restriction to essential items, cashless payment where possible, 2m apart, masks, crowd control	Outdoor activities generally are lower risk than indoor activities. Peer countries are cancelling such events					

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What is the international evidence telling us about preparing for festivals?

Christman	France	Waiting to decide plans after lockdown impacts are analysed, expected early Decembe
Christmas	UK	Large Christmas markets cancelled in Birmingham, Edinburgh, London, Glasgow and Bristol
	Tennessee, USA	Restricted the size of private gatherings to 10, and limited to three households
Thanksgiving	Minnesota, USA	Recommendation to socially isolate for two weeks beforehand
	Canada	Ontario imposed a 10-person bubble to contain COVID-19
Diwali	UK	Diwali celebrations at Trafalgar Square have been swapped for a virtual celebration
DIWali	India	Many states have banned the use and sale of firecrackers
	Egypt	Ramadan bazaars with stalls selling food, drinks and clothes were not allowed
Ramadan	Malaysia	Group iftars and charity tables were banned
	Saudi Arabia	Shortening of Tarawih prayers, which were held without public attendance
Eid ul-Fitr	Malaysia	Only allowed to visit relatives who live nearby with gatherings limited to 20 people

Progress update



Progress update

GOVERNANCE AND SET UP

- ► Delivered weekly Progress Report and Progress Update meeting today
- ► Delivered 1GC Azure detailed design and shared with HSE
- Completed first 1GC Azure feedback session with HSE Technology team and now updating accordingly
- ► Completed first full draft of 1GC Data Protection Impact Assessment
- ▶ Meetings with GeoHive, CSO, DOH and HSE to discuss data requirements and ownership. Requires DOT input (see next page)
- ▶ Gained access to HSE Track and Trace data for analysis included today
- ► Meeting today with Covid19 Data Coordination Group to introduce project

USE CASE DESIGN

- Send detailed mobile requirements to DOH to support 3 mobile contract discussions
- ► Met with DOH Disease Modellers to get their input to the Social Distance Index Design
- ► AIB completed payments analysis and now awaiting confirmation on how to send
- Confirmed required changes to 1GC Dashboard with initial focus on changes relevant to this weeks' analysis. Other changes (such as politician view) to be updated next week

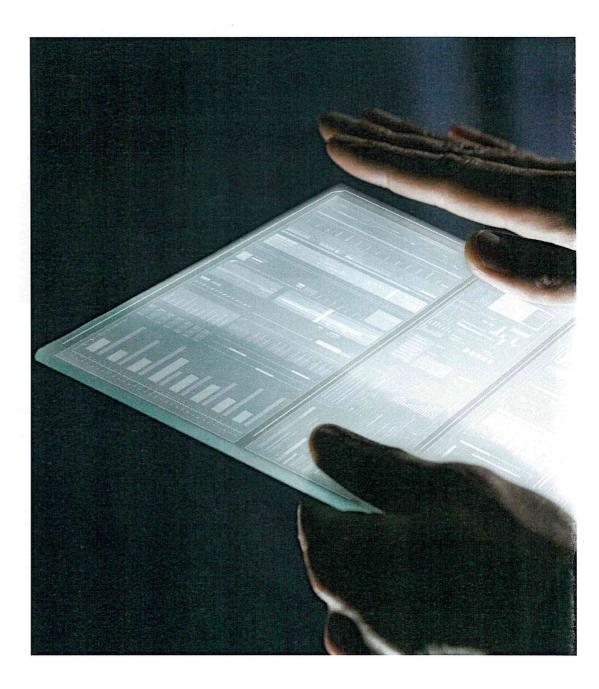
INSIGHT DEVELOPMENT

- ► Update on specific "control group" cross county analysis and with summary included today
- ➤ This includes cross border analysis, "Half Your Contacts" success, Donegal assessment, comparison between Laois, Kilkenny and Offlay, Wet Pub Dublin vs Cork, etc
- ▶ Detailed analysis of international and Ireland restriction "value" and with summary included today
- ► Initial analysis of T&T contact text fields and super-spreader characteristics and included today
- Summary analysis of economic impact per restriction and industry and included today

Next steps

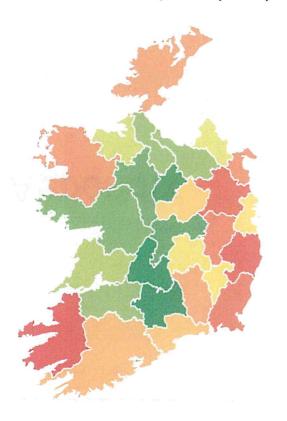
- Update and expand Use Cases for feedback from today and with LED and restriction focus
- Resolve Data Protection and Data Sharing Points
- Stand Up Microsoft Azure insight Platform with HSE
- Confirm DOH Contract, get access to 3 mobile data and start build / incorporation of insights

Appendix



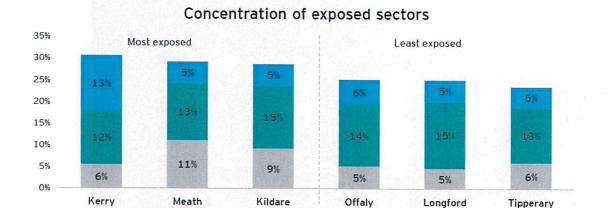
PUP analysis: Kerry, Wicklow and Meath highest 'exposure' to C-19 disruption given sectoral mix

COVID-19 sector 'exposure' by county



Sectors were ranked according to their risk of Covid-19 lockdown disruption (1-5). Counties were then ranked based on their sectorak employment mix to assess those at most risk of disruption.

- Kerry, Wicklow, Meath, Wexford and Kildare have the highest exposure given sectoral composition, skewed more towards hospitality and public-facing sectors
- Tipperary, Longford, Offaly and Roscommon have the lowest exposure risk



Accommodation and food

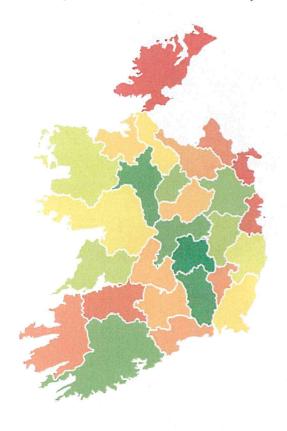
■ Wholesale and retail

Source: CSO, DEASP, EY analysis, EY 2019 local employment estimates

■ Construction

PUP analysis: Border counties doing worse than expected given sectoral mix

PUP payments versus national average (9 Nov)

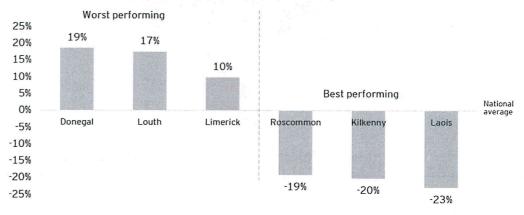


Source: CSO, DEASP, EY analysis, EY 2019 local employment estimates

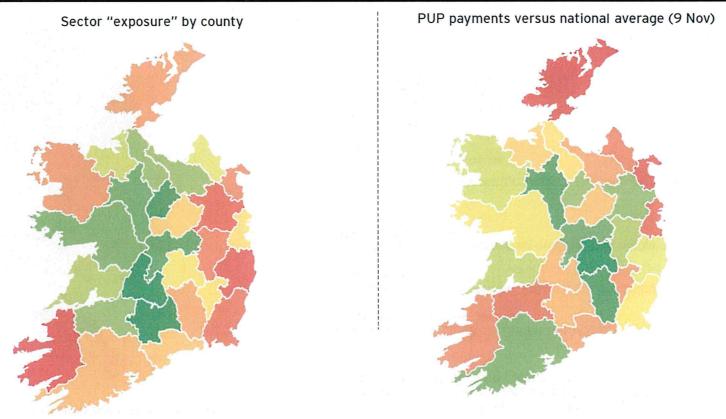
PUP recipients in each county were compared to national average levels expected by sector. This assessed if counties are performing better or worse than the national average given their sectoral composition.

- Donegal, Louth, Limerick, Dublin and Monaghan are currently worst-performing compared to national average
- Laois, Kilkenny, Roscommon, Offaly and Cork doing better than national average given sector mix
- Donegal, Dublin and Monaghan have been at higher restriction levels than the rest of the country for longer

County performance V national average (9 Nov)



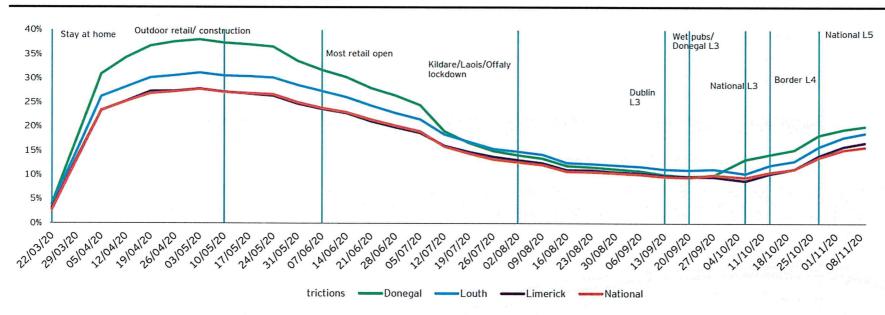
PUP analysis: C-19 case rates and prolonged restrictions levels appear to be impacting unemployment levels



- ▶ Border counties are performing worse than expected in terms of current PUP recipients given 'exposure' risk
- Cork, Mayo, Galway and Wicklow are doing better than expected, and have been in lockdown for less time than Dublin and the border region

Source: CSO, DEASP, EY analysis

Donegal consistently above national average for employment impacts, even before additional lockdown



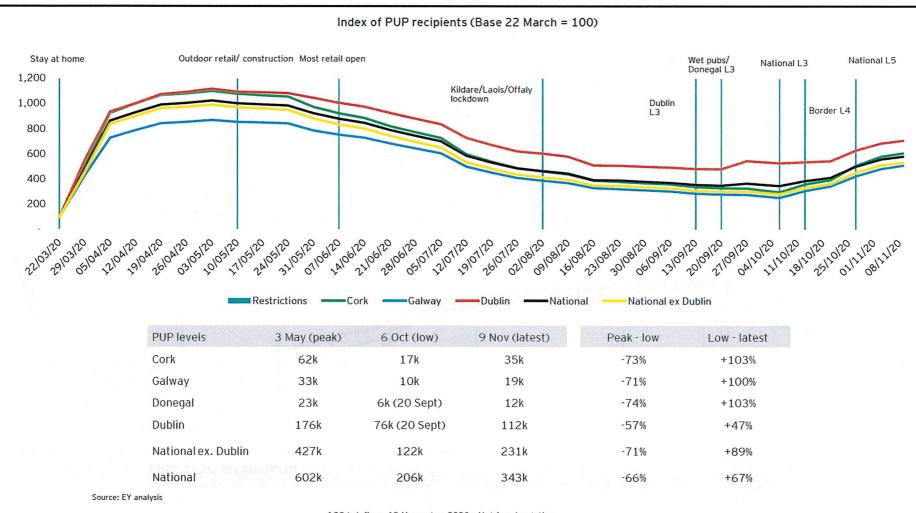
PUP % share of 2019 employment (est)

	National	Donegal	Louth
Peak	28% (602k)	38% (23k)	31% (17k)
Current	16% (343k)	20% (12k)	17% (10k)
Open to level 3	+ 86k	+3k	+ 3k
Level 3 to level 4	N/A	+ 2k	N/A
Level 3 to Level 5	+46k	+14k	+2k

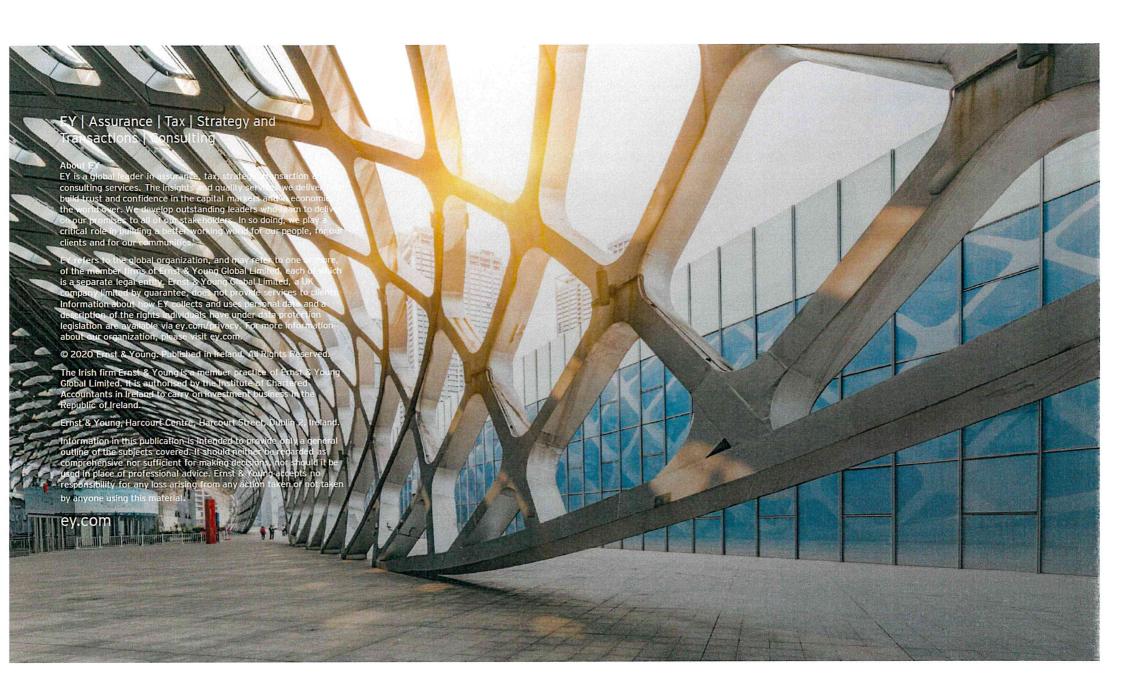
- PUP levels in Level 5 have not risen to wave 1 peak (early May)
- Donegal performing worse than average due to sectoral composition and prolonged lockdown

Source: CSO, DEASP, EY analysis, EY 2019 local employment estimates

PUP levels increase with Level 5, but remain 43% below previous peak



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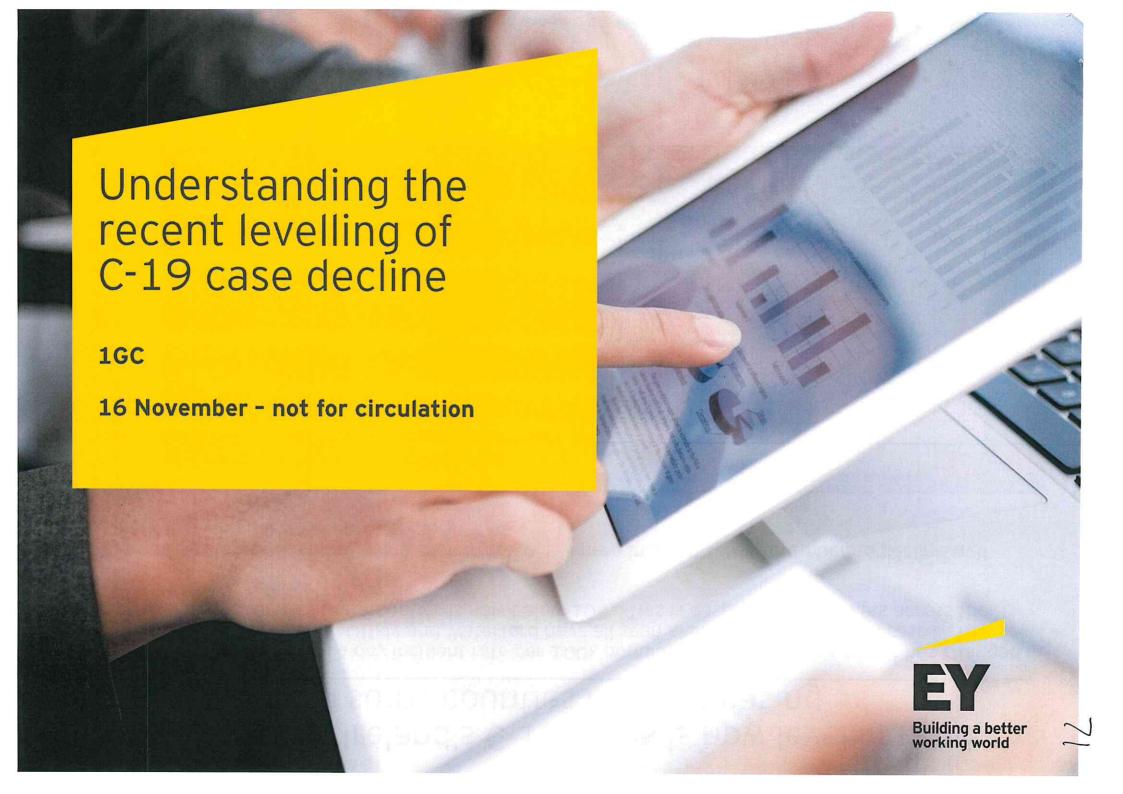


1GC Priority Use Case Analysis Based on Briefing Session 13 Nov 2020

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDEN CY	OWNER
Ireland Restriction Impact	Retrospective Analysis of introduction and removal of restrictions in Ireland to seek to isolate individual value. Informs future restrictions decisions	 Complete sensitivity analysis for 7-15 days outcome Add university opening and going online Add NI restrictions for Border Counties Complete Restriction Analysis Confirm and if yes complete multivariate analysis 	VERY HIGH	None	Graham and Fiona
International Restrictions Impact	Retrospective Analysis of introduction and removal of restrictions in Europe to seek to isolate individual value. Informs future restrictions decisions	 Increase to 12 countries Add additional identified restriction data Complete Restriction Analysis Confirm and if yes complete multivariate analysis 	VERY HIGH	None	Nitin and Nik
Current Increase Explanation	Understand the recent slowing / reversal of cases reduction	 Understand the recent changes by LED Overlay most recent outbreak data, e.g. funerals, etc Overlay with recent mobility data, e.g. TII, Google, Apple Compare with May decline to see what is different 	VERY HIGH	None	ТВС
Track and Trace Text Analytics	Detailed analysis of contact explanations to better understand causes of outbreaks	 Complete analysis for "communion parties", "hotels" and "schools/universities" Quantify positivity rate for each category and compare versus average around the same time Add Roscommon final to GAA analysis Bring together into three or four stories ("party", "funeral", etc) 	HIGH	None	Kenny
Christmas Disease Rates	Understand disease growth and restrictions implications over Christmas	Incorporate Christmas Disease Forecast Estimates from NEPHET to understand impact of Christmas period by county / LED Inform related restrictions analysis accordingly	HIGH	None	TBC
Facebook Survey Tool	Create Excel showing Facebook Survey compliance by county and restriction	 Add all "compliance" self reporting metrics, e.g. mask wearing, hand washing, social distancing, etc Create front end allowing user to select and compare counties over time and with restriction milestones highlighted 	MED	None	ТВС
County Analysis	Detailed LED level analysis per county showing key drivers of spread	 Complete for Cork, Waterford, Galway, Limerick, Carlow and Kerry Complete specific comparison for all border county LEDs and confirm relationship with geographic proximity 	MED	None	ТВС

1GC Priority Use Case Analysis Based on Briefing Session 13 Nov 2020

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDEN CY	OWNER
Impact of Alcohol	Understand the impact of alcohol sales on outbreaks to better inform related restriction setting	 Get AIB data (dependency) Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting AIB Data	Manny
Dashboard Enhancements	Create an interactive dashboard to support senior government stakeholder briefings	Create view for politicians summarising counties: Cases / Hospitalisations / Deaths Excess mortality analysis performed by CSO Hospitalisations Median age of deaths Economic factors such as small business claims, PUP	MED	None	Graham and Fiona
Senior Briefings	Prepare briefing plan and story board for senior government stakeholders	 Enhance our county and national analysis as outline above, bring all analysis up to date Improve the restriction impact analysis Integrate measures of compliance, particularly trending in the last number of weeks Integrate wider sources such as deaths, excess mortality, etc Be clear on data / analysis quality in these briefings, e.g. what is "qualitative", "impressionistic", etc 	HIGH	None	Eve, Manny
Christmas Briefing	Our ability to monitor compliance will be critical for December	Consider an enhanced daily analysis snapshot and briefing schedule	MED	None	Eve
Impact of Working From Home	Understand the impact of working from home on outbreaks to better inform related restriction setting	 Get Stay at Home Index from 3 mobile (dependency) Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting 3 Mobile Data	John
Impact of Social Distance	Understand the impact of social distancing on outbreaks to better inform related restriction setting	 Get Social Distance data from 3 mobile (dependency) Create Social Distance Index for Dublin Merge with disease prevalence Complete the related analysis to assess and quantify the relationship 	HIGH	Awaiting 3 Mobile Data	John



The reduction in Ireland's C-19 cases is now levelling and with the cases in some counties now increasing

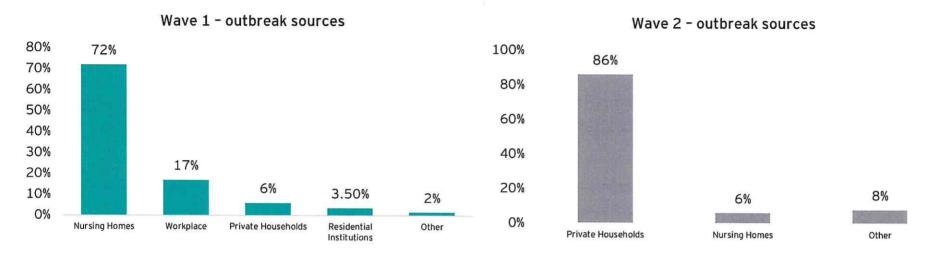
The below table shows the 14 day incident rate per 100k population by county and how it has changed in the last three days. Leitrim, Offaly and Waterford have all seen short term increases in cases. The reduction in cases for 14 other counties is now below 10%. This is despite incident rates across the country still being relatively high.

This is quite different from the trend seen in Wave 1, where incident rates continued to decline well beyond this level of disease prevalence.

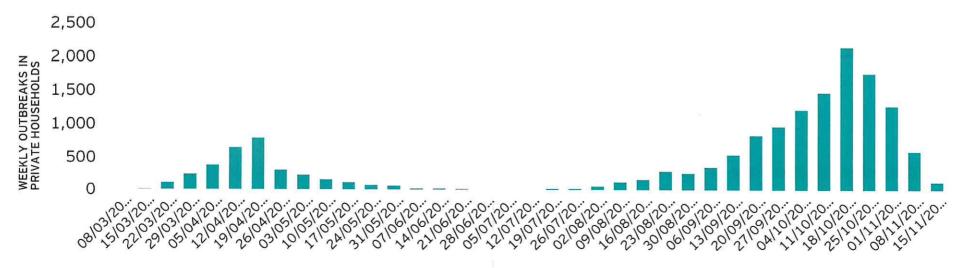
Counties	01/11/2020	02/11/2020	03/11/2020	04/11/2020	05/11/2020	06/11/2020	07/11/2020	08/11/2020	09/11/2020	10/11/2020	11/11/2020	12/11/2020	13/11/2020	14/11/2020	15/11/2020	% Change in last 3 Day
_eitrim	106.1	96.7	84.3	68.7	56.2	31.2	28.1	34.3	37.4	37.4	40.6	53.1	62.4	71.8	78	47%
Waterford	204	201.4	196.3	194.5	188.5	179	164.4	148.1	137.7	130	136	115.3	142	140.3	154.9	34%
Offaly	162.9	159.1	136	118	112.9	111.6	109	115.4	118	106.5	112.9	107.7	110.3	118	137.2	27%
Limerick	269.4	262.7	228.3	227.8	229.9	226.3	218.1	220.1	213.4	209.3	201.1	197.5	196.5	212.9	201.6	2%
Kilkenny	132	142.1	134	136	134	135	141.1	141.1	134	131	133	128	129	132	130	2%
Westmeath	321.1	309.8	306.4	263.6	253.5	221.9	208.4	198.3	179.1	171.2	162.2	167.8	151	167.8	170.1	1%
Monaghan	288.3	273.7	221.5	208.5	177.6	179.2	169.4	146.6	140.1	125.4	125.4	122.2	128.7	135.2	123.8	1%
Wexford	173.7	171	140.3	123.6	125.6	96.2	89.5	83.5	74.8	68.1	67.5	49.4	51.4	48.8	49.4	0%
Kerry	221.4	199.7	186.2	179.4	194.3	190.9	178.7	163.2	155	141.5	141.5	130	128.6	128.6	129.3	-1%
Donegal	321	309.7	305.9	286.4	300.3	299	291.5	295.2	275.8	284.6	300.9	281.4	270.7	272.6	275.8	-2%
Roscommon	204.5	227.8	229.3	223.1	198.3	192.1	176.6	156.5	150.3	173.5	168.9	172	161.1	162.7	165.8	-4%
Vicklow	115.9	115.1	106.7	104.6	106.7	91.3	89.2	89.9	82.9	77.2	71.6	72.3	71.6	71.6	69.5	-4%
Dublin	220.9	227.2	219.5	211.5	201.5	201.1	192.2	186.8	173.7	162.6	154.6	146.2	138.2	143.4	140.3	-4%
outh	297.2	298.7	256.8	221.9	193.2	201.7	188.5	176.1	159.1	155.2	157.5	159.8	149	152.9	152.9	-4%
Kildare	240.9	231	210.8	186.5	176.6	169	156.4	142.5	122.2	116	101.1	93.9	85.4	93	89	-5%
aois	205.4	201.9	194.8	177.1	167.7	167.7	168.8	167.7	155.8	152.3	147.6	142.9	131.1	129.9	131.1	-8%
Carlow	268.7	275.8	252.9	245.9	217.8	219.6	187.9	170.4	147.5	130	114.2	101.9	103.6	96.6	93.1	-9%
Tipperary	130.4	130.4	131	130.4	132.2	129.1	128.5	124.1	115.9	124.1	117.8	113.4	117.2	115.3	102.2	-10%
Salway	297.6	283.3	256.9	243.4	211.6	187.9	171.7	145.3	125.9	108.9	108.1	96.9	86.8	82.9	86	-11%
vleath	474.3	482.5	380.4	323	291.7	280.4	260.5	243	212.8	203	172.3	163	152.8	151.8	144.1	-12%
Cavan	590.7	563.2	475.2	364.9	294.1	261.2	231	203.5	156.2	140.5	132.6	118.1	107.6	98.5	103.7	-12%
Clare	229.8	210.4	190.2	187.7	182.6	170	172.5	162.4	138.9	132.1	122.9	109.4	104.4	102.7	93.4	-15%
ongford.	247.1	227.5	195.7	185.9	198.2	168.8	168.8	161.5	156.6	149.2	139.5	132.1	122.3	122.3	110.1	-17%
∕layo	243.7	229.9	214.5	195.4	181.6	182.4	183.1	173.2	163.2	147.9	151.7	147.9	144.8	120.3	115.7	-22%
Cork	305.2	278.2	259.7	243.7	235	240.9	217.9	197.8	182.4	159.9	146.1	121.9	109.1	103.2	91.2	-25%
iligo	360.1	332.6	302.1	283.8	256.4	216.7	207.5	186.2	155.6	152.6	154.1	154.1	145	125.1	111.4	-28%
National	253.5	248	228	212.7	202.1	196.4	185.6	175.5	161	151.5	145	135.3	129.2	130.2	126.9	-6%

There are fundamental differences between the outbreaks in Wave 1 and Wave 2, which will impact how they trend

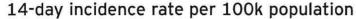
Wave 1 was characterised by outbreaks in nursing homes with a median age of 47 years old. Wave 2 has been driven by Private Households and with a median age of 33 years old. That is, both outbreaks have quite different citizen profiles and this will impact how each trends.

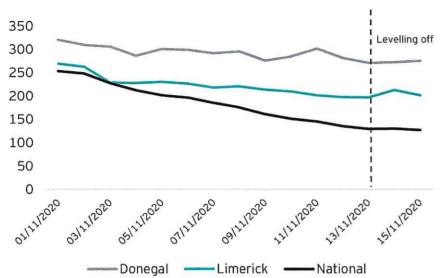


The peak of Private Household outbreaks in Wave 2 is approaching triple that seen during Wave 1.



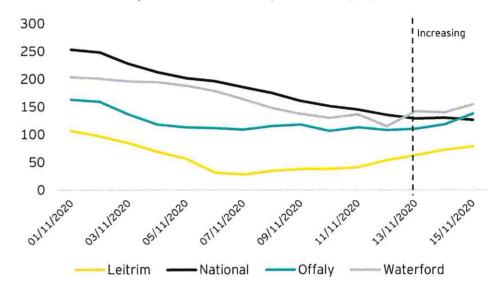
Outbreaks in Private Households and among younger people are impacting the worse performing counties





- Limerick and Donegal decreasing at a slower rate compared to other counties
- Limerick one family outbreak resulted in 149 new cases in October
- ► Limerick increase in outbreaks among 20-24 and 15-19 age groups
- Donegal one Hospital outbreak resulted in 93 new cases since the start of November

14-day incidence rate per 100k population

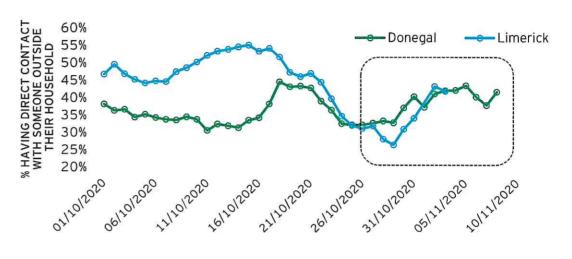


- Leitrim, Offaly and Waterford beginning upward trend with cases increasing
- Waterford increase in 20-24 age group being infected with Private Household outbreaks
- Waterford 103 Private Household outbreaks since start of October compared to 37 Private Household outbreaks in total before October

The levelling of disease spread coincides with increases in direct contacts outside the household, but not mobility

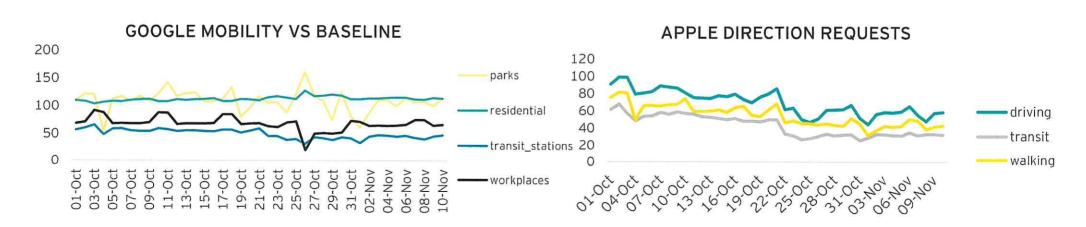
Limerick and Donegal both saw increases in those reporting direct contact outside their household between 29 October and 2 November. The infection rate in both counties is now levelling.

Also, the Amárach Public Health Survey shows the level of people believing that the pandemic is behind us reducing from 43% in May to 22% in November. This may point to lockdown fatigue, with no clear end in sight resulting in reduced compliance.



Source: Facebook survey, 13 November 2020

The most recent Google and Apple mobility reports are show below. Neither show any significant change in mobility around the time of the recent slowing of C-19 decline.





1GC interim update - Week 5

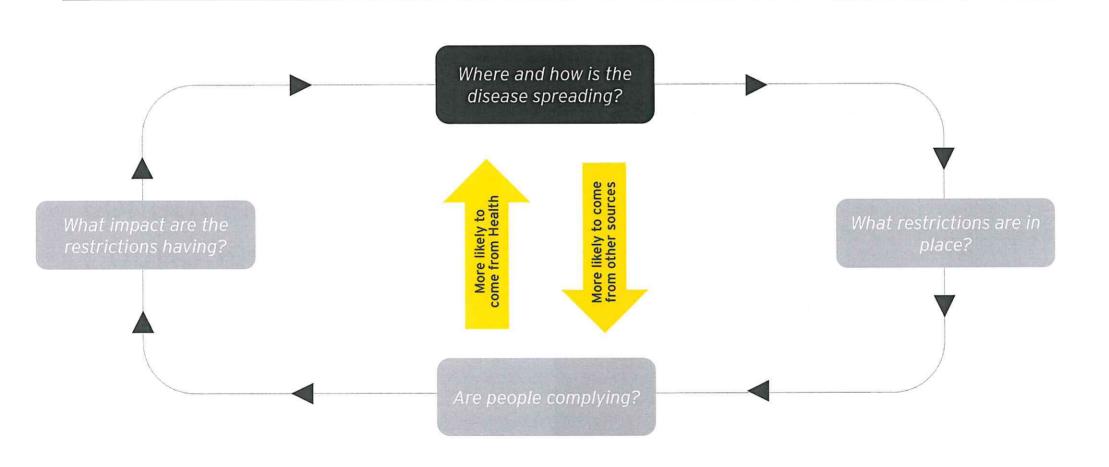
Agenda



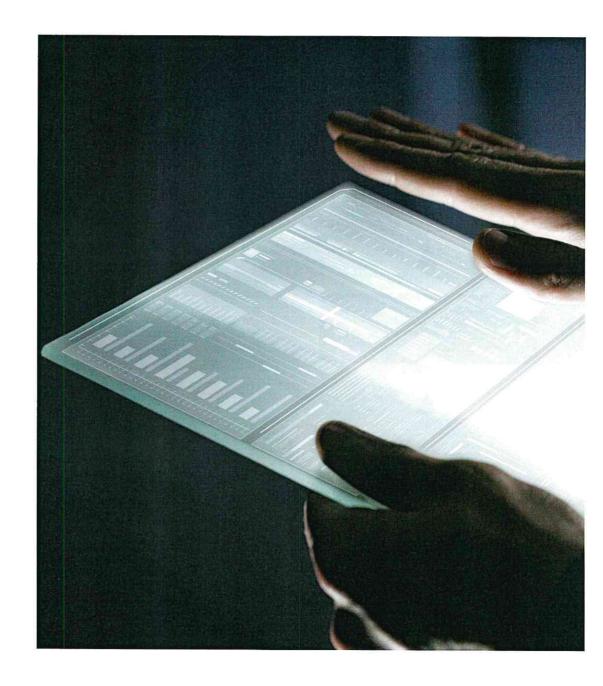


- Briefings shared to date
- Continuation of county analysis
- Restrictions impact analysis

Answering four key questions to support government decision making



Continuation of county analysis



Overview of Incident Rate Per Capital Per County

																																																					-			\neg
Average Two Weekly Incident Rate Per 100k	255	6 1		18-Sep			. 0			25-Sep	26-Sep	27-Sep	28-Sep		0			03-00	20-40	20-00		D8-0-40			1	. 0		14-0ct	15-Oct	9	17-Oct		T	20-Oct	- 2	1 6	4	25-Oct	26-Oct			1	31.00	200	02-Nov				06-Nov	07-Nov	08-Nov	0	10-Nov	- 0	13-Nov	14-Nov
Carlow	39		33	35	35	37 3	9 4	10 4	42 4	14 4	2 4	0 39	9 39	26	33	35	44	44	44	42	42	10	42 !	54 6	1 7	4 7	7 83	84	119	116	149	167	198	204 2	42 24	2 270	0 292	306	311	327	327	293 2	99 2	70 27	8 24	9 24	2 214	213	177	160	137	126	05	95 98		
Cavan	20	22	22	21	24	24 2	2 2	2 3	32 3	37 3	7 4	9 51	1 47	56	67	79	84	88 1	14 1	34 1	44 1	34 2	00 3	03 33	9 38	6 41	2 571	641	735	760	811	824	910 #	188 81	## ##	# 983	3 966	967	964	810	752	668	45 5	89 56	2 47	4 36	5 295	263	232	206	159	143	33 1	19 112	2 102	المنتاني
Clare	29	30	35	38	42	44 4	1 4	14 4	40 4	40 4	1 4	7 50	0 53	63	76	76	87	96	21 1	44 1	58 1	33 1	99 2	46 26	1 26	8 30	4 310	306	309	322	326	327	322	313 3	04 31	1 272	2 264	281	252	248	253	255 2	35 2	29 20	9 18	9 18	6 181	173	171	160	139	132	22 1	39 104	4 104	
Cork	11	12	14	17	23	27 3	2 3	36 4	42 4	47 5	2 6	2 66	6 71	81	88	97	102	105	10 1	11 1	19 1	27 1	40 1	55 15	9 18	11 19	9 209	232	237	256	275	308	322	336 3	40 32	7 33	4 347	337	335	333	331	334	18 3	05 27	6 25	8 24	2 233	239	216	195	179	158	43 1	19 10	8 102	
Donegal	46	56	64	73	84	97 10	6 12	22 14	48 15	59 17	8 18	5 19	1 204	211	219	233	258	265 2	73 2	93 3	12 3	19 3	26 3	24 34	5 35	5 35	5 354	367	365	356	344	347	329	320 3	20 31	2 32	4 322	329	318	313	317	322	10 3	20 30	9 30	5 28	6 300	297	290	293	275	285	273 2	81 27	1 272	275
Dublin	109	114	121	123 1	36 1	37 13	36 14	10 14	44 14	46 14	8 15	2 160	0 154	159	163	168	172	161	166 1	62 1	71 1	55 1	63 1	73 17	4 17	7 18	0 184	193	197	201	223	231	238	241 2	52 25	7 25	3 255	255	258	255	252	252 2	37 2	20 22	6 21	7 20	9 200	199	191	185	172	161	151 1	42 13	4 139	S 1300
Galway	22	24	29	27	28	30 3	32 3	39 3	39 4	45 4	16 5	4 6	2 6	74	81	79	85	89	93	92	97 1	07 1	13 1	37 15	3 15	5 16	5 173	203	228	262	273	288	314	326 3	55 37	2 36	8 373	382	384	370	354	341	113 2	96 28	2 25	5 24	3 21	187	171	144	126	109	108	97 8	6 83	
Kerry	22	22	19	18	19	18 1	19 1	19 1	19 2	24 2	22 2	4 2	5 2	2 20	21	26	40	46	52	62	64	73	91 1	06 11	0 11	3 14	4 153	177	174	197	215	240	246	263 2	69 25	7 26	9 291	299	279	281	269	271 2	36 2	20 19	8 18	3 17	8 194	190	177	162	153	139	139 1	29 12		127
Kildare	54	59	63	58	59	67 6	57 6	59 7	71	75 7	76 7	5 7	8 7	7 85	82	80	97	95	94	87	98	99 1	08 1	25 14	16 15	54 16	8 188	198	204	208	244	257	278	293 3	05 30	3 29	8 301	306	298	289	290	292	70 2	42 23	1 21	0 18	6 17	169	156	143	121	118	103	94 8	5 9:	
Kilkenny	30	27	21	24	22	26 2	21 2	22 2	21	19 2	24 2	6 2	6 2	3 26	29	38	40	45	42	43	51	51	59	61 7	73 8	37 9	8 105	109	123	142	146	154	165	165 1	77 17	74 18	0 175	176	173	171	168	150	33 1	31 13	9 13	14 13	6 13	134	141	141	133	128	130 1	25 12		126
Laois	45	48	46	44	44	44	46 4	47	40	33	34 3	1 3	2 3	2 35	43	43	76	76	89	87	96 1	05 1	23 1	24 13	33 13	35 13	39 136	161	169	151	174	185	201	214 2	222 22	20 22	0 233	3 242	251	256	231	235	227 2	08 20	4 19	7 17	9 17) 174	175	174	163	157	155 1		6 13	10
Leitrim	81	81	78	72	75	41	44 4	44	44	41 :	34 3	7 3	7 2	5 19	25	25	28	31	31	28	34	34	53	81 9	97 12	25 13	37 147	7 162	218	218	225	240	253	262 2	72 27	78 25	9 247	7 222	209	200	178	125	122 1	09 9	7 8	4 6	9 5	3 31	28	34	37	37	47	56 8		
Limerick	51	55	53	49	45	44	39 3	39 3	36	34	35 3	3 3	3 3	4 39	37	45	58	69	90	96 1	07 1	14 1	19 1	45 16	50 16	57 18	32 189	207	208	231	246	248	277	280 2	290 30	01 28	8 293	3 306	299	310	306	312	277 2	69 26	2 22	8 22	7 22	221	216	218	211	207	198 1	1100	5 21	
Longford	51	51	49	49	46	37	39 3	39	34	32	37 3	9 4	9 5	73	98	120	127	132	147	152 1	54 1	69 1	69 1	76 2	08 19	93 19	96 181	1 193	176	213	240	254	279	291 2	281 30	08 29	6 281	1 289	291	306	279	294	259 2	45 22	13 19	13 18	1 19	3 166	164	157	152	142	132 1		5 11	II DOWN
Louth	88	91	94	96 1	02 1	02 1	98 10	07 10	09 1	01 1	95 10	4 9	2 8	76	75	74	79	77	88	90	85	85	89 1	16 1	09 1	16 11	15 152	2 161	181	185	188	178	221	261 2	293 28	83 27	2 286	299	311	289	296	293	285 2	97 29	7 25	7 21	9 19	3 202	189	177	159	155	157 1	56 14	7 15	- 20.00
Mayo	20	19	26	27	26	26 :	31 3	30	29	32	31 3	2 3	0 2	8 26	28	24	26	30	33	32	36	42	42	54	57	75 8	30 90	107	123	131	150	167	185	208 2	228 24	43 25	0 246	5 256	266	259	248	242	261 2	46 2	2 21	6 19	8 18	3 184	185	176	162	147	151 1	45 14		113
Meath	30	28	28	27	32	32	35 3	38	37	44	42 4	7 4	4 4	7 51	62	67	71	68	85	90	96 1	15 1	29 1	64 1	83 1	99 21	13 306	6 357	403	452	490	488	591	629 6	57 6	56 64	8 649	9 661	651	590	558	531	181 4	50 4	8 35	52 31	4 28	2 272	249	232	204	201	172 1	54 14	1 14	
Monaghan	28	29	26	24	39	39	37 3	37	54	60	68 9	3 11	6 13	5 134	166	173	189	178	207	226 2	257 2	57 2	70 3	03 3	19 3	31 31	13 36	2 350	368	350	375	365	402	389 4	106 40	09 38	4 375	5 349	363	323	310	305	303 2	88 20	19 21	18 20	5 17	1 176	166	142	137	121	122 1	16 11		112
Offaly	63	63	62	60	64	60	62 5	56	59	56	59 5	6 6	3 6	2 65	67	74	77	77	99	103 1	04 1	10 1	23 1	30 1	36 1	40 14	45 14	1 151	1 140	177	201	195	210	224 2	222 2	24 21	4 224	4 217	222	227	218	236	191 1	62 1	3 13	30 11	2 10	5 100	96	97	99	85	99	94 8		5 114
Roscommon	29	29	31	33	33	45	54 5	57	62	67	64 7	6 8	4 9	9 102	121	133	143	161	155	155 1	170 1	66 1	66 1	92 1	84 2	00 18	81 18	7 201	1 198	3 201	223	232	228	239 2	260 2	71 26	0 276	6 263	263	259	231	240	229 2	203 2	25 22	29 21	8 19	5 189	174	153	152	175	170 1	175 16	VI 220	169
Sligo	8	8	12	.11	15	17	15 1	17	17	17	18 2	4 3	2 2	7 27	31	27	38	55	64	75	90 1	07 1	37 1	50 1	63 1	75 18	86 20	8 241	1 291	304	294	325	356	366 3	395 4	06 40	9 423	3 438	438	423	397	359	354 3	156 3:	13 30	04 28	5 25	9 220	211	189	159	154	154 1	54 14		3 114
Tipperary	20	19	19	19	19	18	16	17	16	19	18 2	21 2	4 2	4 25	31	32	36	40	48	53	55	58	58	66	70	71 7	78 8	3 79	9 88	93	110	113	115	118 1	120 1	26 12	4 134	4 139	133	139	145	133	139 1	31 1	30 13	30 13	0 13	2 130	128	122	117	123	118 1	13 11	7 11	1,000
Waterford	71	81	84	85	89	95	97 9	97	87	88	86 6	6 6	7 5	9 53	44	38	35	34	28	31	32	40	46	56	64	61 (66 7	0 83	3 109	9 131	132	143	155	160 1	173 1	76 19	20	5 215	226	225	228	210	205 2	201 2)1 19	95 19	14 18	7 176	163	146	136	128	134 1	14 14	12 14	1 156
Westmeath	48	47	47	48	52	51	52 5	51	48	50	55 5	54 5	55 4	7 48	52	62	66	64	68	80	88	96 1	100 1	05 1	15 1	48 1	67 17	1 217	7 211	251	294	324	337	425 4	435 4	53 45	5 460	0 453	461	465	415	440	402 3	869 3	/2 35	54 26	6 25	5 229	216	208	184	158	151 1	62 13	100	150
Wexford	33	35	35	36	34	33	23 2	23	25	28	28 2	27 2	27 3	5 33	33	35	40	41	48	57	73	80	85	98 1	12 1	30 1	60 17	3 188	8 202	2 250	271	272	297	298	301 3	22 31	8 31	3 301	268	257	258	242	192 1	74 1	/2 14	11 12	4 12	5 96	89	83	74	67	67	48 4	19 4	
Wicklow	52	65	70	70	70	72	70	77	74	71	69 6	55 6	37 7	0 73		72	74	77					76	80	84	88	91 8	7 89	9 91			120	124			45 14			145	147	100000	12.1517		110001	16 10	-	10		88	89	82	77	89		34 8	_
National	56	59	62	63	68	70	71	74	76	79	80 8	34 8	8 8	8 92	96	101	108	107	114	116	124 1	28 1	34 1	50 1	58 1	67 1	77 19	0 207	7 217	7 231	251	261	279	290	302 3	05 30	2 30	7 309	307	298	291	286	268 2	253 2	7 22	26 21	1 20	1 195	184	173	159	150	142 1	133 12	12	124

Trend vs. National

6,033



Summary

Key Events

- Cases in Cork city rose as wet pubs reopened, with mobility within the county rising 7.3%. Cases around the rest of the county followed shortly after
- Cork had a large number of GAA games on 03/10 and 04/10. No matches occurred after this, with level 3 restrictions being applied around this time
- Cases throughout Cork began to fall 10 days after this, Indicating both measures were effective
- Cases in Cork City South Central, the LEA containing UCC, were twice as high as other LEAs in Cork city during mid October. This gap disappeared by November, indicating reopening the college negatively impacted C-19 spread

Cork City as an epicentre

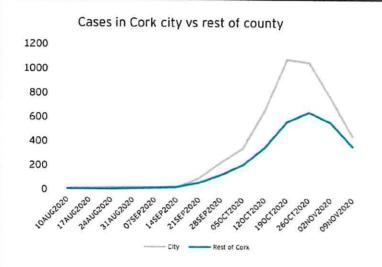
- Cork city was most severely affected. A clear trend of Cork city vs the rest of the county emerges from the data
- 68 cases were detected in one community authreak in with two large nursing home outbreaks (38/32 cases) also detected

Weekend of 14/11

- While incidence rates are falling, Gardai had to disperse large crowds in the city centre this weekend due to individuals consuming takeaway alcohol in large crowds
- Areas such as Grand Parade at Coal Quay noted as popular for these activities

Employment summary

- Manufacturing is the largest employment sector in Cork (c.15%), followed by retail (12%) and health (11%) (EY 2019 employment estimates)
- At peak, 39% of Cork's workforce were on PUP or TWSS (96k). Current PUP levels are currently much lower than the previous peak (35k versus 62k in May)



Since the 1st of September

4,385 cases, with 44% linked to outbreaks

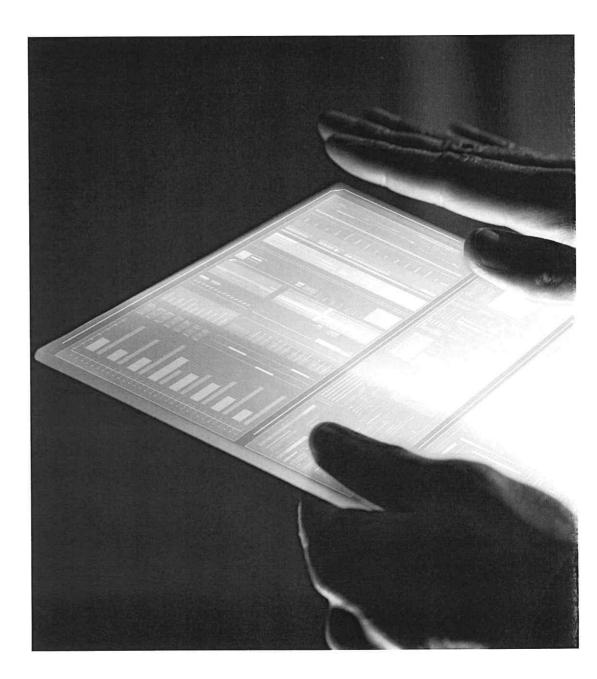
Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	868	332
Community outbreak	393	60
Nursing home	105	8
School	103	21
Extended family	82	20

Notable events	Date	No. of cases
Community outbreak	26/10/2020	68
Restaurant / Cafe	17/09/2020	38
Nursing home		38
Nursing home	医数数重量	30
Community outbreak	22/09/2020	29

Average Daily Change in 14 day incidence by restriction

1.60	1.90	2.72	Santanana	Name of Street, or other Designation of Street, or other Desig	1.37			0.04	0.07		0.20		3.85	5.61	9.94	6.98		
			-2.76	-1.00		-1.73	-1.36			-0.07		-0.14					-5.07	
7947	ribi	12533																-13.34
tions	closed,	closed	etc etc	rder	me Skm	ened	PLF	ning	ning	ıblic	List	sdo	are	back to	ned	nal	ınal	nal
restriction	are clo	S	nts e	ome c km)	at hor	ope r	atory	reopenin	3 reopenin	s on p. port	Green List	Face masks in shops	childcar	nts bac ampus	Ope	vel 3 Nationa	National	vel 5 National
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Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties - highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



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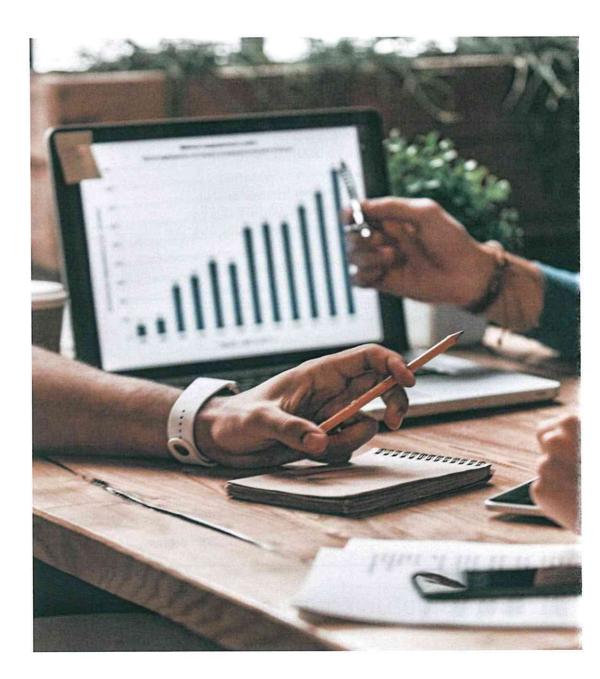


International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular 1GC COVID-19 insights publication and with new research included today

Ireland - restrictions analysis

Interactive demo showing restrictions impact analysis by county



US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.).

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

Selected cities - cases generated and positivity rates

	San Fr	rancisco	Chi	cago	New	York
	Cases	Positivity rate	Cases	Positivity rate	Cases	Positivity rate
Full-service restaurants	+12k	0.09%	+89k	0.33%	+199k	0.22%
Fitness centres	+1k	0.02%	+20k	0.13%	+70k	0.20%
Religious organisations	+479	0.04%	+9k	0.28%	+30k	0.49%
Take-out restaurants	+290	0.01%	+14k	0.14%	+19k	0.11%
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Department stores	+40	0.00%	+540	0.02%	+1k	0.03%
Pharmacies	+40	0.01%	+250	0.02%	+1k	0.02%

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

Note: Calculation of positivity rate using cases generated as a proportion of visits generated

Key findings

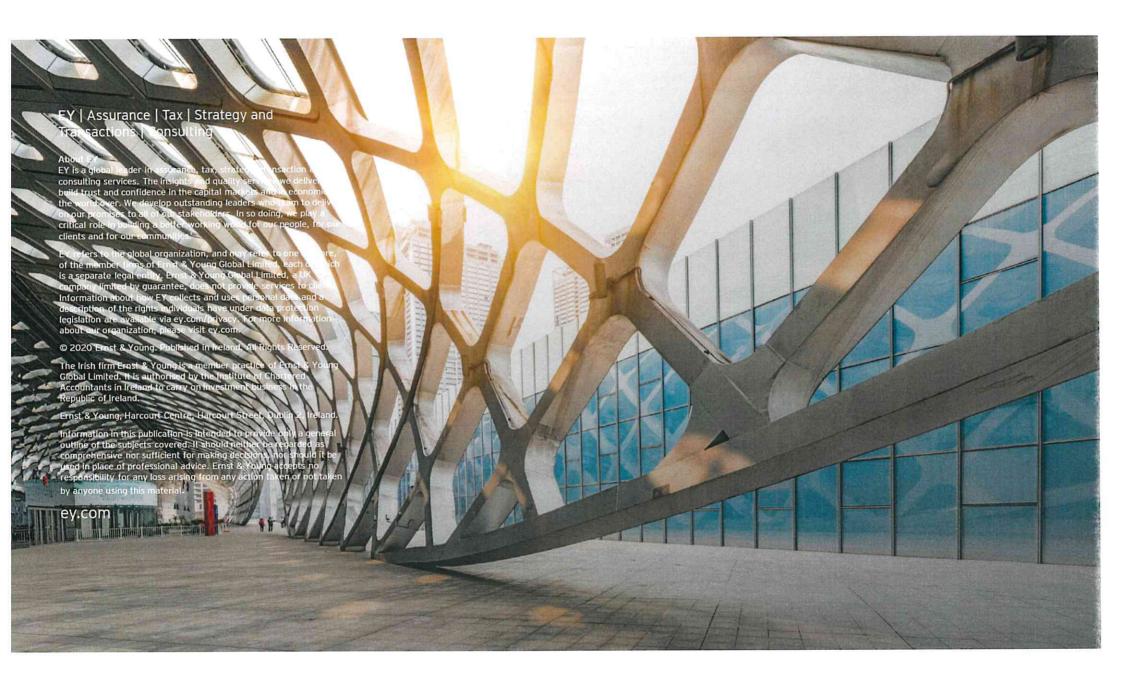
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- A small fraction of 'super-spreader' locations account for a large majority of infections
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility
- This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10)

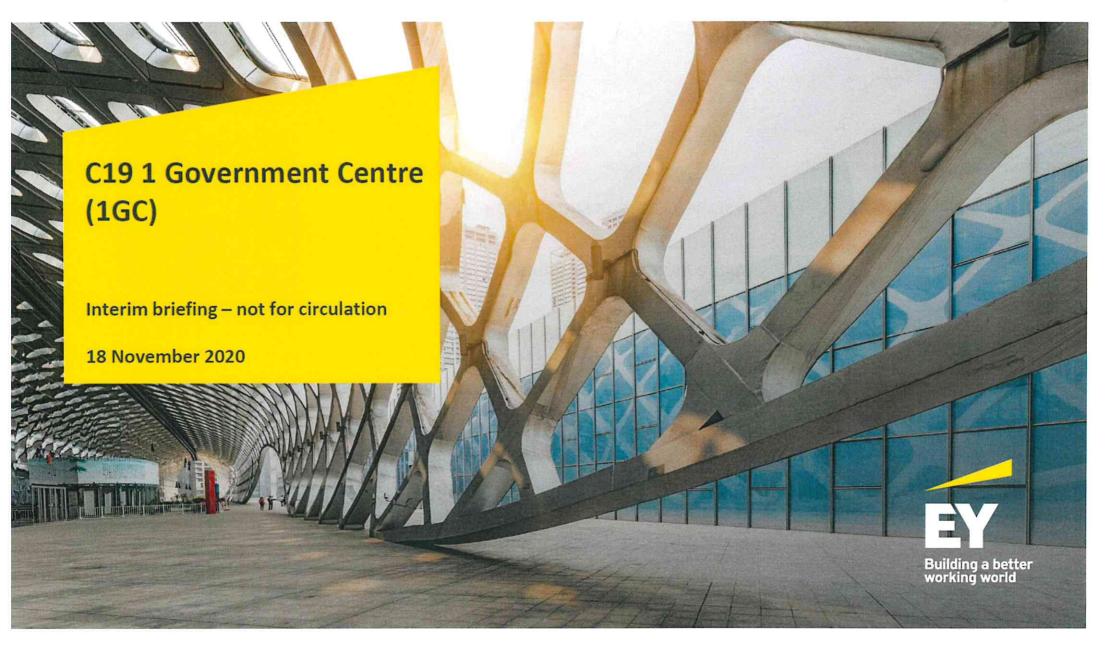
Approach to Christmas monitoring We will use a variety of existing data sources to monitor restriction performance over the Christmas period

			by NPHET Incidence)		Provided by isations (act				insights compliance)	Approach overview
Setting	Description	HSE	CIDR	TII/NTA	Survey	cso	Gardaí	Mobile data	Payments data	 Leverage existing health
Events	Indoor and outdoor (e.g. concerts, sports events, weddings, funerals)	~	~				ТВС	~		data from NPHET, curate
Social/family gatherings	Levels of gatherings in private households	~	~		18/6			~		agencies and create new
Retail and services	Levels of activity in retail and other services (e.g. hairdressers)	~	~			~		~	~	insights from additional data sources
Workplaces	Attendance at physical workplaces	~	~				SPH	~		 Analyse all data to provid
Domestic transport and travel	Levels of movement around the country	~	~	~		~				insights on effectiveness
Education	Schools, childcare, adult and higher education	~	~							of restrictions over the agreed period
Bars/restaurants	Activity levels in bars and restaurants	~	~	(3.20)					~	 Analyse the link to diseas
Care homes	Residential facilities, assist living and nursing homes	~	V							prevalence in each settin
Sentiment/compliance	Indicators around compliance to restrictions	1 4		~	~		ТВС	~		► Leverage insights to
International travel	International travel levels and related disease spread	~	~			~		~		inform restriction measures for future
Leisure/recreation	Gyms, pools, leisure centres	~	4					~		planning as well as provide "stories" to help
Accommodation services	Stays in hotels, guesthouses and B&Bs	~	~					~	~	bring to life for the public

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The
 Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have
 considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we
 shall have no responsibility whatsoever in relation to any such use.
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some
 information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when
 determining the content of the presentation.
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information.





1GC interim update – Week 5

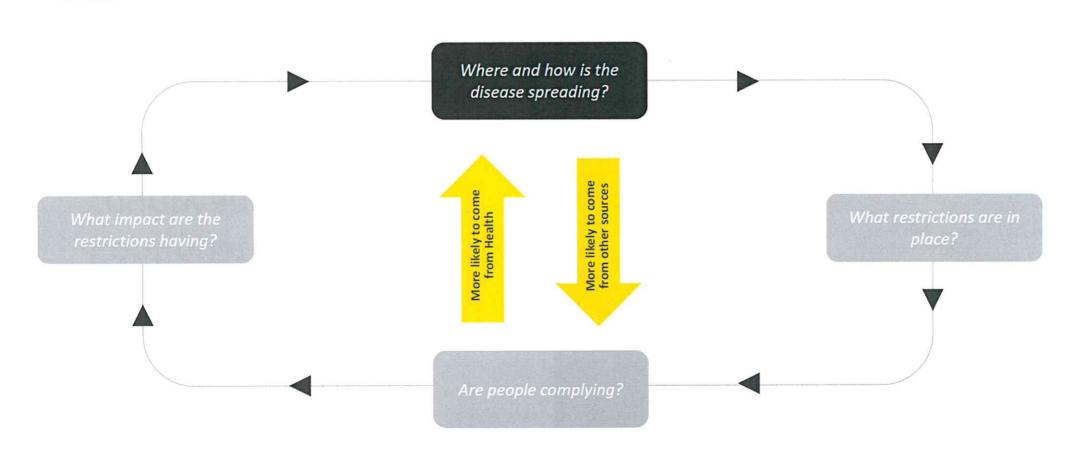
Agenda



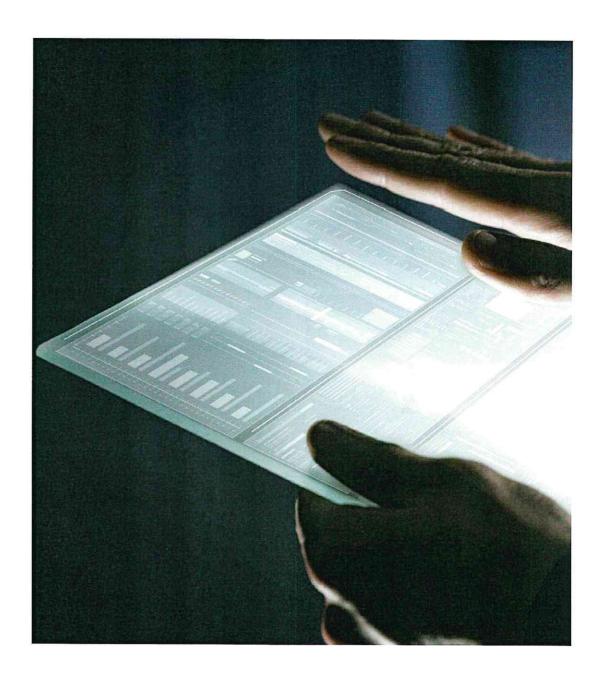


- Briefings shared to date
- Continuation of county analysis
- Restrictions impact analysis

Answering four key questions to support government decision making



Continuation of county analysis



Overview of Incident Rate Per Capital Per County

Average Two Weekly Incident Rate Per 100k	1.			တု (2 0		÷ (2-5	23-Sep		25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Sep	01-Oct	02-Oct	03-Oct	04-Oct	1	06-Oct		ω .	09-Oct	10-0ct	11-0ct	12-Oct	13-Oct	4		1 0	٠,	18-Oct	13-00	21-Oct	. 0	က်	24-0ct	25-Oct	26-Oct	27-Oct	28-Oct		34-04	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	13-Nov	14-Nov
Carlow		37	33	35	35	37	39	40	42	44	42	40	39	39	26	33	35	44	44	44	42	42	40	42	54	61	74	77	83	84	119	116	149	167 1	98 2	04 24	12 24	2 270	292	306	311	327	327	293 2	99 2	70 2	8 24	19 24	2 21	4 21	3 177	160	137	126	105	95	98	91 88
Cavan	20	22	22	21	24	24	22	22	32	37	37	49	51	47	56	67	79	84	88	114	134	144	164	200	303	339	386	412	571	641	735	760	311	824 9	10 #	111	# ###	# 983	3 966	967	964	810	752 (68 6	45 5	89 5	32 47	4 36	5 29	5 26	3 232	206	159	143	133	119 1	112 1	02 108
Clare	29	30	35	38	42	44	41	44	40	40	41	47	50	53	63	76	76	87	96	121	144	158	183	199	246	261	268	304	310	306	309	322	326	327 3	22 3	13 30	04 31	1 272	2 264	281	252	248	253 2	255 2	35 2	29 20	9 18	9 18	6 18	1 17	3 171	160	139	132	122	109 1	104 1	04 93
Cork	11	12	14	17	23	27	32	36	42	47	52	62	66	71	81	88	97	102	105	110	111	119	127	140	155	159	181	199	209	232	237	256	275	308 3	22 3	36 34	40 32	7 334	4 347	337	335	333	331	334 3	18 3	05 2	76 25	8 24	2 23	3 23	216	195	179	158	143	119 1	108 1	02 89
Donegal	46	56	64	73	84	97	106	122	148	159	178	185	191	204	211	219	233	258	265	273	293	312	319	326	324	345	355	355	354	367	365	356	344	347 3	29 3	20 32	20 31	2 324	4 322	329	318	313	317	322 3	10 3	20 3	9 30	5 28	6 30	0 29	7 290	293	275	285	273	281 2	271 2	72 275
Dublin	109	114	121	123	136	137	136	140	144	146	148	152	160	154	159	163	168	172	161	166	162	171	165	163	173	174	177	180	184	193	197	201	223	231 2	38 2	41 25	52 25	7 25	3 255	255	258	255	252	252 2	37 2	220 2	26 21	7 20	9 20	0 19	9 191	185	172	161	151	142 1	134 1	39 136
Galway	22	24	29	27	28	30	32	39	39	45	46	54	62	65	74	81	79	85	89	93	92	97	107	113	137	153	155	165	173	203	228	262	273	288 3	314 3	26 35	55 37	2 368	8 373	382	384	370	354	341 3	13 2	296 2	32 25	5 24	3 21	1 18	7 171	144	126	109	108	97	86	83 86
Kerry	22	22	19	18	19	18	19	19	19	24	22	24	25	22	20	21	26	40	46	52	62	64	73	91	106	110	113	144	153	177	174	197	215	240 2	246 2	63 26	59 25	7 26	9 291	299	279	281	269	271 2	36 2	220 1	98 18	33 17	8 19	4 19	0 177	162	153	139	139	129 1	128 1	28 127
Kildare	54	59	63	58	59	67	67	69	71	75	76	75	78	77	85	82	80	97	95	94	87	98	99	108	125	146	154	168	188	198	204	208	244	257 2	78 2	93 30	05 30	3 29	8 301	306	298	289	290	292 2	70 2	242 2	31 21	10 18	6 17	7 16	9 156	143	121	118	103	94	85	93 89
Kilkenny	30	27	21	24	22	26	21	22	21	19	24	26	26	26	26	29	38	40	45	42	43	51	51	59	61	73	87	98	105	109	123	142	146	154 1	65 1	65 17	77 17	4 18	0 175	176	173	171	168	150 1	33 1	131 1	39 13	34 13	13	4 13	4 141	141	133	128	130	125 1	126 1	29 126
Laois	45	48	46	44	44	44	46	47	40	33	34	31	32	32	35	43	43	76	76	89	87	96	105	123	124	133	135	139	136	161	169	151	174	185 2	201 2	14 2	22 22	0 22	0 233	242	251	256	231 :	235 2	27 2	208 2	04 19	7 17	9 17	0 17	4 175	174	163	157	155	149 1	136 1	36 137
Leitrim	81	81	78	72	75	41	44	44	44	41	34	37	37	25	19	25	25	28	31	31	28	34	34	53	81	97	125	137	147	162	218	218	225	240 2	253 2	62 2	72 27	8 25	9 247	222	209	200	178	125 1	22 1	109	97 8	34 E	9 5	6 3	1 28	34	37	37	47	56	81	81 87
Limerick	51	55	53	49	45	44	39	39	36	34	35	33	33	34	39	37	45	58	69	90	96	107	114	119	145	160	167	182	189	207	208	231	246	248 2	277 2	80 2	90 30	1 28	8 293	306	299	310	306	312 2	77 2	269 2	32 22	28 22	27 22	9 22	1 216	218	211	207	198	195 1	195 2	11 201
Longford	51	51	49	49	46	37	39	39	34	32	37	39	49	59	73	98	120	127	132	147	152	154	169	169	176	208	193	196	181	193	176	213	240	254 2	279 2	91 2	81 30	8 29	6 281	289	291	306	279	294 2	59 2	245 2	23 19	93 18	19	3 16	6 164	157	152	142	132	127 1	115 1	15 103
Louth	88	91	94	96	102	102	98	107	109	101	95	104	92	80	76	75	74	79	77	88	90	85	85	89	116	109	116	115	152	161	181	185	188	178 2	221 2	61 2	93 28	3 27	2 286	299	311	289	296	293 2	85 2	297 2	97 25	57 21	9 19	3 20	2 189	177	159	155	157	156 1	147 1	51 151
Mayo	20	19	26	27	26	26	31	30	29	32	31	32	30	28	26	28	24	26	30	33	32	36	42	42	54	67	75	80	90	107	123	131	150	167 1	185 2	08 2	28 24	3 25	0 246	256	266	259	248	242 2	61 2	246 2	32 2	16 19	18	3 18	4 185	176	162	147	151	145 1	141 1	18 113
Meath	30	28	28	27	32	32	35	38	37	44	42	47	44	47	51	62	67	71	68	85	90	96	115	129	164	183	199	213	306	357	403	452	490	488 5	591 6	29 6	57 65	6 64	8 649	661	651	590	558	531 4	81 4	150 4	48 35	52 31	14 28	2 27	2 249	232	204	201	172	154 1	141 1	40 133
Monaghan	28	29	26	24	39	39	37	37	54	60	68	93	116	135	134	166	173	189	178	207	226	257	257	270	303	319	331	313	362	350	368	350	375	365 4	102 3	89 4	06 40	9 38	4 375	349	363	323	310	305 3	03 2	288 2	59 2	18 20	5 17	1 17	6 166	142	137	121	122	116	117 1	24 112
Offaly	63	63	62	60	64	60	62	56	59	56	59	56	63	62	65	67	74	77	77	99	103	104	110	123	130	136	140	145	141	151	140	177	201	195 2	210 2	24 2	22 22	4 21	4 224	217	222	227	218	236 1	91 1	162 1	53 13	30 11	12 10	6 10	0 96	97	99	85	99	94	87	95 114
Roscommon	29	29	31	33	33	45	54	57	62	67	64	76	84	99	102	121	133	143	161	155	155	170	166	166	192	184	200	181	187	201	198	201	223	232 2	228 2	39 2	60 27	1 26	0 276	263	263	259	231	240 2	29 2	203 2	25 23	29 21	18 19	5 18	9 174	153	152	175	170	175	163 1	166 169
Sligo	8	8	12	11	15	17	15	17	17	17	18	24	32	27	27	31	27	38	55	64	75	90	107	137	150	163	175	186	208	241	291	304	294	325 3	356	66 3	95 40	6 40	9 423	438	438	423	397	359 3	54 3	356 3	33 30	04 28	35 25	9 22	0 211	189	159	154	154	154	140 1	128 114
Tipperary	20	19	19	19	19	18	16	17	16	19	18	21	24	24	25	31	32	36	40	48	53	55	58	58	66	70	71	78	83	79	88	93	110	113 1	115	18 1	20 12	6 12	4 134	139	133	139	145	133 1	39 1	131 1	30 13	30 13	30 13	2 13	0 128	122	117	123	118	113	117 1	14 101
Waterford	71	81	84	85	89	95	97	97	87	88	86	67	67	59	53	44	38	35	34	28	31	32	40	46	56	64	61	66	70	83	109	131	132	143	155	60 1	73 17	6 19	4 205	215	226	225	228	210 2	205 2	201 2	01 19	95 19	94 18	7 17	6 163	146	136	128	134	114	142 1	141 156
Westmeath	48	47	47	48	52	51	52	51	48	50	55	54	55	47	48	52	62	66	64	68	80	88	96	100	105	115	148	167	171	217	211	251	294	324	337 4	25 4	35 45	3 45	5 460	453	461	465	415	440 4	102 3	369 3	72 3	54 26	66 25	5 22	9 216	208	184	158	151	162	133 1	150 150
Wexford	33	35	35	36	34	33	23	23	25	28	28	27	27	35	33	33	35	40	41	48	57	73	80	85	98	112	130	160	173	188	202	250	271	272	297 2	98 3	01 32	2 31	8 313	301	268	257	258	242 1	192 1	174 1	72 1	41 12	24 12	6 9	6 89	83	74	67	67	48	49	49 49
Wicklow	52		70	70	70	72	70	77	74	71	69	65	67	70	73	65	72	74	77	78	78	77	76	76	80	84	88	91	87	89	91	103	119	120	124	24 1	29 14	5 14	5 149	149	145	147	149	141 1	30 1	117 1	16 10	07 10	04 10	6 9	1 88	89	82	77	89	86	84	85 85
National	No.	59	62	63	68	70	71	74	76	79	80	84	88	88	92	96	101	108	107	114	116	124	128	134	150	158	167	177	190	207	217	231	251	261	279	90 3	02 30	5 30	2 307	309	307	298	291	286 2	268 2	253 2	47 2	26 2	11 20	1 19	5 184	173	159	150	142	133	127 1	128 124
National	56	59	62	63	68	70	71	74	76	79	80	84	88	88	92	2 96	101	108	107	114	116	124	128	134	150	158	167	177	190	207	217	231	251	261	2/9 2	90 3	02 30	15 30	2 307	309	307	298	291	286 2	08 2	233 2	9/ 2	20 2	11 20	1 19	J 164	1/3	159	150	142	133	121 1	40

County view - Cork

Total Confirmed Cases Trend vs. National

Summary

Key Events

- Cases in Cork city rose as wet pubs reopened, with mobility within the county rising 7.3%. Cases around the rest of the county followed shortly after
- Cork had a large number of GAA games on 03/10 and 04/10. No matches occurred after this, with level 3 restrictions being applied around this time
- Cases throughout Cork began to fall 10 days after this, indicating both measures were effective
- Cases in Cork City South Central, the LEA containing UCC, were twice as high as other LEAs in Cork city during mid October. This gap disappeared by November, indicating reopening the college negatively impacted C-19 spread

Cork City as an epicentre

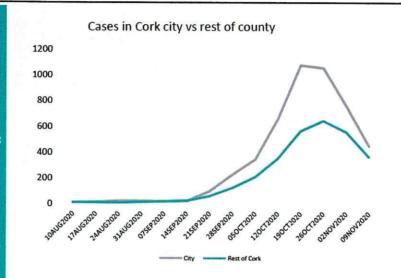
- Cork city was most severely affected. A clear trend of Cork city vs the rest of the county emerges from the data
- 68 cases were detected in one community outbreak in with two large nursing home outbreaks (38/32 cases) also detected

Weekend of 14/11

- While incidence rates are falling, Gardai had to disperse large crowds in the city centre this weekend due to individuals consuming takeaway alcohol in large crowds
- Areas such as Grand Parade at Coal Quay noted as popular for these activities

Employment summary

- Manufacturing is the largest employment sector in Cork (c.15%), followed by retail (12%) and health (11%) (EY 2019 employment estimates)
- At peak, 39% of Cork's workforce were on PUP or TWSS (96k).
 Current PUP levels are currently much lower than the previous peak (35k versus 62k in May)



Since the 1st of September

4,385 cases, with 44% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	868	332
Community outbreak	393	60
Nursing home	105	8
School	103	21
Extended family	82	20

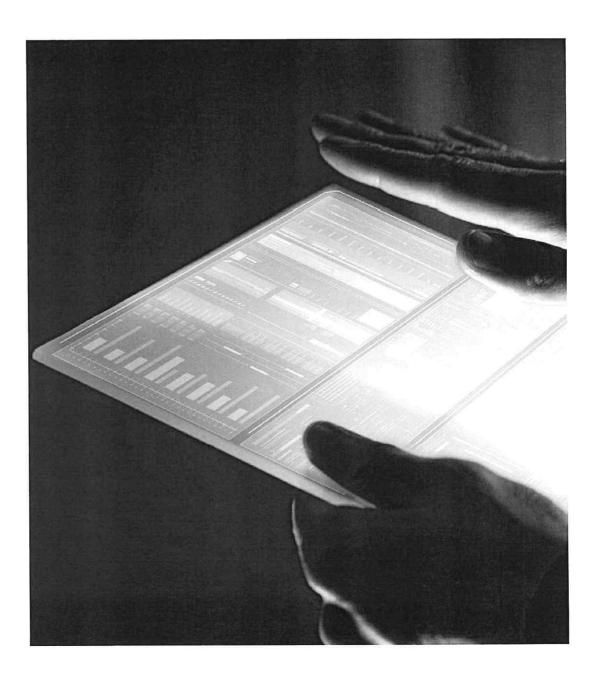
Notable events	Date	No. of cases
Community outbreak	26/10/2020	68
Restaurant / Cafe	17/09/2020	38
Nursing home	The sales	38
Nursing home	6463E	30
Community outbreak	22/09/2020	29

Average Daily Change in 14 day incidence by restriction

1.60	1.90	2.72	-2.76	-1.00	1.37	-1.73	-1.36	0.04	0.07	-0.07	0.20	-0.14	3.85	5.61	9.94	6.98	-5.07	-13,34
No restrictions	childcare closed, School Closed	Bars closed	Non-essential retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Face masks in shops	Schools + childcare opened	Students back to campus	Wet Bars Opened except Dublin	Level 3 National	Level 3 Max National	Level 5 National

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Restrictions impact analysis



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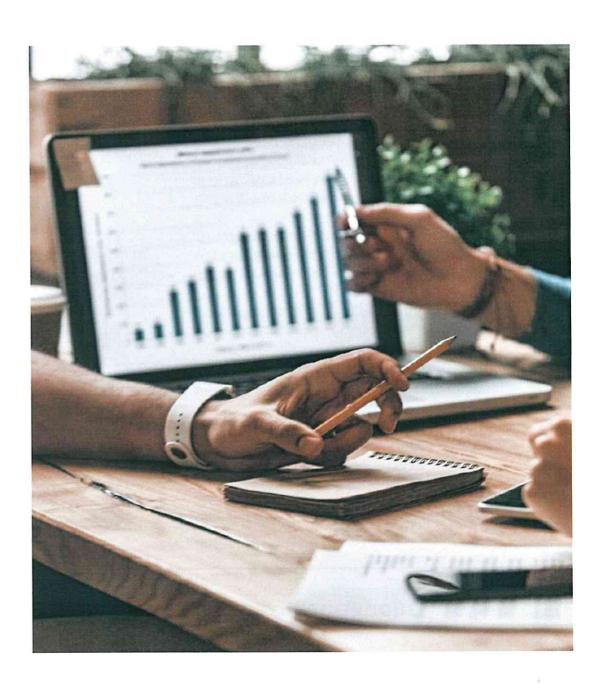


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Interactive demo showing restrictions impact analysis by county



US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

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Calculates potential visits and infections over two months generated by the re-opening of certain locations.

Selected cities - cases generated and positivity rates

	San Fr	ancisco	Chi	icago	New	York
	Cases	Positivity rate	Cases	Positivity rate	Cases	Positivity rate
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Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

Note: Calculation of positivity rate using cases generated as a proportion of visits generated

1GC briefing - 18 November 2020 - Not for circulation

Key findings

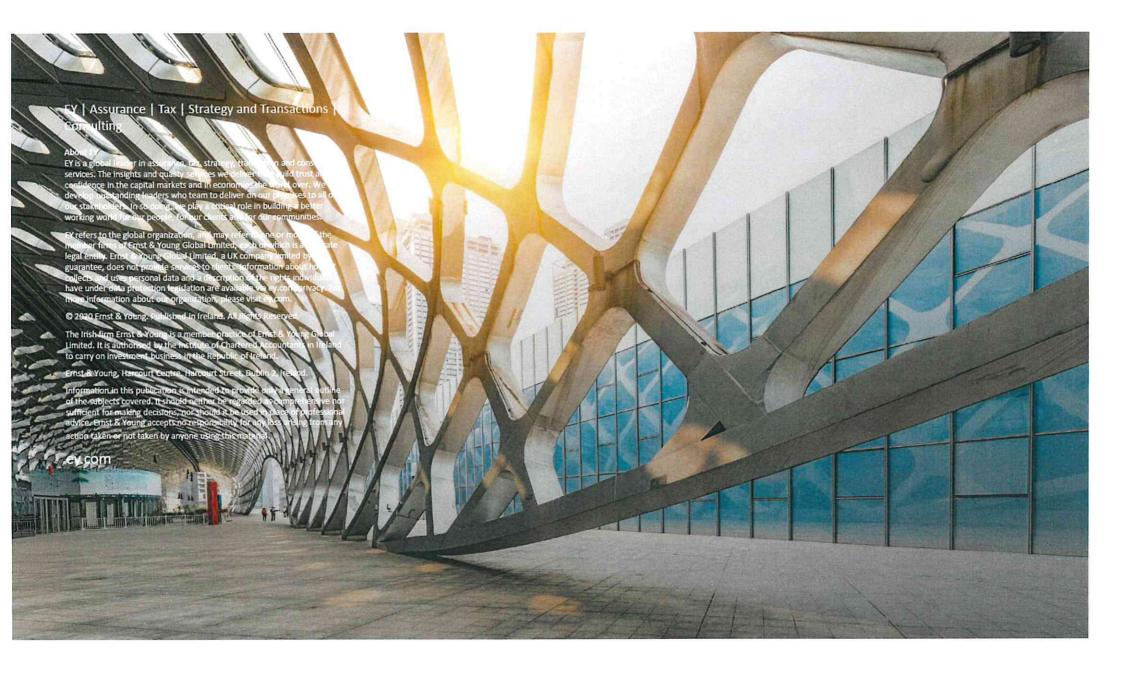
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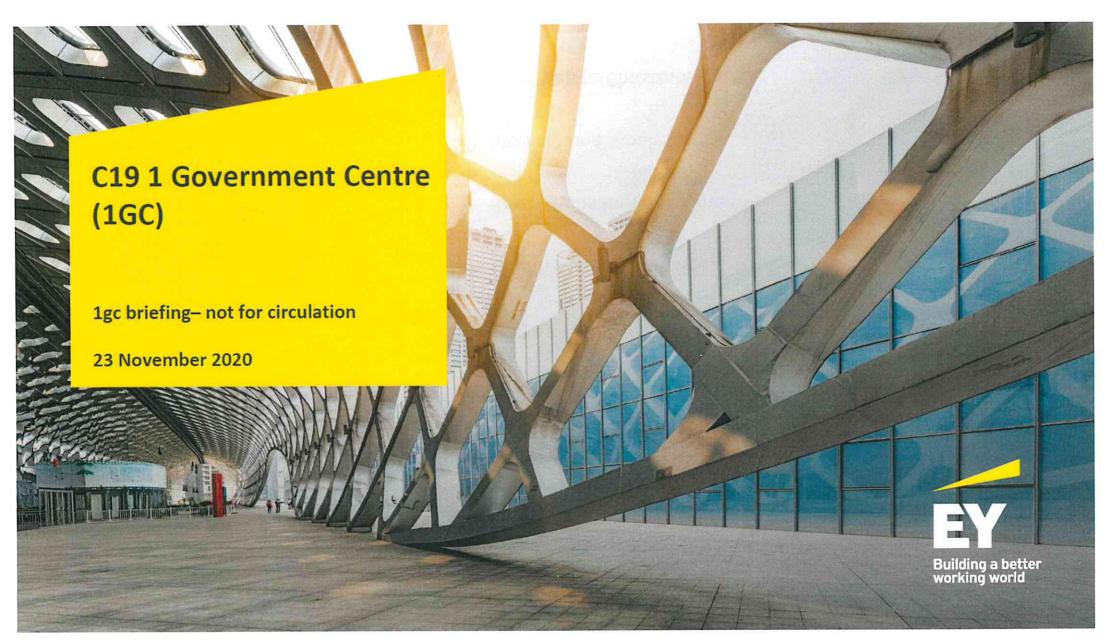
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			by NPHET Incidence)	Provid	ed by public : (activity/co		isations		r insights (compliance)	Approach overview
Setting	Description	HSE	CIDR	TII/NTA	Survey	cso	Gardaí	Mobile data	Payments data	 Leverage existing health dat
Events	Indoor and outdoor (e.g. concerts, sports events, weddings, funerals)	~	~				TBC	~		from NPHET, curate data
Social/family gatherings	Levels of gatherings in private households	~	~					~		from Government agencies and create new insights from
Retail and services	Levels of activity in retail and other services (e.g. hairdressers)	~	~			~		~	~	additional data sources
Workplaces	Attendance at physical workplaces	~	~					~		Analyse all data to provide
Domestic transport and travel	Levels of movement around the country	V	~	~		~				insights on effectiveness of restrictions over the agreed
Education	Schools, childcare, adult and higher education	~	~		100					period
Bars/restaurants	Activity levels in bars and restaurants	~	~						~	 Analyse the link to disease prevalence in each setting
Care homes	Residential facilities, assist living and nursing homes	~	~							
Sentiment/compliance	Indicators around compliance to restrictions			~	~		ТВС	~		 Leverage insights to inform restriction measures for
International travel	International travel levels and related disease spread	V	~			~		~		future planning as well as provide "stories" to help
Leisure/recreation	Gyms, pools, leisure centres	~	~					~		bring to life for the public
Accommodation services	Stays in hotels, guesthouses and B&Bs	~	~					~	~	

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use.
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation.
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information.





1GC update – Week 6

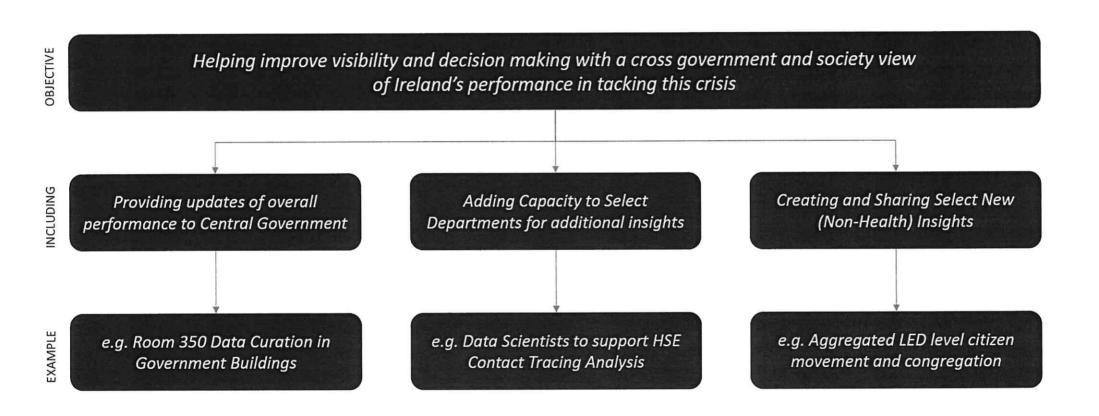
Agenda



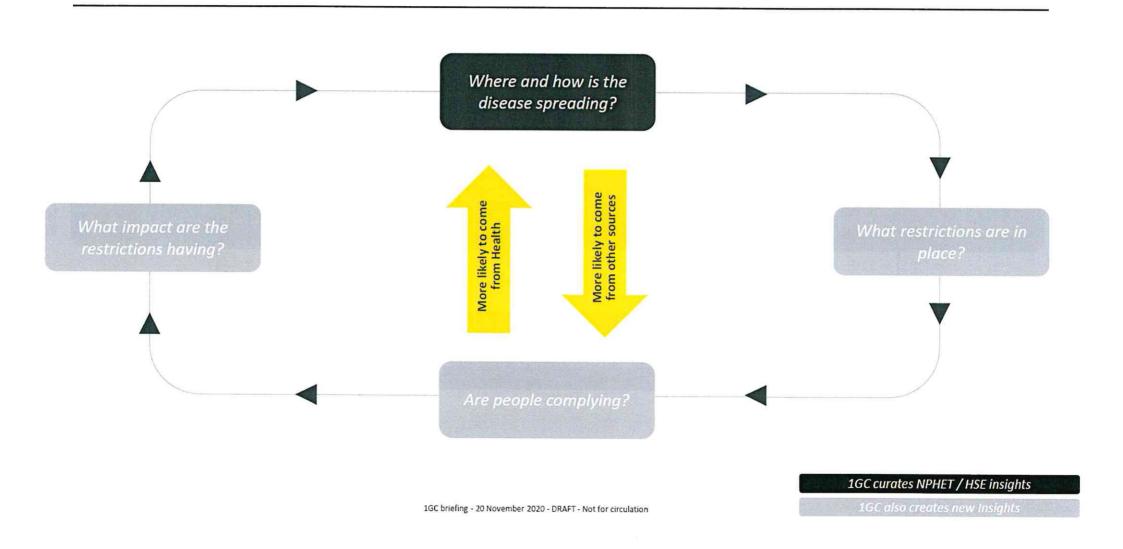


- 4 1GC Intro
- Country Specific Analysis
- Restrictions Impact analysis
- International Analysis
- Roadmap to Christmas

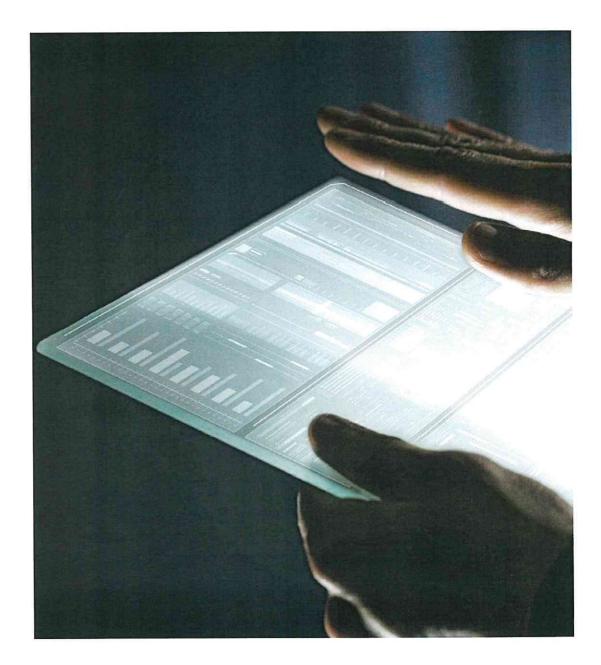
Introduction to the C-19 One Government Centre (1GC)



Answering four key questions to support government decision making



County specific analysis



Introduction to County Specific Analysis

This section summarises the how C-19 is spreading in select countries. They can be broadly put into four categories:

- 1. Driven by proximity to the border
- 2. Driven by a specific outbreak event (while accepting that all counties have outbreaks), e.g.
 - Nursing Homes
 - Workplace
 - Social
 - Private House
 - University
- 3. Following the national restriction trend change
- 4. Dublin

County Analysis Summary

County	Border County	Major Incidence	Dublin and Surrounding Area	Following National Restrictions Trend	Wave One Outbreak Sources	Wave Two Outbreak Sources	Change in 14 day incidence rate (14/11-17/11)	Wave 2 Incidence rate
Cavan	-	1		·	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	-0.14	
Louth	· ·	1		V	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	0.1	
Donegal	1	/			Travel Related, Nursing Home, Community Houset all Long. Stay Unit	Delivate House & Hornitale Extended Camilla	0.06	
Monaghan	_	·			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential Institutions	-0.08	
Leltrlm*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	0.13	
Meath			-	· ·	Nursing Home, Private Houses, Workplace	Private Houses, Nursing Homes, Community Outbreak	0.01	
Dublin		-	-		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	-0.18	
Klidare**					Nursing Home, Private Houses,	Priate House, Workplace, Nursing Homes	-0.03	
Cork		-			Residential Institution Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	-0.08	
Galway	+	~		✓ ×	Hospital, Nursing Home, Private	Private House, Community Outbreak, Nursing	-0.1	
Kerry					Houses Private Houses, Residential	Home Private House, Community Outbreak, Nursing	-7.00	
Limerick		-		-	Institutions, Hospital Nursing Home, Private Houses, Residential Institution	Home Extended Family, Community Outbreak, Private House	0.15	
Carlow*		·			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	-0.09	
Clare		_			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	0.17	
Laols*		~			Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	-0.32	
Longford*		·	1		Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	-0.02	
Offaly*		·			Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	0.06	
Roscommon		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	-0.05	
Tipperary		~			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	0.05	
Waterford		~			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	0.05	
Klikenny*		✓			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	-0.09	
Wicklow**			·	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	-0.03	
Mayo				· · · · · · · · · · · · · · · · · · ·	Nursing Home, Hospital, Community Hospital/Long-Stay Unit	Private House, Nursing Home, School, Workplace	-0.04	
Sligo*				1	Nursing Home, Private House, Travel Related	Private House, Extended Family, Religious/Other Ceremony	-0.23	
Westmeath*					Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	-0.33	
Wexford					Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	-0.07	

 $[\]hbox{*Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR}\\$

^{**}Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow
Wave 1: 03/03-25/07 Wave 2: 26/07-20/11

1GC briefing - 20 November 2020 - DRAFT - Not for circulation

Overview of Incidence Rate Per Capital Per County

UPDATE FOR NEW DATA

The below heatmap shows the county incident rate per capital over the last two months. The overall reduction in cases has levelled in the week with some counties now increasing.

Two Weekly Incidence Rate Per 100k	17-Sep	18-Sep	19-Sep	21.Sep	22-Sep	23-Sep	24-Sep	25.Sen	26-Sep	27. San	30 00	dac-07	dec-62	30-Sep	01-0ct	02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	07-Oct	08-Oct	09-Oct	10-Oct	11-0ct	12-Oct	13-Oct	14-Oct	15-Oct		17-Oct	18-Oct	19-Oct	20-Oct	21-Oct		130-27	23-001	24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	Nov-In	UZ-Nov	03-Nov	04-Nov	Nov-SO	06-Nov	07-Nov	08-Nov	NoN-60	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	Change Last 3 Days
Offaly	62	60	64	60	52 5	6 5	9 5	6	59 1	56	63	62	65	67	74	77	77	99	103	104	110	12:	131) 13	5 140	0 14	5 1	11 15	51 14	0 17	7 2	01 15	95 2	0 22	4 2	22 1	224	214	224	217	222 :	227	218	236	191	162	153	130	112	106	100	36	97	99	85	99	94	87	95	114	112	117	19%
Leitrim	78	72	75	41	44 4	4 4	4 4	11	4	7	37	251	13	25	25	28	31	31	28	34	34	5.	8	1 9	125	5 13	7 14	7 16	2 2	18 2	8 22	5 2	40 25	3 26	2 2	72	278 2	59	247	222	209 :	200	178	125	122	109	97	84	69	56	31	28	34	37	37	47	56	81	81	87	94	94	13%
Waterford	84	85	83	95	97 5	7 8	7 8	3 1	36 6	37	67	59	53	44	38	35	34	28	31	4.32	4() 41	5	6	6	1 6	6 7	0 8	3 10	19 t	31 13	12 14	13 15	5 16	0 1	73	176	194	205	215	226	225	228	210	205	201	201	195	194	187	176	163	146	136	128	134	114	142	141	156	163	163	13%
Limerick	53	49	45	44	39	19 3	6 3	4	5	13	33	34	39	37	45	58	69	90	96	107	114	11	141	5 16	3 167	7 18	2 19	9 20	7 20	08 2	31 24	6 2	48 27	7 28	0 2	90	301 2	88	293	306	299	310	306	312	277	269	262	228	227	229	221	216	218	211	207	198	195	195	211	201	222	238	11%
Clare	35.	38	42	44	41 4	4 4	0 4	0	41 4	17	50	53	63	76	76	87	96	121	144	158	183	19	24	8 26	1 26	8 30	4 3	0 30	6 30	9 32	2 32	6 3	27 33	2 31	3 3	04	311 2	72	264	281	252	248	253	255	235	229	209	189	186	181	173	171	160	139	132	122	109	104	104	93	103	111	7%
Louth	94	96	102	102	98 10	7 10	9 10	n :	95 10)4	92	88	76	75	74	73	77	88	90	85	8	5 8	111	5 10	3 116	6 11	5 15	2 16	1 1	81 18	5 18	8 17	78 2	1 2	1 2	93	283 2	72	286	299	311	289	296	293	285	297	297	257	219	193	202	189	177	159	155	157	156	147	151	151	168	157	495
Donegal	64	73	84	97 1	06 12	2 14	8 15	9 1	78 18	55 1	91 2	04	211	219	233	258	265	273	293	312	315	3 32	32	4 34	359	5 35	5 35	4 38	7 36	55 35	6 34	4 34	17 33	9 32	0 3	20	312	24	322	329	318	313	317	322	310	320	309	305	286	300	297	290	293	275	285	273	281	271	272	275	269	281	3%
Galway	23	27	28	30	32 (9 3	9 4	5	16 !	34	62	65	74	81	79	85	89	93	92	97	107	7 11	13	7 15	3 155	5 16	5 17	3 20	3 22	28 26	2 27	3 2	88 3	4 32	6 3	55	372 :	168	373	382	384	370	354	341	313	296	282	255	243	211	187	171	144	126	103	108	97	86	83	86	80	84	296
Roscommon	31	33	33	45	54 5	7 6	2 6	7	4 7	76	84	99	102	121	133	143	161	155	155	170	166	16	193	2 18	200	0 18	31 18	7 20	11 15	98 2	01 22	3 2	32 22	8 23	9 2	60	271 2	60 2	276	263	263 3	259	231	240	229	203	225	229	218	195	189	174	153	152	175	170	175	163	166	169	141	169	296
Wicklow	70	70	70	72	70 7	7 7	4 7	71	9 6	5	67	70	73	65	72	74	77	78	78	77	76	7	81) 8	8	8 5	91 8	7 8	9	91 10	3 1	19 II	20 12	4 12	4 1	29	145	145	149	149	145	147	149	141	130	117	116	107	104	106	91	88	89	82	77	89	86	84	85	85	82	86	196
Tipperary	19	19	THE .	13	16	17	6	9	18	21	24	24	25	31	32	36	40	48	53	55	58	5	6	5 7	7	1 7	8 8	3 7	9 8	8 5	3 1	10 1	13 1	5 11	8 I	20	126	124	134	139	133	139	145	133	139	131	130	130	130	132	130	128	122	117	123	118	113	117	114	101	105	110	-456
Kerry	19	19	13	18	19	19 1	9 2	123	2 6	4	25	22	20	21	26	40	46	52	62	64	73	3 9	1 10	5 11	3 11	3 14	4 15	3 17	7 17	4 19	7 2	15 24	10 24	6 26	3 2	69	257 2	69	291	299 7	279	281	269	271	236	220	198	183	178	194	190	177	162	153	139	139	129	128	128	127	123	122	-5%
Mayo	26	27	26	26	31 3	0 2	3 3	2	31	2	30	28	26	28	24	26	30	33	32	36	4	4	5	4 8	7 7	5 8	0 9	0 10	7 12	23 1	31 15	50 te	67 16	5 20	8 2	28	243 2	50	246	256	266	259	248	242	261	246	232	216	198	183	184	185	176	162	147	151	145	141	118	113	110	110	-7%
Wexford	35	36	34	33	23 2	3 2	5 2	8	8	7	27	35	33	33	35	40	41	48	57	73	80	8	9	3 11.	2 130	0 16	0 17	3 18	8 20	12 25	0 2	71 2	72 25	7 29	8 3	101	322	318	313	301	268	257	258	242	192	174	172	141	124	126	96	83	83	74	67	67	48	49	49	49	47	45	-9%
Meath	28	27	32	32	35 3	8 3	7 4	4	12 4	17	14	47	51	62	67	71	68	85	90	96	115	5 12	16	18	3 19	9 21	3 30	6 35	7 40	3 45	2 49	0 41	88 5	11 62	9 6	57 (556 E	48	649	661	651 8	590	558	531	481	450	448	352	314	282	272	249	232	204	201	172	154	141	140	133	139	128	-9%
Kildare	63	58	59	67	67 6	9 7	1 7	5	76 7	75	78	77	85	82	80	97	95	94	87	96	35	9 10	125	5 14	5 15	4 16	8 18	8 19	8 20	04 20	8 24	4 25	57 27	8 29	3 3	05	003 2	298	301	306	298	289	290	292	270	242	231	210	186	177	169	156	143	121	118	103	94	85	93	89	88	85	-10%
Kilkenny	21	24,	22	26	21 3	2 2		9	4	6	16	26	28	23	38	40	45	42	43	5	5	1 5	6	1 7	8	7 3	8 10	5 10	9 12	23 14	2 14	6 1	54 16	5 16	5 1	77	174	180	175	176	173	171	168	150	t33	131	139	134	136	134	134	141	141	133	128	130	125	126	129	126	118	116	-1196
Longford	49	49	46	37	39 3	9 3	4 3	2	37 :	39	49	59	73	98	120	127	132	147	152	154	165	9 16	17	8 20	3 19	3 19	6 1	1 19	3 17	6 2	3 24	0 2	54 27	9 2	1 2	81	308 2	96	281	289	291	306	279	294	259	245	223	193	181	193	166	164	157	152	142	132	127	115	115	103	103	100	-15%
Dublin	121	123	136	137 1	36 14	0 14	4 14	6 1	8 15	52 1	60	54	159	163	168	172	161	166	162	17	165	5 16	17:	3 17	17	7 18	0 ts	4 19	3 19	7 2	01 22	3 2	31 2	8 2	11 2	52	257 2	53	255	255	258	255	252	252	237	220	226	217	203	200	199	191	185	172	161	151	142	134	139	136	119	118	-18%
Cavan	22	21	24	24	22 2	2 3	2 3	7	7	19	51	47	56	67	79	84	88	114	134	144	164	20	30	3 33	9 38	6 41	2 5	71 64	1 73	35 76	0 8	111 8	24 9	0 101	2 10	58 1	158 9	83	966	967	964	810	752	688	645	589	562	474	365	295	263	232	206	159	143	133	119	112	102	108	98	87	-18%
Carlow	33	35	35	37	39 4	0 4	2 4	4	12	10	39	39.	26	33	35	44	44	44	42	42	40	4	5	1 6	1 7	4 7	7 8	3 8	4 1	19 1	6 14	19 16	87 t	8 20	4 2	42	242 2	70	292	306	311	327	327	293	299	270	278	249	242	214	213	177	160	137	126	105	95	98	91	88	72	77	-18%
Cork	1	17	23	27	32	6 4	2 4	7 !	52 6	2	66	71	81	88	97	102	105	110	111	115	127	7 14	15	5 15	9 18	1 19	9 20	9 23	2 2	37 25	6 27	75 31	08 32	2 33	6 3	40	327	134	347	337	335	333	331	334	318	305	276	258	242	233	239	216	195	179	158	143	119	108	102	29	83	96	-19%
Monaghan	26	24	39	39	37	7 5	4 6	0	8 5	33	116	135	134	166	173	189	178	207	228	257	257	7 27	30	3 31	3 33	1 31	3 36	2 35	0 36	8 35	0 37	75 38	65 46	2 38	9 4	06	109	84	375	349	363	323	310	305	303	288	269	218	265	171	176	166	142	137	121	122	tte	117	124	112	114	104	-19%
Laois	46	44	44	44	46 4	7 4	0 3	3	4	31	32	32	35	43	43	76	76	89	87	96	105	5 12	12	1 13	3 13	5 13	9 13	8 16	1 16	39 1	51 17	74 1	85 2	11 21	4 2	22	220 :	220	233	242	251	256	231	235	227	208	204	197	179	170	174	175	174	163	157	155	149	136	126	137	116	107	-26%
Westmeath	47	48	52	51	52	51 4	8 5	0 1	55 5	54	55	47	48	52	62	88	64	68	80	95	96	6 10	100	5 11	5 141	8 16	7 1	71 21	7 2	m 2	51 25	14 3	24 3	7 42	5 4	35	153	EF.	480	453	461	465	415	440	402	269	372	254	266	255	229	216	208	184	158	151	152	123	150	150	117	117	-28%
Sligo			15	17		100	1	A STATE		1	6	27	27	20	27	-10	55	64	75	90	1 107	7 13	15	0 16	171	5 19	6 20	0 2	1 2	91 30	4 20	14 2	25 35	c 20	6 4	95	100	ing .	122	438	120	423	397	050	354	250	333	204	205	259	220	211	189	150	150	1Ex	154	140	128	114	100		35%
National		63	-	-	71 7	4 7		9	20 0	34	_		-	oc.	_	100	107			_								_	_					_	_					_	_	_	_		_				-			-		100	109	104	_	_	128				-8%

County view – Cavan (19/11)

Total Confirmed Cases Trend vs. National

Summary

Previous Findings: Border County

- As a border county Cavan has witnessed high rates of infection in particular in the Cavan-Belturbet LEA
- · Challenge of cross-border variance in restriction levels

Previous Findings: Outbreaks

- · "Private House" outbreaks in late September grew
- Crosserlough (LEA Ballyjamesduff) win County Final, with reports of celebrations and "lock ins"

22 in schools and 18 in the community

Previous Findings: Restrictions

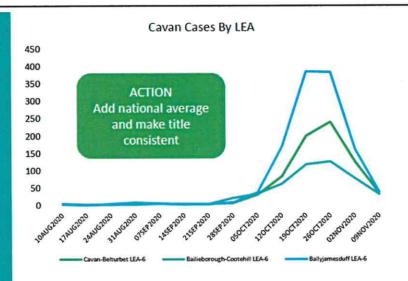
- Case incidents increase appear to coincide with easing of restrictions and events above
- Level 4 appears to have desired impact of reducing incident rate
- · Level 5 further accelerates case incident reduction

November Findings: Level 5 Impact

- Travel along the Belturbet bypass (border road) fell by 33% during October
- Incidence rate has fallen from 2.5 times the national average to the national average during November
- Outbreak-related cases fell from 90 in the last 2 weeks of October to 13 in the first two weeks of November

Employment Summary

 Cavan had c.47% of its workforce on PUP or TWSS (15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP which is down from 9.7k in May (CSO, DSP)



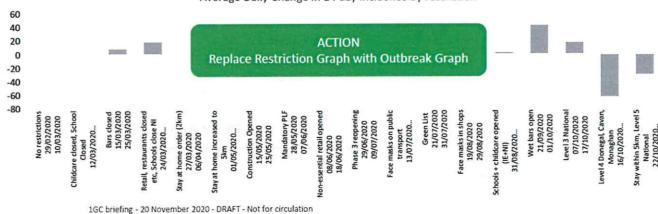
Since the 1st of September

1,272 cases, with 32% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	215	72
Community outbreak	51	2
Nursing home	29	12
School	24	8
Extended family	19	1

Notable events	Date	No. of cases
Community outbreak	09/10/2020	50
Restaurant / Cafe	04/10/2020	19
Nursing home		16
Nursing home		8
Community outbreak	21/10/2020	7

Average Daily Change in 14 day incidence by restriction



County View - Meath (13/11)





Summary

Outbreak

- Private homes leader in outbreaks with 61% of total, 3.2 cases per outbreak on average
- . A Nursing Home outbreak with 33 cases
- One significant community outbreak of 29 cases

GAA Football County Final

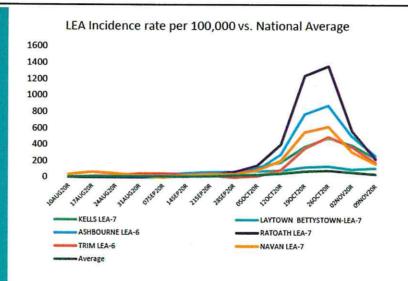
- In the week following Ratoath's Senior Football Championship victory (October 4th), cases in the Ratoath LEA rapidly spiked
- This was followed by a rise in incidences throughout the rest of the county

Commentary on Restrictions

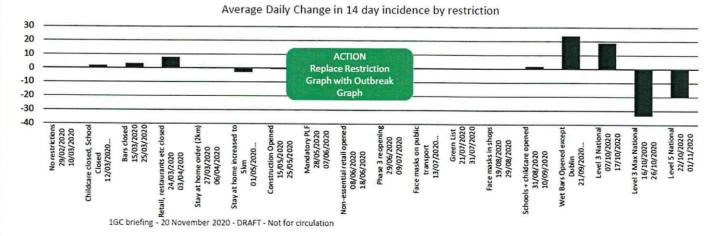
- In the days following level 3 restrictions in Meath, cases began to stabilize and fall.
- Level 5 restrictions helped to accelerate this decline in cases, bringing Meath's incidence rate down from nearly double the national rate in mid-late October to both levels being nearly equal by November.

Employment summary

Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP remain lower than peak (13k versus 25k) levels (CSO, DSP)



Since the 1st of September 2,466 cases, with 27% linked to outbreaks No. of Top 5 Settings No. of Cases Outbreaks Private house 397 121 Nursing home 74 Community outbreak 45 Workplace 38 18 School 25 10 Notable events Date No. of cases Nursing home 51 Community outbreak 10/10/2020 29 Community outbreak 13/10/2020 12 Workplace 19/10/2020 11 Nursing home 10



County View – Donegal (20/11)

Total Confirmed Cases Trend vs. National 2,755

Summary

Border County

Incidence rates in LEAs bordering Northern Ireland were consistently higher than other areas in the county

Compliance

- Mask compliance in Donegal reduced (against national and previous Donegal trend) with Level 4 restrictions. This is against the trend in Donegal for Level 3
- Road travel near the border fell by 27% between September and October, likely a result of level 3 restrictions and restrictions in Derry
- However, from October to November, road travel on this road rose by 6%, despite additional restrictions in both countries being put in place

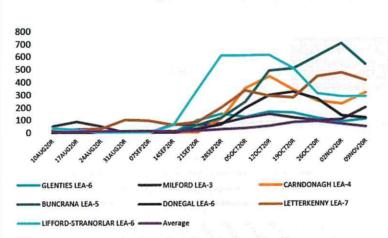
Commentary on Restrictions

- Despite level 5 being effective in other counties, cases in Donegal continue to decline at a far lower rate compared to national levels
- resulted in 99 cases A large hospital outbreak in
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in
- Low association between outbreaks and sporting activities. County Football Championship Final was cancelled

Employment summary

Donegal had c.49% of its workforce on PUP or TWSS (30k) at the peak in early May (EY 2019 employment estimates) . The numbers currently on PUP remain lower than peak (12k versus 23k) (CSO, DSP)





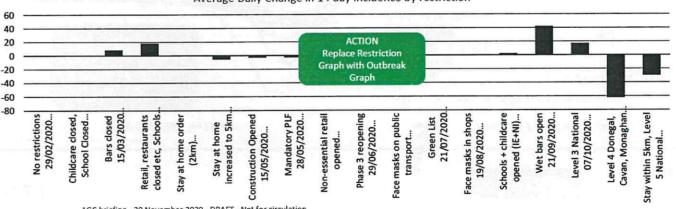
Since the 1st of September

2165 cases, with 62% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	651	235
Workplace	159	28
Hospital	126	5
Extended family	118	19
Nursing home	58	5

Notable events	Date	No. of cases
Hospital	DESCRIPTION OF THE PARTY OF THE	99
Workplace	23/09/2020	55
Nursing home		49
Social gathering	24/10/2020	20
Hospital		17

Average Daily Change in 14 day incidence by restriction



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County view - Galway (20/11)

Total Confirmed Cases Trend vs. National

Summary

Key Events

- NUI Galway, located in Galway City Central LEA, reopened on 24/09. Within 10 days, cases in this LEA spiked
- Wet pubs reopening saw mobility within the county rise by 5.4%. Cases around the rest of the city began to rise during mid-October
- GAA senior championship football semi-finals and finals occurred in the last week of September, which, with the pubs open, may have exacerbated the spread during this time
- Ten days after national level 3 lockdown (27/10) we see cases decline almost immediately, falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Outbreaks

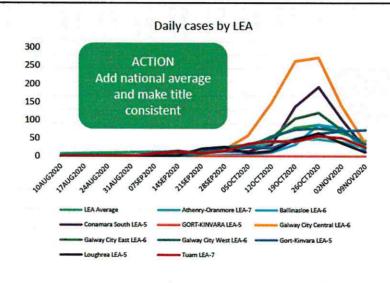
confirmed outbreak in mid-October

confirmed outbreak in mid-Octobe

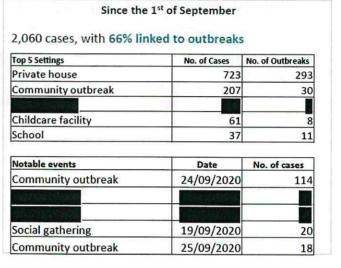
Throughout November, private household cases were responsible for 49% of outbreak cases, with the nursing home outbreak and community outbreaks making up a large proportion of the remaining percentage

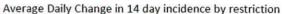
Employment summary

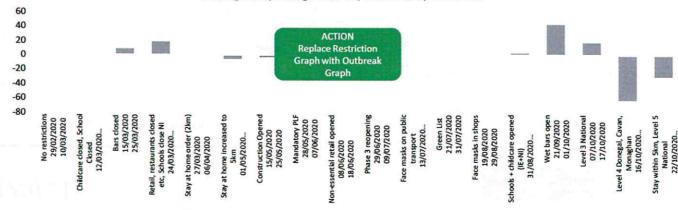
 Galway had c.39% of its workforce on PUP or TWSS (49k) at the peak in early May (EY 2019 employment estimates).
 There are currently 19.5k on PUP which is down from 32.5k in May (CSO, DSP)



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Dublin – local authority breakdowns over time

ACTION MAKE for Wave 2 only

		16MAR	23MA	R 30f	MAR	6APR	13APR	20APR	27APR	04MAY	11MAY	18MAY	25MAY	อมบท	OSJUN 1	5JUN	22JUN	29JUN	06JUL	13JUL I	OJUL	27JUL C	BAUG 1	OAUG 1	17AUG 2	24AUG	BIAUG (D7SEP	14SEP	21SEP	28SEP	05OCT	120CT	190CT	26OCT	02NOV	1
	RUSH-LUSK LEA-5	3	14	4	49	121.1	175.9	227.8	170.2	69.2	51.9	31.7	17.3	3	3	3	3	3	3	3	3	3	3	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.	3
	SWORDS LEA-7	3	38	.9	74	155.7	311.5	350.4	305.6	188.8	60.3	42.8	40.9	23.4	3	3	3	13.6	11.7	3	15.6	23.4	11.7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	247.2	297.8	371	8
	BLANCHARDSTOWN- MULHUDDART LEA-5	14.2	48	1	102	243.6	444.7	501.3	515.5	512.6	274.7	59.5	34	48.1	39.7	22.7	3	3	3	14.2	22.7	28.3	22.7	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	1
•	CASTLEKNOCK LEA-6	3	32	.5	65	169.1	336	370.7	316.5	192.9	52	17.3	13	3	3	13	3	3	3	3	3	10.8	13	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	299.2	201.6	ε
	HOWTH-MALAHIDE LEA-7	3		73	110.4	146.1	251.2	254.7	162.1	115.8	80.2	41	28.5	17.8	14.3	10.7	12.5	3	3	3	3	3	8.9	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.	
	BALBRIGGAN LEA-5	3	30	0.1	68.4	125.8	213.3	284.4	278.9	172.3	71.1	27.3	38.3	43.8	13.7	3	3.	3	3	3	3	3	.3	- 3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	22	
	ONGAR LEA-S	3	41	9	114.4	195.3	346	362.8	214.9	131.2	67	16.7	19.5	25.1	3	3	3	3	3	14	3	3	3	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245	
	STILLORGAN LEA-6	3	62	13	170.4	213.1	239.3	239.3	190.1	140.9	147.5	108.2	22.9	16.4	3	3	3	3	3	3	3	3	3	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104	
Rathdown	DUNDRUM LEA-7	3	42	27	93.5	189.6	272.3	251	146.9	85.4	74.8	40.1	18.7	13.4	18.7	18.7	3	3	3	3	3	3	3	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.	
No.	GLENCULLEN-SANDYFORD LEA-		-				100.3		202.	****		***			TORE										19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106	
Š	7	3				166.6								3							30				19.1	24,0	13.7	23.6	49.9	65.6	68.3	115.5	120.8	105	107.7		
2	KILLINEY-SHANKILL LEA-7	13.1					204.8			-		76.2	-	3										3		22.5	-	-	65/57				100000	-	- 2000		
	DÚN LAOGHAIRE LEA-7	14.4				235.4						52.9		19.2	3	12	3			3						33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5		
	BLACKROCK LEA-6	14.8	38				272.8					97.8		74.1		20.8	3			20.8	17.8			3		3	41.5	50.4		47.4	65.2	77.1	59.3		195.7		
	LUCAN LEA-S	3				266.3			11/10/015	20000		89.8		68.8	14077	26.9			18	3	3	150	18	Dell'	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4		380		
	TALLAGHT CENTRAL LEA-6 RATHFARNHAM-TEMPLEOGUE	3				157.4		-				7,000		60.2			3		3			3	3	3	20.8	41.7	53,2		157.4								
	LEA-7 FIRHOUSE-BOHERNABREENA	3	68	3.9	123.2	152.4	238	298.5	242.1	146.1	85.6	56.4	50.1	25	3	3	3	3	3	3	3	12.5	3	3	3	12.5	35,5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160	
	LEA-5	3	58	3.5	90,6	108.2	292.4	368.	292.4	231	108.2	61.4	40.9	17.5	14.6	3	3	3	3	3	3	3	23.4	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	1 19	
	TALLAGHT SOUTH LEA-5	3	28	3.2	90.2	155.1	256.6	34	358.1	290.4	248.1	183.3	104.3	81.8	59.2	47.9	22.6	14.1	3	3	19.7	36.7	42.3	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290,4	267.9	279	ķ
	CLONDALKIN LEA-7	30.1	83	3.8	172	279.4	367.6	421	475.1	412.7	264.4	219.3	159.1	66.6	19,3	15	12.9	3	3	3	- 3	3	21.5	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285	
	PALMERSTOWN-FONTHILL LEA-5	18 : L		5.3	99.9	126.2	207.7	231	126.2	99.9	81.5	34.2				916				15.8	13.1			Billio	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	200	
	BALLYMUN-FINGLAS LEA-6			3.2	74.5	178.1						87.3		36.4	27.3	21.8	12.7	14.5	9.1	13.0	9.1	10.9			12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6		492.6		
			100					22-12				-		-0.00		21.0	14.1	14.5		20.5	2000	17	10.2	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	A CONTRACTOR	THE SAME		
	CABRA-GLASNEVIN LEA-7 BALLYFERMOT-DRIMNAGH			2.6	83.5	160.3	318.8	3/5.	395.6	354,6	155.2	56.3	58	40.9	17	1			8.5	20.5	23.9		10.2	13.6	11.1	30.7	44.3	52.9	65.2	120.2	134./	140.0	151	252.3	204.3	102	
	LEA-5	17.4	41	1.2	99.9	225.8	343	373.	356	225,8	78.1	41.2	19.5	10.9	3	3	3	3	10.9	3	13	13	3	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277	
	KIMMAGE-RATHMINES LEA-6	9	63	2.7	132.5	166.5	241.7	315.	241.7	141.4	87.7	39.4	16.1	3	3	3	3	3	3	12.5	23.3	10,7	3	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	2 223	
	PEMBROKE LEA-5	11	5	7.2	131.9	175.9	274.9	299.	299.1	270.5	136.3	77	41.8	30.8	17.6	3	11	3	3	3	11	3	3	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	7 90	ľ
	SOUTH EAST INNER CITY LEA-S	12.3		32	76.3	115.8	150.2	155.	2 91.1	81.3	69	17.2	_ 3	- 3	3	3	3	3	3	12.3	59.1	49.3	3	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160	ŀ
	NORTH INNER CITY LEA-7	7.9	35	9.3	78.6	108.5	198.1	235.	169.8	117.5	89.6	62.9	40.9	28.3	11	3	14.1	12.6	3	3	7.9	12.6	15.7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205	
	CLONTARF LEA-6	131 3	40	0.6	107	171.6	276.8	345.	1 374.7	293.5	107	31.4	24	16.6	3	18.5	14.8	3	3	3	9.2	9.2	3	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	3 142	
	DONAGHMEDE LEA-5	1	2	1.6	98.6	230.8	389.5	401	5 327	204.4	50.5	31.3	26.4	3	3	14.4	16.8	3	3	3	3	12	19.2	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	2 240	
	ARTANE-WHITEHALL LEA-6	3	56	5.7	129	260	445.7	502	4 473.1	308.9	109.5	70.4	66.5	41.1	13.7	13.7	17.6	11.7	3	11.7	11.7	27.4	37.1	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265	
	SOUTH WEST INNER CITY LEA-5				141.7						132.3	66.1									11.8	18.9						146.4		196			184.2		240.9	177	

There is a moderate correlation between areas hit hard in Wave 1 and Wave 2, with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin, Artane-Whitehall, etc. Note these areas contain many more EDs that were classified as "marginally disadvantaged" or "disadvantaged" on the Pobal HP Social Deprivation Index than areas with lower incidence rates, which contained many EDs classified as "affluent".

County view - Dublin (19/11)

Total Confirmed Cases Trend vs. National

Summary

Key Events

- Significant differences exists within each of the four county council areas of Dublin with Dun Laoghaire—Rathdown seeing lower overall incidence. This is consistent with socioeconomic differences per area
- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs: Dublin North, Dublin North West, Dublin North Central
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases, whereas in other counties Level 3 may have been sufficient

Outbreaks

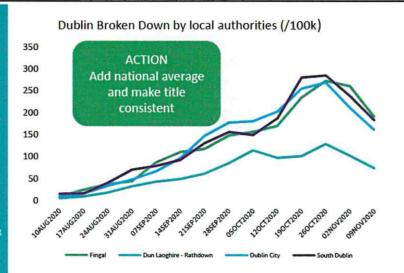
- 80% of outbreak cases in the last 8 weeks came from private houses. Other common settings include nursing homes, hospitals, and schools and childcare facilities to a lesser extent

Tallaght Resurgence

 Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Employment summary

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k, compared to a peak of 176k in May (CSO, DSP)



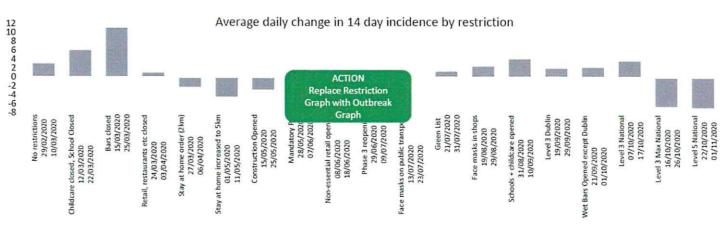
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Since the 1st of September

12,606 cases, with 56% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable events	Date	No. of cases		
Extended family	24/09/2020	288		
Nursing home		75		
Hotel	12/09/2020	38		
Childcare facility	20/10/2020	38		
Residential institution	02/10/2020	30		



County view – Waterford (20/11)

Total Confirmed Cases Trend vs. National

Summary

Key Events

- Cases spiked in early September due to a meat factory outbreak resulting in 50 cases. This primarily occurred in Waterford city east, south and Tramore-Waterford city west
- Cases rose in the same LEAs in mid October, indicating cases may have come from nearby counties such as Cork, which saw cases rise earlier in the month
- Cases stabilized in the ten days after Level 3 restrictions came into effect
- While falling steadily throughout November, cases began to rise again towards the middle of the month

Outbreaks

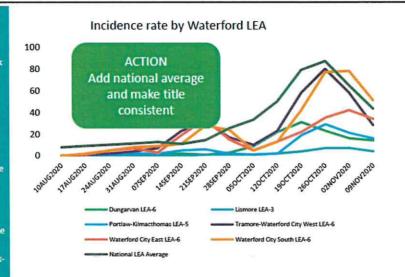
- Workplace outbreaks have been prominent in Waterford, making up 30% of outbreak-related cases in November, with the largest resulting in 24 cases
- Private household outbreaks make up another 63% of outbreakrelated cases during this period

Waterford City

 Outbreaks in September and October were both driven by cases occurring in Waterford city. Unlike other counties, these do not seem to spread throughout Waterford to the same degree, with LEAs outside Waterford city maintaining lower cases compared to national levels

Employment summary

 Waterford had c.45% of its workforce on PUP or TWSS (21k) at the peak in early May (EY 2019 employment estimates). There are currently 8k on PUP which is down from 14k in May (CSO, DSP)



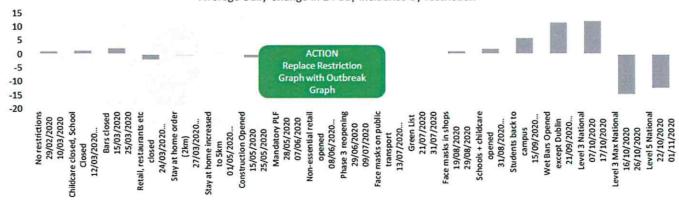
Since the 1st of September

777 cases, with 63% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks		
Private house	329	135		
Workplace	84	8		
Community outbreak	20	2		
Other	12	2		
Extended family	11	3		

Notable events	Date	No. of cases			
Workplace	04/09/2020	49			
Workplace	03/11/2020	21			
Community outbreak	02/10/2020	16			
Private house	09/09/2020	10			
Other	28/10/2020	9			

Average Daily Change in 14 day incidence by restriction



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County view - Roscommon (20/11)

925
Trend vs. National

ACTION
Add trend vs. national

Summary

Key Events

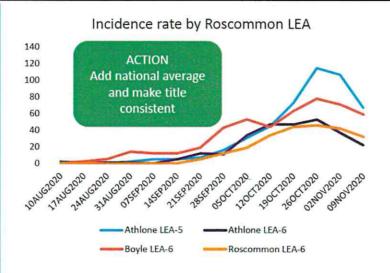
- Level 3 (max) restrictions put in place as of 26th October can be seen to align with a reduction in incidence rate
- In some instances this reduction can be seen to accelerate again with the introduction of level 5 restrictions on the 2nd November (Athlone LEA-5, Roscommon LEA-6, Boyle LEA-6)
- An increase can be seen in Athlone LEA-6 in the week following the football final held September 20th, potentially due to the winner being located in this LEA (Kiltoom)

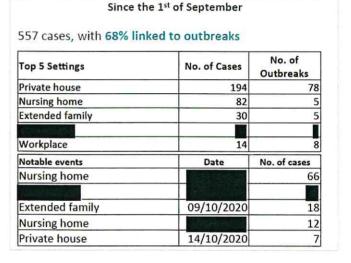
Outbreaks

- The main driver of outbreaks within the county since the start of November are those seeded in nursing homes – representing 64%
- Private house outbreaks make up a significant portion of new the remainder at 33% of new outbreaks

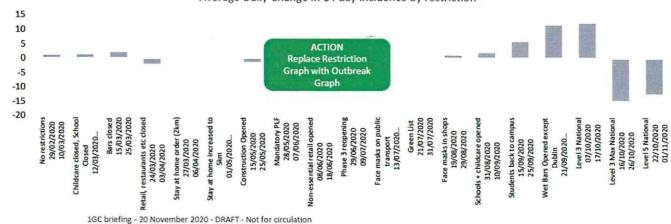
Employment summary

Roscommon had c.37% of its workforce on PUP or TWSS (11k) at the peak in early May (EY 2019 employment estimates). There are currently 3k on PUP which is down from 7k in May (CSO, DSP)





Average Daily Change in 14 day incidence by restriction



County view - Cork (16/11)

WORK IN PROGRESS

Total Confirmed Cases Trend vs. National
6,140

Summary

Key Events

- Cases in Cork city rose as wet pubs reopened, with mobility within the county rising 7.3%. Cases around the rest of the county followed shortly after
- Cork had a large number of GAA games on 03/10 and 04/10. No matches occurred after this, with level 3 restrictions being applied around this time
- Cases throughout Cork began to fall 10 days after this, indicating both measures were effective
- Cases in Cork City South Central, the LEA containing UCC, were twice as high as other LEAs in Cork city during mid October. This gap disappeared by November, indicating reopening the college negatively impacted C-19 spread

Cork City as an epicentre

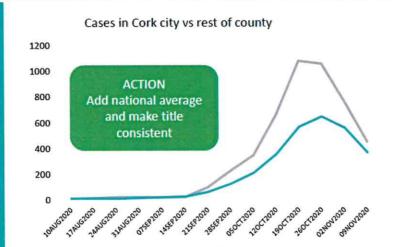
- Cork city was most severely affected. A clear trend of Cork city vs the rest of the county emerges from the data
- 68 cases were detected in one community outbreak in with two large nursing home outbreaks (38/32 cases) also detected

Weekend of 14/11

- While incidence rates are falling, Gardai had to disperse large crowds in the city centre this weekend due to individuals consuming takeaway alcohol in large crowds
- Areas such as Grand Parade at Coal Quay noted as popular for these activities

Employment summary

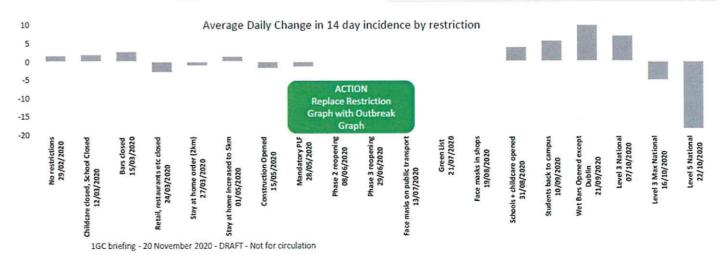
At peak, c 39% of Cork's workforce were on PUP or TWSS (96k) (EY 2019 employment estimates). Current PUP levels are lower than the previous peak (35k versus 62k in May) (CSO, DSP)



Since the 1st of September 4,492 cases, with 45% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks		
Private house	929	354		
Community outbreak	411	67		
Nursing home	114	9		
School	- 113	2		
Extended family	90	22		
Notable events	Date	No. of cases		
Community outbreak	26/10/2020	68		

Notable events	Date	No. of cases		
Community outbreak	26/10/2020	68		
Nursing home	\$77E3144E4	46		
Restaurant / Cafe	17/09/2020	38		
Nursing home		30		
Community outbreak	22/09/2020	29		



Might update with new CIDR on Monday depending if there is a new set Rory Murphy, 20/11/2020 RM4

County View - Laois, Offaly and Kildare (17/11)



Summary

Summer Outbreaks

- · Increasing case number trend emerges in July
- · Outbreaks concentrated in food and meat processing plants
- Highest numbers in Offaly in Edenderry (93 of 103 cases) in two weeks preceding August 17th, with Kildare largely focussed in Athy/Kildare (129/151 of 437)

Commentary on Restrictions - Laois & Offaly

- County lockdowns for Laois, Offaly and Kildare from August 8th
- Offaly and Laois leave lockdown on 21st August and the following week cases begin to rise in Laois with minimal decrease in Offaly – note Laois had relatively few cases prior to lockdown

Commentary on Restrictions - Kildare

- Kildare lockdown extended for an additional 10 days
- Case numbers fall however prevalence appears to shift from the south and middle of the county (Athy. Kildare Town, and Newbridge) to the north of the county (Naas, Maynooth and Celbridge)
- As cases increase in North Kildare from October a similar trajectory of case growth appears in Dublin West

Employment summary

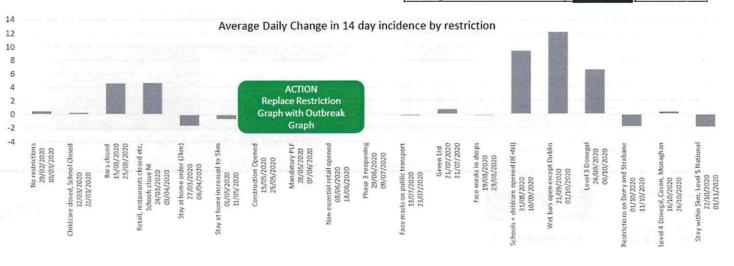
 These counties had c.40% of their combined workforce on PUP or TWSS (c.73k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP remain significantly lower than peak (24k versus 44k) (CSO, DSP). ACTION
Add national average
and make title
consistent

Average taken across Laois, Offaly, Kildare

2,859 cases, with 57% linked to outbreaks No. of Top 5 Settings No. of Cases Outbreaks Private house 870 342 Nursing home 216 13 162 16 Hospital 23 School 84 13 Extended family

Since the 1st of September

Notable events	Date	No. of cases
Nursing home		52
Hospital		49
Nursing home	1 F F F F F	46
Nursing home		38
Nursing home		38



County view - Kerry (20/11)

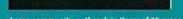
Total Confirmed Cases Trend vs. National



Key Events

- North Kerry (Listowel) is most severely affected. This coincides with severe outbreaks southern parts of Limerick such as Newcastle West and Adare-Rathkeale, as well as Limerick city
- killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- Remainder of county (further south, smaller towns) generally less afflicted

Outbreaks



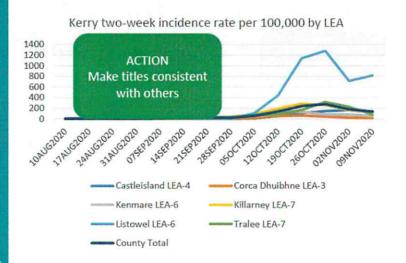
- Large community outbreak in Kerry of 25 cases
- Private homes also account for a sizable proportion of outbreak-related cases

Listowel's high incidence

Listowel's incidence effectively tripled the next LEA in terms of incidence. Note the small population of "14000 people meant 182 cases over a 2-week period prior to Oct 26th translates to very high incidence — a small number of cases would translate to high population-adjusted incidence

Employment summary

 Kerry had c.49% of its workforce on PUP or TWSS (32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP which is down from 22k in May (CSO, DSP)

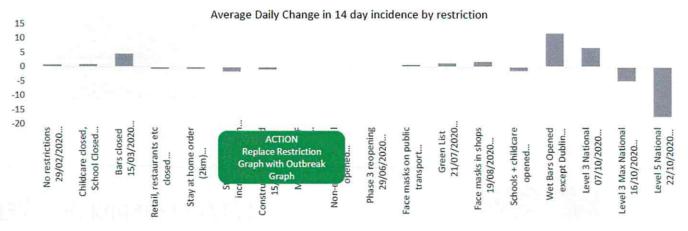


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963 cases, with 45% linked to outbreaks Top 5 Settings No. of Cases No. of Outbreaks Private house 150 53 Community outbreak 101 14 Extended family 25 7 School 23 4 Notable events Date No. of cases

Since the 1st of September

Notable events	Date	No. of cases		
	4800 C			
Community outbreak	03/09/2020	43		
Community outbreak	23/10/2020	25		
Religious/Other ceremony	16/10/2020	11		
Restaurant / Cafe	11/09/2020	11		



County view – Limerick (20/11)

WORK IN PROGRESS



13/10/2020

15/10/2020

31

25

Summary

Key Events

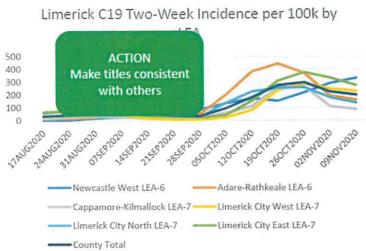
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November. Note Listowel (northernmost LEA in Kerry) experienced the highest incidence levels in that county
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Outbreaks

- affecting nearby counties as well such as Kerry, Clare and Tipperary
- · Major 122 case community outbreak stands out in late October
- 149 case extended family outbreak mid-early October

Employment summary

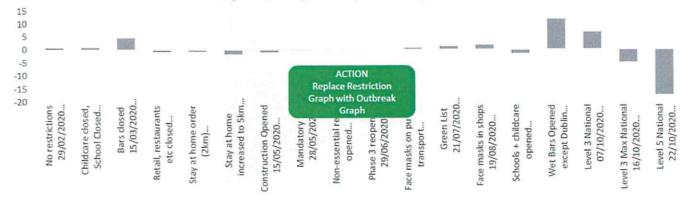
 Limerick had c.43% of its workforce on PUP or TWSS (34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP which is down from 22k in May (CSO, DSP)



Since the 1st of September 1771 cases, with 39% linked to outbreaks No. of Cases No. of Outbreaks Top 5 Settings 242 Extended family Community outbreak 117 Private house 34 Social gathering 51 No. of cases Notable events Date Extended family 23/09/2020 141 94 08/10/2020 Community outbreak

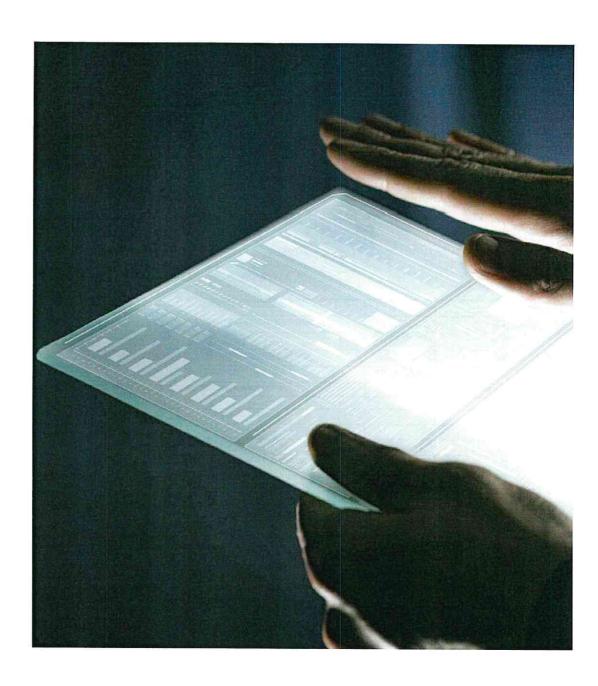
Social gathering Average Daily Change in 14 day incidence by restriction

Residential institution



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Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries

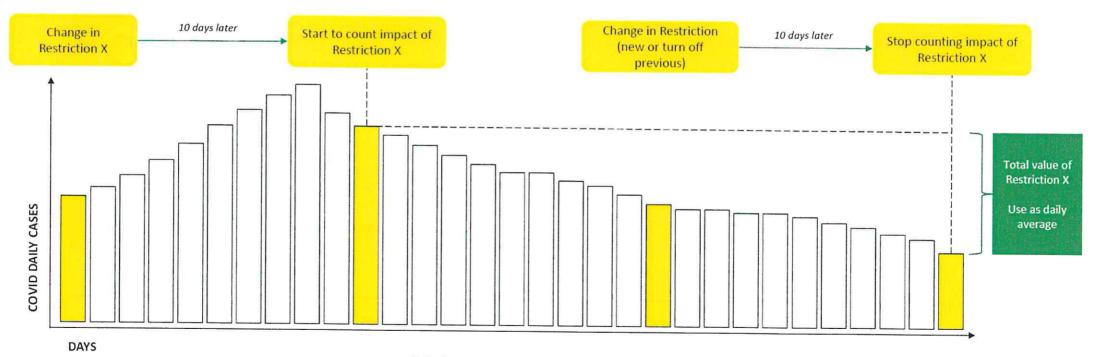


International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular 1GC COVID-19 insights publication and with new research included today

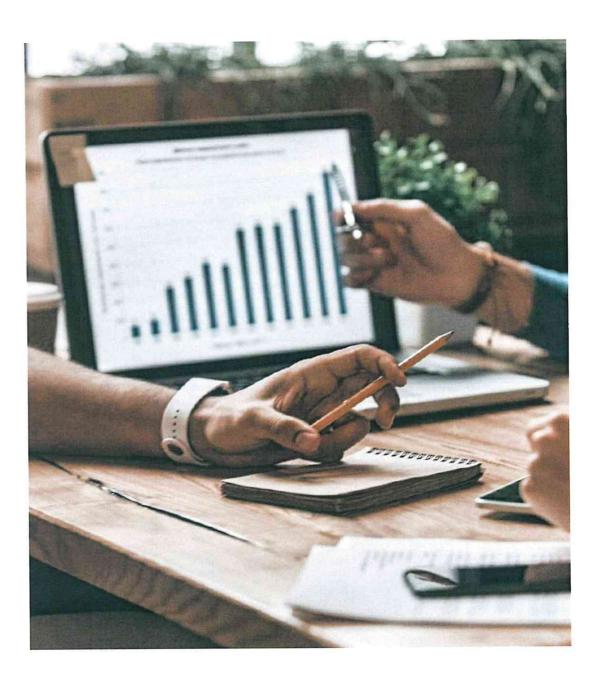
Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There has been relatively few changes, which are generally applied in combination, hiding the unit value per restriction. There is also time a lag between a restriction change and the impact being seen. However, it is also clearly important that restrictions decisions are made with the maximum understanding of the impact. Hence, 1GC has used the below methodology to quantify changes in restrictions. This calculation has been applied for both Ireland and select international countries. The outputs should be seen as directionally useful rather than precise statistical outputs. They are also presented alongside international academic research to provide a broad view to support decisions.



Ireland – restrictions analysis

Interactive demo showing restrictions impact analysis by county

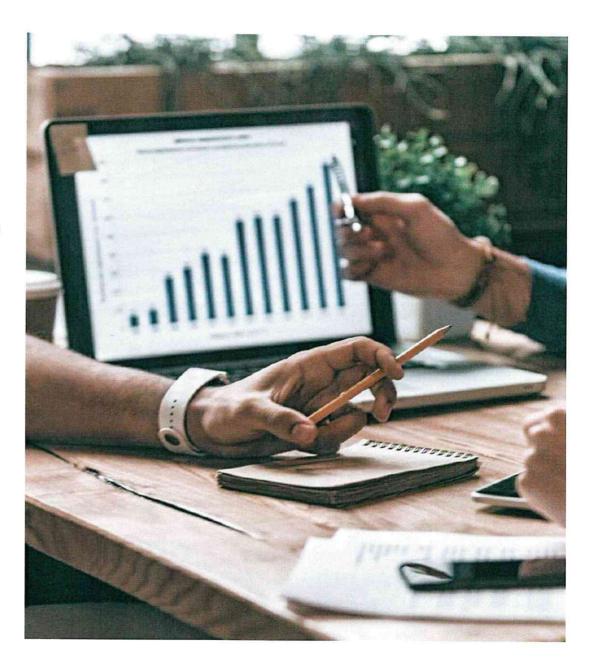


Track and Trace Free Text Analysis

The HSE Track and Trace system captures the information for each citizen being tested for C-19. This includes a contact type field, which explains the contact between citizens that the test resulted from. Contact categories are selected by the contact tracer from a drop down list, including "social", "work", etc.

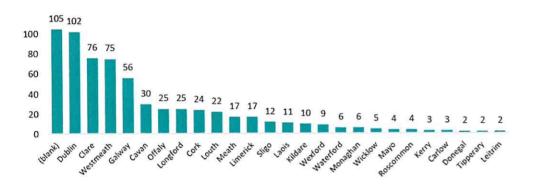
There is also a free text field where the contact tracer may add further details. For example, if the category was "social" then the free text field may say "attended sports game together".

A selection of the analysis of this free text field is shown in this section. Note it is a relatively small sample of data and should be treated only as directionally informative.

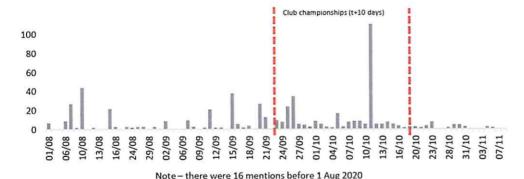


GAA-related events generated clusters of contacts, but absolute levels remain low GAA-related terms mentioned 653 times since March

GAA and related terms mentioned in free text (by county)



GAA and related terms mentioned in free text (over time)



Key message: GAA events and celebrations appear to have generated incidences of high numbers of contacts with positive individuals. However, overall levels appear low.

Clare

24 GAA contacts on 7 Aug 33 GAA contacts on 10 Aug

Galway

34 contacts on 15 Sep Mention a specific GAA team

End of July start for club games in Clare as master fixtures committee recommend new formats

Westmeath

52 GAA contacts on **11** Oct GAA related

Football senior finals on 27 Sep Dublin

17 contacts on 15 Aug

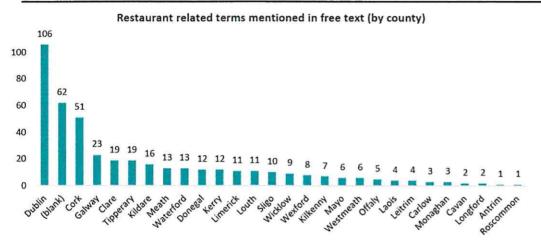
Mention a specific GAA camp

Camps took place between 22 July and 23 Aug

Source: Contact tracing analysis Terms searched: terms GAA, Gaelic, County Final, County Championship, Hurling and Football Football and hurling championships took place between 13 Sep and 9 Oct 2020

Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

Contacts generated in restaurant settings, however overall levels remain low Restaurants mentioned 439 times since March



Key message: Restaurants generated contacts, however absolute levels remain relatively low given data available.

Dublin

18 contacts relating to a coffee chain 17-19 Aug

5 contacts relating to Dublin restaurant chain 24-25 Sep

Cork

5 contacts relating to a restaurant chain 28 Sep

> 4 contacts relating to one restaurant

4 contacts relating to a fast food chain 9-10 Nov

Restaurant related terms mentioned in free text (over time)



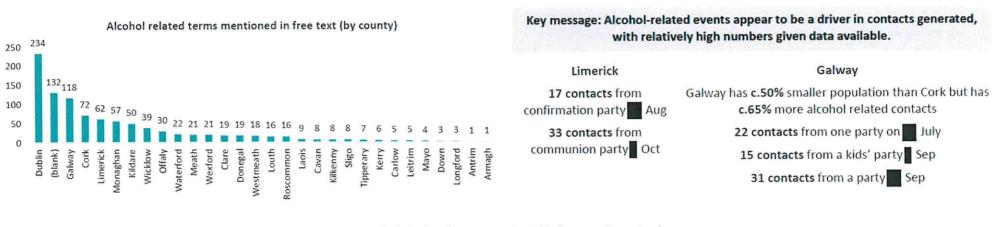
Note - there were 18 mentions before 1 July 2020

Source: Contact tracing analysis
Terms searched: Restaurant, eating out, out for a meal, and a list of all national chains in Ireland

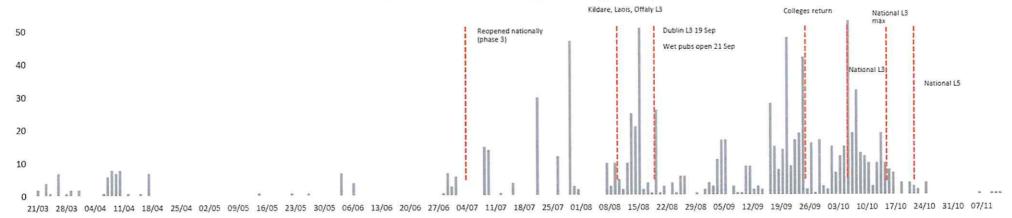
Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

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Alcohol and social gatherings generated contacts with positive individuals Alcohol and party-related terms mentioned 1,017 times since March



Alcohol related terms mentioned in free text (over time)



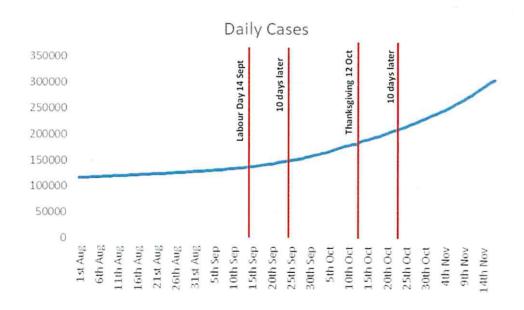
Source: Contact tracing analysis Terms searched: alcohol, drink, party, celebration, booze, beer, wine, cans, pint

Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

Canadian Thanksgiving: Test & Trace data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Track & Trace records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 dramatically changed after Thanksgiving, with a 14% increase in positive cases
 between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 14 September, 14 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.).

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

Selected cities - cases generated and positivity rates

	San Fr	ancisco	Chi	icago	New	/ York
	Cases	Positivity rate	Cases	Positivity rate	Cases	Positivity rate
Full-service restaurants	+12k	0.09%	+89k	0.33%	+199k	0.22%
Fitness centres	+1k	0.02%	+20k	0.13%	+70k	0.20%
Religious organisations	+479	0.04%	+9k	0.28%	+30k	0.49%
Take-out restaurants	+290	0.01%	+14k	0.14%	+19k	0.11%
Grocery stores	+150	0.01%	+3k	0.19%	+11k	0.15%
Department stores	+40	0.00%	+540	0.02%	+1k	0.03%
Pharmacies	+40	0.01%	+250	0.02%	+1k	0.02%

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

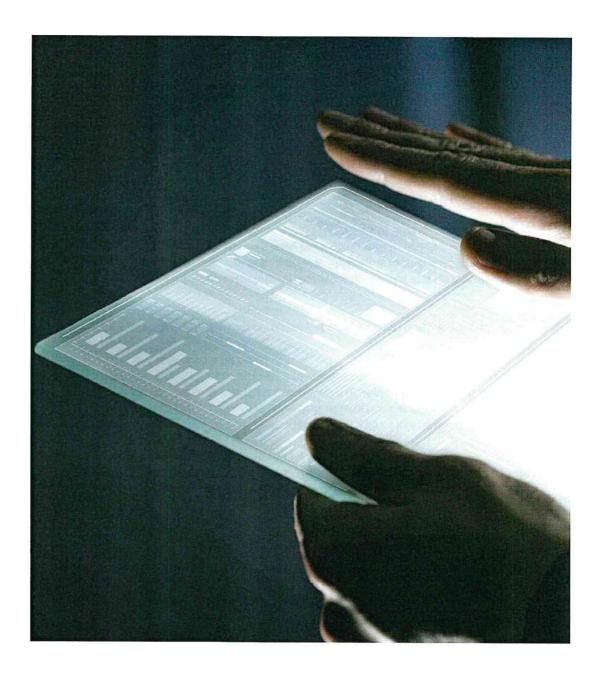
Note: Calculation of positivity rate using cases generated as a proportion of visits generated

Key findings

- The table depicts the expected additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10)
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more

http://hirr.hartsem.edu/research/fastfacts/fast_facts.html

Roadmap for next six weeks



Approach to Christmas monitoring

We will combine a variety of data sources to monitor activity over the Christmas period



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What will the next six weeks look like?

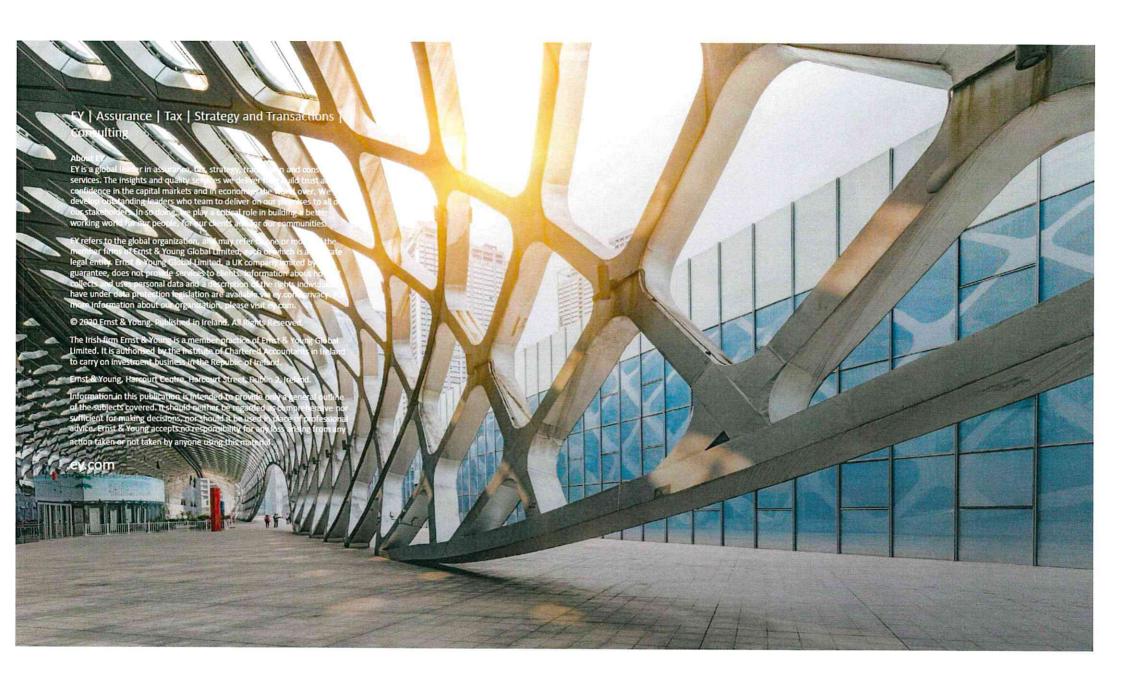
Data is anonymised and aggregated to LED or country and by industry type.

No personal identifiable information

This week W/c 16 Nov	Week 2 W/c 23/11	Week 3 W/c 30/11	Week 4 W/c 7/12	Week 5 W/c 14/12	Week 6 W/c 21/12
		Proposed brief	ing frequency		
Weekly/ ad-hoc	Weekly / ad-hoc	Weekly / ad-hoc	Daily / ad-hoc	Daily / ad-hoc	Daily / ad-hoc
	林的多洲的黑色	Insights d	elivered		
County dashboard	County dashboard	County dashboard	County dashboard	County dashboard	County dashboard
Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak driver
Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact
Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis
	Transport	Transport	Transport	Transport	Transport
	Facebook survey	Facebook survey	Facebook survey	Facebook survey	Facebook surve
monitoring	Spending data	Spending data	Spending data	Spending data	Spending data
nce		Stay at home index	Stay at home index	Stay at home index	Stay at home index
		1GC briefing - 20 November 2020 - DR	AFT - Not for circulation	Social distance index	Social distance index

Disclaimer

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





1GC update - Week 6

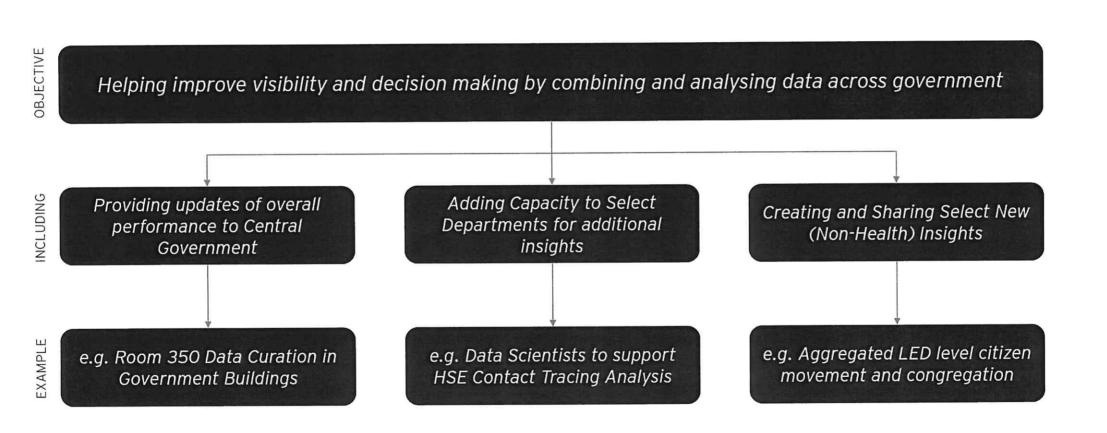
Agenda



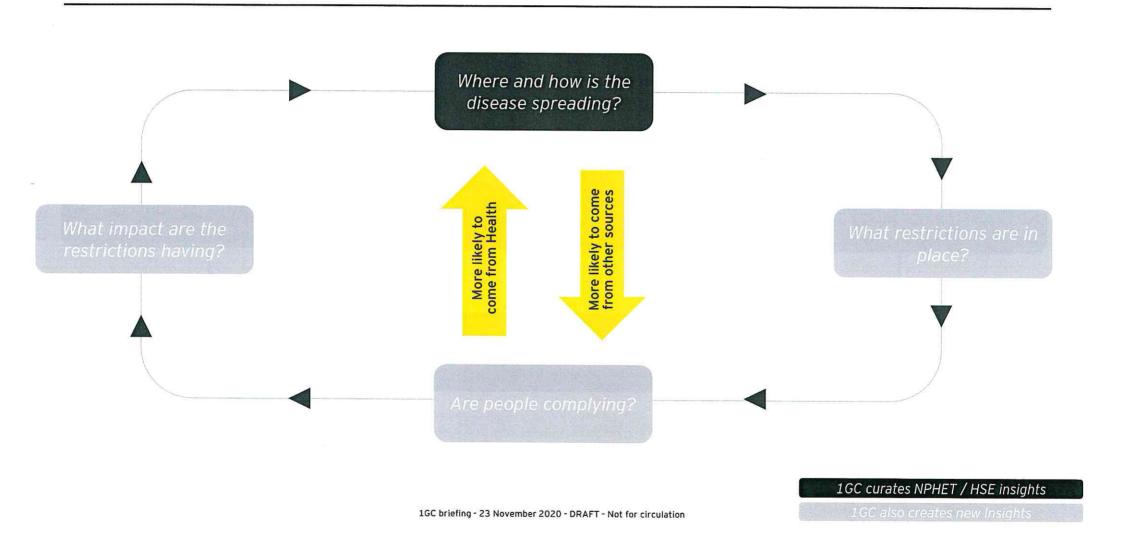


- ❖ 1GC Intro
- County Specific Analysis
- Restrictions Impact analysis
- International Analysis
- Roadmap to Christmas

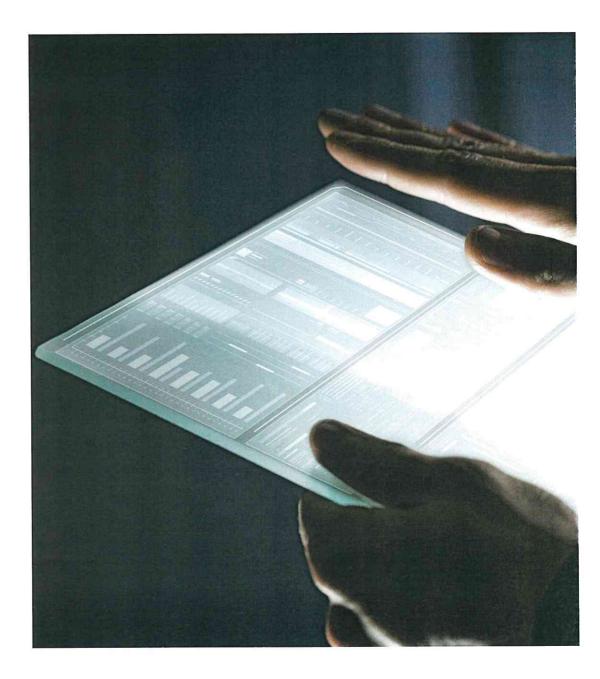
Introduction to the C-19 One Government Centre (1GC)



Answering four key questions to support government decision making



County specific analysis



Introduction to County Specific Analysis

This section summarises the analysis for each county. The data suggests that the profiles of counties can be broadly categorised as follows:

- 1. Driven by proximity to the border
- 2. Driven by significant known outbreak event(s) (while accepting that all counties have outbreaks), e.g.
 - Nursing Homes
 - Workplace
 - University
 - Social
 - Private House
- Following the national restriction trend change
- 4. Dublin

County Analysis Summary

County	Border County	Major Incidence	Dublin and Surrounding	Following National Restrictions Trend	Wave One Outbreak Sources	Wave Two Outbreak Sources	Change in 14 day incidence rate	Wave 2 Incidence rate
			Area				(14/11-17/11)	
Cavan	/	~		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	-0.14	
Louth	/	1		· ·	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Instutions	0.1	
Donegal	1	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	0.06	
Monaghan	/	~			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential Insitutions	-0.08	
Leitrim*	/				Nursing Home, Private House, Travel Related	Private Houses, Extended Family,	0.13	
Meath		· ·	1	1	Nursing Home, Private Houses,	Religious/Other Ceremony Private Houses, Nursing Homes, Community	0.01	
Dublin	-	1			Workplace Nursing Home, Private Houses,	Outbreak Private Houses, Extended Family, Nursing	-0.18	
Kildare**	1		-		Residential Institution Nursing Home, Private Houses,	Priate House, Workplace, Nursing Homes	-0.03	
Cork			 		Residential Institution Workplace, Private Houses, Nursing	Private House, Community Outbreak, Nursing	-0.08	
1500 (St. 150)	-		-	-	Homes Hospital, Nursing Home, Private	Home Private House, Community Outbreak, Nursing	-0.1	
Galway	-				Houses Private Houses, Residential	Home Private House, Community Outbreak, Nursing	_	
Kerry		✓			Institutions, Hospital Nursing Home, Private Houses,	Home Extended Family, Community Outbreak,	-0.11	
Limerick		*		✓	Residential Institution	Private House	0.15	
Carlow*		1			Hospital, Nursing Home, Private Houses	Prívate House, Workplace, Hospital	-0.09	
Clare		1			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	0.17	
Laois*		1			Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	-0.32	
Longford*		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	-0.02	
Offaly*		1			Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	0.06	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	-0.05	
Tipperary		· ·			Workplace, Private Houses, Nursing	Private House, Workplace, Nursing Home	0.05	
Waterford		1			Workplace, Private House, Nursing	Private House, Workplace, Community	0.05	
Kilkenny*					Home Hospital, Private House, Community	Outbreaks Private House, Workplace, Hospital	-0.09	
Wicklow**	1				Hospital/Long-Stay Unit Workplace, Private House, Residential	Private House, Nursing Home, Workplace	-0.03	
CONTROL DE SANCE AND ALL CONTROL DE CONTROL	-				Institution Nursing Home, Hospital, Community	Private House, Nursing Home, School,	-0.04	
Mayo	-				Hospital/Long-Stay Unit Nursing Home, Private House, Travel	Workplace Private House, Extended Family,	-	
Sligo*	-			1	Related	Religious/Other Ceremony	-0.23	
Westmeath*				~	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	-0.33	
Wexford				~	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing	-0.07	

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Wave 1: 03/03-25/07 Wave 2: 26/07-20/11

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Overview of Incidence Rate Per Capital Per County

UPDATE FOR NEW DATA

The below heatmap shows the county incident rate per capital over the last two months. The overall reduction in cases has levelled in the week with some counties now increasing.

Rate Per 100k	17-Sop	18-Sep	dac-el	21.500	22.Sep	23.00	24.0.45	da0.47	dac-oz	20-5ep	7/-Sep	28-Sep	29-Sep	30-Sep	01-Oct	02-Oct	03-Oct	04-Oct	05-Oct	Se Cer	07-Oct	08-04	100-60 100-61	10-Oct	11-0et	12-Oct	13-04	14-00	20.04	17-Oct	2 0	19-Oct	20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct	26-Oct	2/-Oct	20-02	30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	AON-GO	20VI-00	08-Nov	%N-60	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	16-Nov	Change Last 3 Days
Offaly	52	60	64	60	62	6	59	56	59	56	61	62	85	67	74	77	77	93	103	104	110	123	130	136	140	145	141	151	140 1	77 2	261 1	95 21	0 22	4 22	2 22	4 214	224	217	222 :	227	218 2	36 19	1 162	153	130	112	106	100	96	97 :	99 8	5 99	94	87	95	114	112 117	19%
Leitrim	78	72	75	41	44	44	14	41	34	37	37	25	19	25	25	28	31	31	28	34	34	53	81	97	125	137	147	162	218 2	218 2	25 2	40 25	3 26	2 27	2 27	3 259	247	222	209 2	208	178 1	5 12	2 109	97	84	63	56	31	28	34	37 3	7 47	56	81	81	87	91 54	13%
Waterford	34	85	89	95	97	97	37	88	86	67	67	53	53	44	38	35	34	23	31	32	40	46	56	64	61	66	70	83	109	131 1	32 1	43 15	5 16	0 17	3 17	6 194	205	215	226	225 2	228 2	10 20	5 20	1 201	195	194	187	76	163	146 1:	36 12	3 134	114	142	141	156 1	63 163	13%
Limerick	53	49	45	44	39 :	39	36	34	35	33	33	34	19	37	45	58	69	9)	56	107	114	119	145	160	167	132	189	207 2	208 2	31 2	46 2	18 27	7 28	0 29	0 30	1 238	293	306	299	310 3	306 3	12 27	7 265	262	228	227	229	221 :	216	218 2	11 20	7 198	95	195	211	201 2	22 208	11%
Clare	35	38	42	44	41 .	4	10 .	40	41	47	50	53	63	76	76	87	96	121	144	158	183	199	246	261	268	304	310	306 3	09 3	22 3	26 3	27 32	2 31	3 30	4 31	1 272	264	281	252	248 2	253 2	5 23	5 229	209	189	183	131	73	171	160 t	39 13	2 122	109	104	104		09 11	
Louth	34	96	102	102	98 1	07 1	19 1	101	95	104	92	80	76	75	74	79	77	83	50	85	85	89	116	103	116	115	152	161	181 1	85 1	83 1	78 22	1 26	1 29	3 28	3 272	286	299	311 2	283 2	256 2	3 28	5 297	297	257	213	193	2012	189	77 1	59 IF	5 157	756	147	151		6) 157	
Donegal	64	73	84	97 1	06 1	22 1	18	59 1	178	185	191	201	211	219	233	258	265	273	253	312	319	326	324	345	355	355	354	367 3	65 3	56 3	44 3	7 32	9 32	0 32	0 31	2 324	322	323	318	313	317 3	2 31	0 320	309	305	286	300	297	90 2	93 2	75 26	5 273	281	271	100	275 2		
Galway	29	27	28	30	32 :	39	39	45	46	54	62	65	74	81	79	85	89	93	52	97	107	113	137	150	155	165	173	203 2	28 2	62 2	73 2	88 31	4 32	6 35	5 37	2 338		382	384	370 3	354 3	41 31	3 296	282	255	243	211	187	171	144 1	PE 10	9 105	97	88	83	86	87 54	2%
Rescommen	31	33	33	45	54 1	57	62 1	67	64	76	84	99	102	121	133	143	161	155	155	170	166	166	192	184	200	181	187	201	198 2	201 22	23 2	32 22	8 23	9 26	0 27	1 260	276	263	263	259	231 2	0 22	9 203	225	229	213	195	189	174	153 1	52 17	5 170	175	163	166	169	141 169	256
Wicklow	70	70	70	72	70	77	74	71	69	65	67	70	73	65	72	74	77	73	78	77	76	76	80	84	88	91	87	89	91 1	00 1	119 1	20 2	4 12	4 12	9 14	5 14.5	149	149	145	147	149	41 131	0 117	116	107	101	106	91	22	89	22 7	7 90	96	04	05	OF	92 66	196
Tipperary	19	19	19	18	16	7	16	19	18	21	24	24	25	31	32	36	40	43	53	55	58	58	66	70	71	78	83	79	88	93 1	110 1	13 11	5 11	B 12	0 12	124	134	139	133	139	145 1	13 13	9 13	1 130	136	133	132	130	128	122 1	17 12	3 116	112	117	114	101 1	05 10	-4%
Kerry	19	18	19	18	19	19	19 :	24	22	24	25	22	20	21	26	40	46	52	€2	64	73	91	106	110	113	144	153	177	174 1	97 2	15 2	10 24	6 26	3 26	9 25	7 239	291	299	279	281 2	269 2	71 23	6 220	198	191	173	194	90	177	162 11	52 12	2 120	729	120	120	127 1	23 122	
Mayo	26	27	26	26	31	30	29	32	31	32	30	23	26	28	24	26	30	33	32	36	42	42	54	67	75	80	90	107	123	13: 1	50 1	67 19	5 20	8 22	24	3 250	246	256	266	259 2	249 2	2 20	1 246	222	210	100	102	-04	105	70 1	20 10	7 45		160	110		110 110	-7%
Wexford	35	36	34	33	23 :	23	25	28	28	27	27	35	33	33	35	40	41	43	57	73	80	85	98	112	130	180	73	188 2	102 2	50 2	271 2	72 29	7 29	8 30	1 32		212	201	200	257 2	FO 5	2 10	3 474	172	141	151	100	00	88	00 1	24 6	7 47	10	141	110	A CONTRACTOR OF THE PARTY OF TH	47 45	-9%
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Kilkenny	21	24	22	26	21	2	21	19	24	26	2€	23	26	29	38	40	45	42	43	51	51	59	61	73	87	38	105	109	123 1	42 1	43 1	54 16	-	5 17	7 17	1 120	175	176	172	171	100 1	0 12	2 42	1 120	124	100	104	24	141	141 4	21 1	0 100	34	85		Jan .	00 60	-11%
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County view - Cavan (19/11)

ACTION Make sure stands as stand alone slide

WORK IN **PROGRESS** Total Confirmed Cases

Trend vs. National

2,183



Cavan profile:

- Cavan has experienced a higher 14 day disease incidence rate per 100k during second wave than the national
- Part of Cavan borders with NI where different restrictions are in place

Summary analysis:

- Cavan-Belturbet LEA which is the only part of Cavan with a NI border is experiencing a higher disease incidence than national average
- Ballyjamesduff LEA has the highest incidence rate. The timing of the acceleration of growth rate appears to correlate with reports of celebrations and 'lock ins' for Crosserlough county final win
- Level of private house outbreaks during September and
- Continued outbreaks in nursing homes and through October
- Travel along the Belturbet by-pass fell 33% during

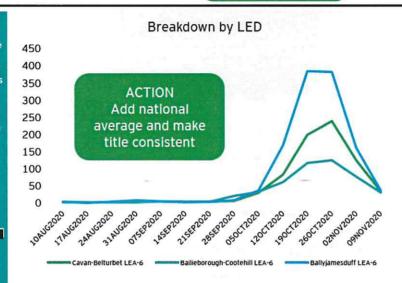
Restriction impact:

- The timing of the growth of cases appears to correlate with the events listed above and the opening of wet pubs
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence
- Level 5 restrictions continue to drive incidence level

Employment Summary:

Cavan had c.47% of its workforce on PUP or TWSS (15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP which is down from 9.7k in May (CSO, DSP)

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration



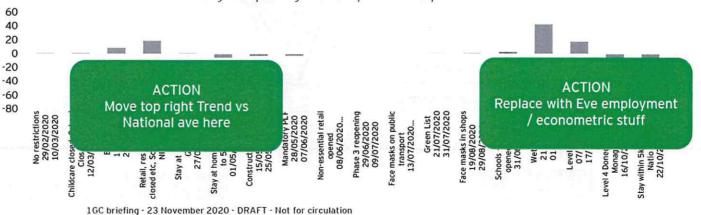
Since the 1st of September

1,272 cases, with 32% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	215	72
Community outbreak	51	2
Nursing home	29	12
School	24	8
Extended family	19	1

Notable events	Date	No. of cases
Community outbreak	09/10/2020	50
Restaurant / Cafe	04/10/2020	19
Nursing home	Date To	16
Nursing home	Harris III	8
Community outbreak	21/10/2020	7

Average Daily Change in 14 day incidence by restriction



County View - Meath (13/11)

WORK IN PROGRESS



Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Dublin borders including a significant commuter population

Summary analysis:

- Ratoath LEA has the highest incidence rate. The timing of the acceleration of growth rate appears to correlate with reports of celebrations and 'lock ins' for Ratoath county final win
- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak of 50 cases
- . One significant community outbreak of 29 cases

Restriction impact:

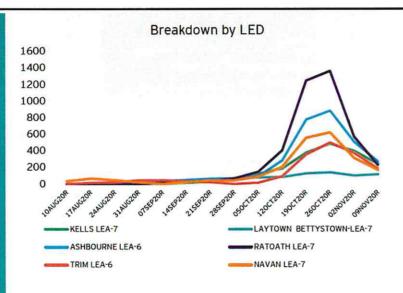
- The timing of the growth of cases appears to correlate with the events listed above and the opening of wet pubs
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- Level 5 restrictions continue to drive incidence level further

Employment summary

 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP remain lower than peak (13k versus 25k) levels (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

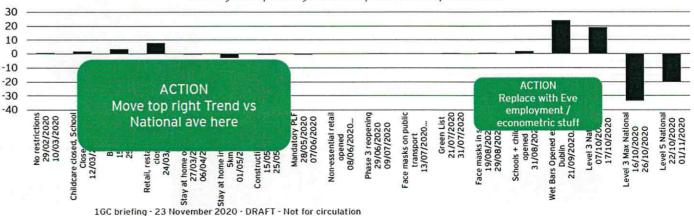


Since the 1st of September

2,466 cases, with 27% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	397	121
Nursing home	74	9
Community outbreak	45	4
Workplace	38	18
School	25	10
Notable events	Date	No. of cases
Nursing home	THE PROPERTY OF	51
Community outbreak	10/10/2020	29
Community outbreak	13/10/2020	
Workplace	19/10/2020	11
Nursing home		10

Average Daily Change in 14 day incidence by restriction



County View - Donegal (20/11)

WORK IN

Total Confirmed Cases Trend vs. National 2.755

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Large part of Donegal borders with NI where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the highest incidence rates
- A large hospital outbreak in resulted in 99 cases in

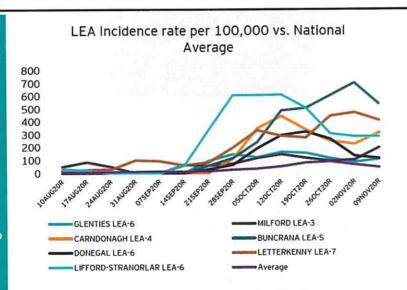
Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

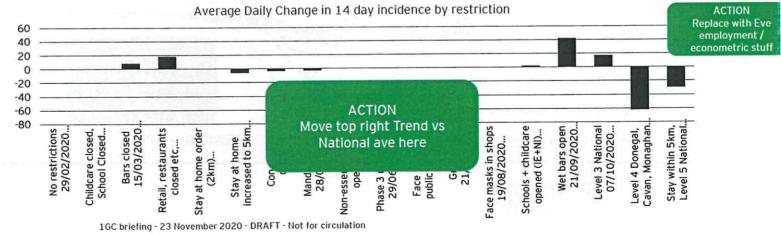
- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have had impact
- Despite level 5 being effective in other counties, cases in Donegal continue to decline at a far lower rate compared to national levels
- Mask compliance in Donegal reduced (against national and previous Donegal trend) with Level 4 restrictions. This is against the trend in Donegal for Level 3

Employment summary

Donegal had c.49% of its workforce on PUP or TWSS (30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP remain lower than peak (12k versus 23k) (CSO, DSP)



Since the 1st of September 2165 cases, with 62% linked to outbreaks No. of Cases Top 5 Settings Outbreaks 651 235 Private house 28 159 Workplace 126 Hospital 19 118 Extended family Nursing home Notable events Date No. of cases 99 Hospital 55 Workplace 23/09/2020 49 Nursing home 24/10/2020 20 Social gathering 17 Hospital



County view - Galway (20/11)

Total Confirmed Cases

Trend vs. National

2,609

Galway profile:

 Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average. It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway
 City East have had the highest 14-day incidence rates
 throughout October. A number of key events occurred
 in late September which could have contributed to this
 increase
- Cases within Galway City Central LEA appear to have increased in this period following the reopening of NUI Galway on the 24 September
- Wet pubs also opened in late September which saw mobility within the county rise by 5.4%
- GAA senior championship football semi-finals and finals also occurred in the last week of September.
- Throughout November, private household cases were responsible for 49% of outbreak cases, with outbreak and community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

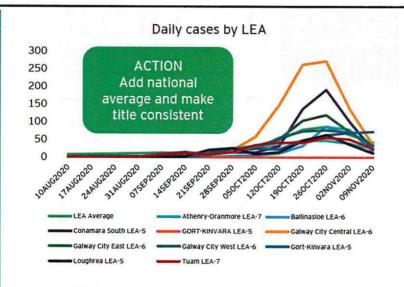
 Cases begin to decline ten days after the national level 3 lockdown (27/10), falling below national levels in November. An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary:

 Galway had c.39% of its workforce on PUP or TWSS (49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP which is down from 32.5k in May (CSO, DSP)

Note

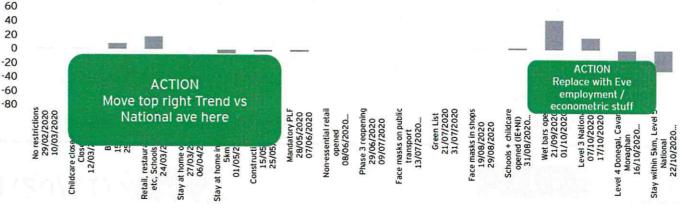
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	723	293
Community outbreak	207	30
March Philip		
Childcare facility	61	8
School	37	11
Notable events	Date	No. of cases
Community outbreak	24/09/2020	114
Accept Age 192	La Contraction	
A CONTROL	Market St.	
Social gathering	19/09/2020	20
Community outbreak	25/09/2020	18

Since the 1st of September

Average Daily Change in 14 day incidence by restriction



1GC briefing - 23 November 2020 - DRAFT - Not for circulation

Dublin - local authority breakdowns over time

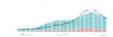
ACTION MAKE for Wave 2 only

		16MAR	23MAI	30N	MAR 0	6APR	13APR	20AP	R 27AP	R 04M	1AY 11	IMAY 1	8MAY 2	5MAY (אטעני	NUL80	SJUN :	2JUN 2	MOTES	06JUL	13JUL	รอากร	27JUL 0	BAUG 1	OAUG 1	7AUG 2	4AUG 3:	1AUG (75EP	14SEP	21SEP	28SEP C	SOCT :	120CT 1	190CT 2	EGOCT	02NOV	091
	RUSH-LUSK LEA-5	3	14	4	49	121.1	175.9	227	7.8 170	0.2	69.2	51.9	31.7	17.3	3	3	3	3	3	3	3	3	3	3	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	1
	SWORDS LEA-7		38						0.4 305		88.8	60.3	42.8	40.9	23.4	3	3	3	13.6	11.7	3	15.6	23.4	11.7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	247.2	297.8	371.8	1 7
	BLANCHARDSTOWN- MULHUDDART LEA-5	14.2	48			243.6			1.3 51!			274.7	59.5	34	48.1	39.7	22.7	3	3	3	14.2	22.7	28.3	22.7	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2		
ringai	CASTLEKNOCK LEA-6	3	32	5	65	169.1	336	370	0.7 310	5.5 1	92.9	52	17.3	13	3	3	13	3	3	3	3	3	10.8	13	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	299.2	201.6	i
	HOWTH-MALAHIDE LEA-7	3	Į.	3 1	10.4	146.1	251.2	25	1.7 16	2.1 1	15.8	80.2	41	28.5	17.8	14.3	10.7	12.5	3	3	3	3	3	8.9	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	3
	BALBRIGGAN LEA-5	3	30	1	68.4	125.8	213.3	28	4.4 27	8.9 1	72.3	71.1	27.3	38.3	43.8	13.7	3	3	3	3	3	3	3	3	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	1
	ONGAR LEA-5	3	41	9 1	14.4	195.3	346	36	2.8 21	4.9 1	31.2	67	16.7	19.5	25.1	3	3	3	3	3	14	3	3	3	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	6
	STILLORGAN LEA-6	3	62	3 1	170.4	213.1	239.3	23	9.3 19	0.1 1	40.9	147.5	108.2	22.9	16.4	3	3	3	3	3	3	3	3	3	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	,
	DUNDRUM LEA-7	3	42	.7	93.5	189.6	272.3	3 2	51 14	6.9	85.4	74.8	40.1	18.7	13.4	18.7	18.7	3	3	3	3	3	3	3	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	Ł
Rathdown	GLENCULLEN-SANDYFORD LEA-						400				F2.0	54.6	49.2											3	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	5
Ď.	7	3	27			166.6			7.5 20		52.9	105	76.2	13.1			3	2	3	3	3	-	1	3	3	3	3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	107.7	70.9	9
Ra	KILLINEY-SHANKILL LEA-7	13.1	28			133.9					91.9	108.1	52.9	28.8	19.2		12	- 2			3	10	3	3	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	9
	DÚN LAOGHAIRE LEA-7	14.4	45			235.4		-					97.8	62.3	74.1	68.2	20.8	,	3		20.8	17.8	- 4	3	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	3
	BLACKROCK LEA-6	14.8	38		118.6	198.7	2000	2 -	100			157.1	THE STATE OF THE S		O SOUTH OF				37	18	20.8	17.0		18	3	-	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	3
	LUCAN LEA-5	3			107.7	266.3			1.4 40			152.6	89.8	92.8	68.8	41.9	26.9	3		10				10		20.8	41.7	53.2	85.6		166.6	2000	138.8	145.8	182.8	224.5	231.4	4
	TALLAGHT CENTRAL LEA-6 RATHFARNHAM-TEMPLEOGUE	3	39	er.	92.6	157.4			861 29 8.5 24		138.8	111.1 85.6	106.4	74 50.1	60.2		3	3	3	3	3	3	12.5	3	3	3	12.5	35.5	48	75.1			146.1					
	LEA-7 FIRHOUSE-BOHERNABREENA	The state of	. 60		123.2	152.4	230	5 23	0,5 24		.40.1	03.0	50.4	30.1			-														77.4	70.0	99.4	181.3	242.7	231	1 190	
	LEA-5	3	58	.5	90.6	108.2	292.4	4 36	8.4 29	2.4	231	108.2	61.4	40.9	17.5	-	3	3	3	3	3	3	3	23.4	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9		1000000		267.9		
	TALLAGHT SOUTH LEA-5	3	28	1.2	90.2	155.1	256.	6	344 35	8.1 2	290.4	248.1	183.3	104.3	81.8	59.2	47.9	22.6	14.1	3	3	19.7	36.7	42.3	36.7	28.2	36.7	93	124.1				160.7	203	100000000000000000000000000000000000000	400000		
	CLONDALKIN LEA-7	30.1	. 83	8.8	172	279.4	367.	6 42	1.3 47	5.1 4	12.7	264.4	219.3	159.1	66.6	19.3	15	12.9	3	3	3	3	3	21.5	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.	Ì
	PALMERSTOWN-FONTHILL LEA-5	3	26	5.3	99.9	126.2	207.	7 23	1.4 12	6.2	99.9	81.5	34.2	3	3	3	3	3	3	3	15.8	13.1	3	3	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	3 260.3	
	BALLYMUN-FINGLAS LEA-6	1	18	1.2	74.5	178.1	325.	4 39	0.8 43	0.8	318.1	138.2	87.3	49.1	36.4	27.3	21.8	12.7	14.5	9.1	3	9.1	10.9	3	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	-
	CABRA-GLASNEVIN LEA-7	3	4	2.6	83.5	160.3	318.	8 37	5.1 39	5.6 3	354.6	155.2	56.3	58	40.9	17	3	3	3	8.5	20.5	23.9	17	10.2	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.	į
	BALLYFERMOT-DRIMNAGH LEA-5	17.4		1.2	99.9	225.8					225.8	78.1	41.2	19.5	10.9	3	3	3	3	10.9	3	13	13	3	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	1 277.	-
	KIMMAGE-RATHMINES LEA-6	9	6	2.7	132.5	166.5	241.	7 31	5.1 24	11.7	141.4	87.7	39.4	16.1	3	3	3	3	3	3	12.5	23.3	10.7	3	3	21.5	35.8	50.1	75.2	111	162.9	282,8	306.1	250.6	245.3	211.2	2 223.	
	PEMBROKE LEA-5	11	5	7.2	131.9	175.9	274.	9 29	9.1 29	9.1	270.5	136.3	77	41.8	30.8	17.6	3	11	3	3	3	11	3	3	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	7 90.	
	SOUTH EAST INNER CITY LEA-5	12.3	3	32	76.3	115.8	150.	2 15	55.2	91.1	81.3	69	17.2	3	3	3	3	3	3	3	12.3	59.1	49.3	3	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	3 160.	1
	NORTH INNER CITY LEA-7	7.9		9.3	78.6	108.5	198.	1 23	35.8 16	9.8	117.9	89.6	62.9	40.9	28.3	11	3	14.1	12.6	3	3	7.9	12.6	15.7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	9 205.	
	CLONTARF LEA-6			0.6	107	171.6	276.	8 34	15.1 37	74.7	293.5	107	31.4	24	16.6	3	18.5	14.8	3	3	3	9.2	9.2	3	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	8 142.	
	DONAGHMEDE LEA-5	MI	2		98.6	230.8	389.	5 40	01.5	327	204.4	50.5	31.3	26.4	3	3	14.4	16.8	3	3	3	3	12	19,2	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	2 240.	
	ARTANE-WHITEHALL LEA-6			6.7	129	260	445.	7 50	02.4 47	73.1	308.9	109.5	70.4	66.5	41.1	13.7	13.7	17.6	11.7	3	11.7	11.7	27.4	37.1	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	3 265.	
		1 3 3					28							35.4		3						11.8	0	11.8		16.5		101.5	145 4	151.1	100	1000	151.1	184.2	222.8	240	9 177.	

There is a moderate correlation between areas hit hard in Wave 1 and Wave 2, with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin, Artane-Whitehall, etc. Note these areas contain many more EDs that were classified as "marginally disadvantaged" or "disadvantaged" on the Pobal HP Social Deprivation Index than areas with lower incidence rates, which contained many EDs classified as "affluent".

Trend vs. National

26,221



Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council areas of Dublin with Dun Laoghaire– Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

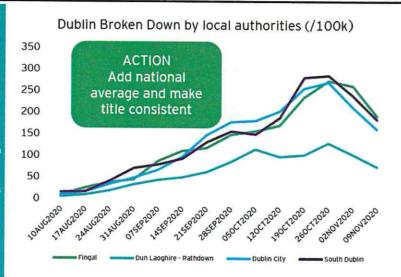
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates).
 Current PUP levels are at 114k, compared to a peak of 176k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration

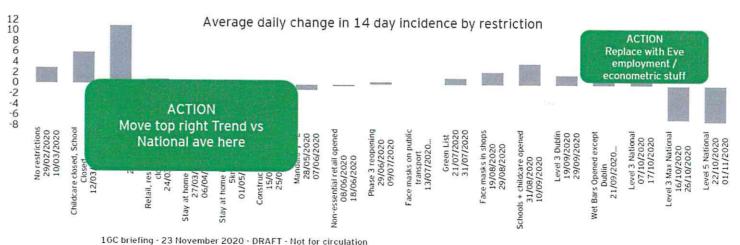


Since the 1st of September

12,606 cases, with 56% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable events	Date	No. of cases
Extended family	24/09/2020	288
Nursing home		75
Hotel	12/09/2020	38
Childcare facility	20/10/2020	38
Residential institution	02/10/2020	30



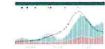
County view - Waterford (20/11)



Total Confirmed Cases

Trend vs. National

975



Waterford profile:

Waterford experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Waterford rising above the national rate in mid-November

Summary analysis:

- Cases rose in early September in Waterford City East, South and Tramore-Waterford City West. There was a meat factory outbreak around this time resulting in 50
- Workplace outbreaks have been prominent in Waterford, making up 30% of outbreak-related cases in November, with the largest resulting in 24 cases
- Private households make up another 63% of outbreakrelated cases during this period
- Outbreaks in September and October were both driven by cases occurring in Waterford city. Unlike other counties, these do not seem to spread throughout Waterford to the same degree, with LEAs outside Waterford City maintaining lower cases compared to national levels

Restrictions impact:

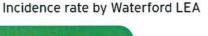
- Cases stabilised in the ten days after Level 3 restrictions came into effect
- While falling steadily throughout November, cases began to rise again towards the middle of the month

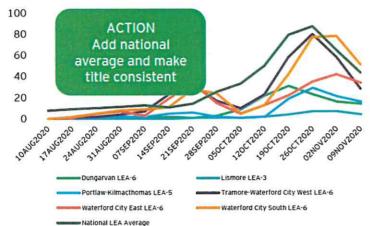
Employment summary:

Waterford had c.45% of its workforce on PUP or TWSS (21k) at the peak in early May (EY 2019 employment estimates). There are currently 8k on PUP which is down from 14k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





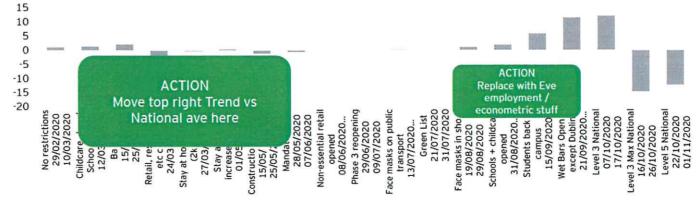
Since the 1st of September

777 cases, with 63% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	329	135
Workplace	84	8
Community outbreak	20	2
Other	12	2
Extended family	11	3

Notable events	Date	No. of cases
Workplace	04/09/2020	49
Workplace	03/11/2020	21
Community outbreak	02/10/2020	16
Private house	09/09/2020	10
Other	28/10/2020	9

Average Daily Change in 14 day incidence by restriction



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County view - Roscommon (20/11)

WORK IN PROGRESS

Total Confirmed Cases

Trend vs. National

925

ACTION Add trend vs national

Roscommon profile:

 Roscommon experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Roscommon rising above the national rate in mid-November

Summary analysis:

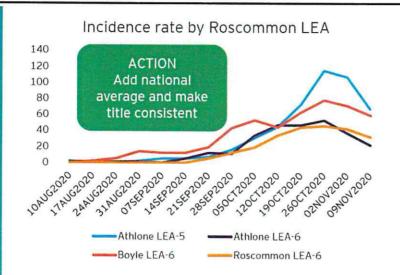
- The main driver of outbreaks within the county since the start of November are those seeded in nursing homes – representing 64%. Private house outbreaks make up a significant portion of remaining outbreaks, at 33% of new outbreaks
- An earlier increase was seen in Athlone LEA-6 in the week following the football final held 20 September. The winning team was located in this LEA. However other events coincided with this date including the reopening of wet pubs

Restrictions impact:

- Level 3 (max) restrictions put in place as of 16 October can be seen to align with a reduction in incidence rate ten days later
- In some instances, this reduction can be seen to accelerate again with the introduction of level 5 restrictions on 22 October (Athlone LEA-5, Roscommon LEA-6, Boyle LEA-6)

Employment summary

 Roscommon had c.37% of its workforce on PUP or TWSS (11k) at the peak in early May (EY 2019 employment estimates). There are currently 3k on PUP which is down from 7k in May (CSO, DSP)



Since the 1st of September

557 cases, with 68% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	194	78
Nursing home	82	5
Extended family	30	5
Workplace	14	8
Notable events	Date	No. of cases
Nursing home	Filester	66
ELEVALUE .	A SHARE	
Extended family	09/10/2020	18
Nursing home	estes della g	12
Private house	14/10/2020	7

Average Daily Change in 14 day incidence by restriction



Trend vs. National

6,140



Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC, were twice as high as other LEAs in Cork city during mid October. This gap declines with November as the universities went online

Restriction impact:

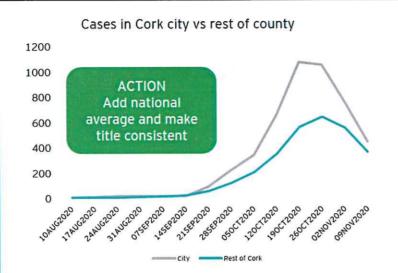
- Cases in Cork city rose as wet pubs reopened, with mobility within the county rising 7.3%. Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which are linked with outbreaks. Level No matches occurred after this, with level 3 restrictions being applied around this time. Cases throughout Cork began to fall 10 days after this, indicating both measures were effective

Weekend of 14/11

- While incidence rates are falling, Gardal had to disperse large crowds in the city centre this weekend due to individuals consuming takeaway alcohol in large crowds
- Areas such as Grand Parade at Coal Quay noted as popular for these activities

Employment summary

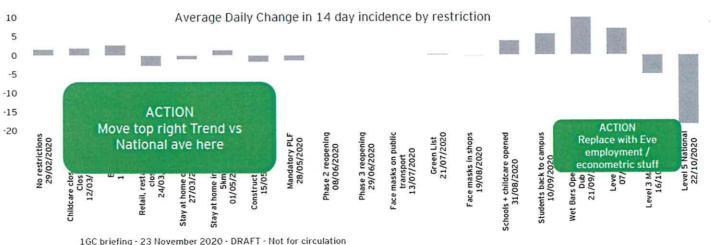
 At peak, c.39% of Cork's workforce were on PUP or TWSS (96k) (EY 2019 employment estimates). Current PUP levels are lower than the previous peak (35k versus 62k in May) (CSO, DSP)



Since the 1st of September

4,492 cases, with 45% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	929	354
Community outbreak	411	67
Nursing home	114	9
School	113	24
Extended family	90	22
Notable events	Date	No. of cases
Community outbreak	26/10/2020	68
Nursing home		46
Restaurant / Cafe	17/09/2020	38
Nursing home	MENT DISTRI	30
Community outbreak	22/09/2020	29





2,542

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

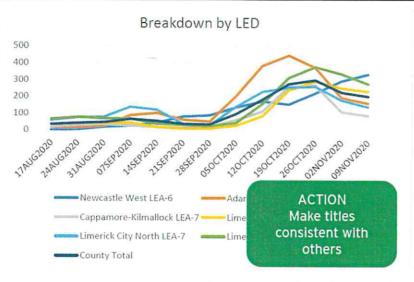
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November. Both are close to Listowel in Kerry, which experienced the highest incidence levels in that county
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Employment summary:

 Limerick had c.43% of its workforce on PUP or TWSS (34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP which is down from 22k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Since the 1st of September

1771 cases, with 39% linked to outbreaks

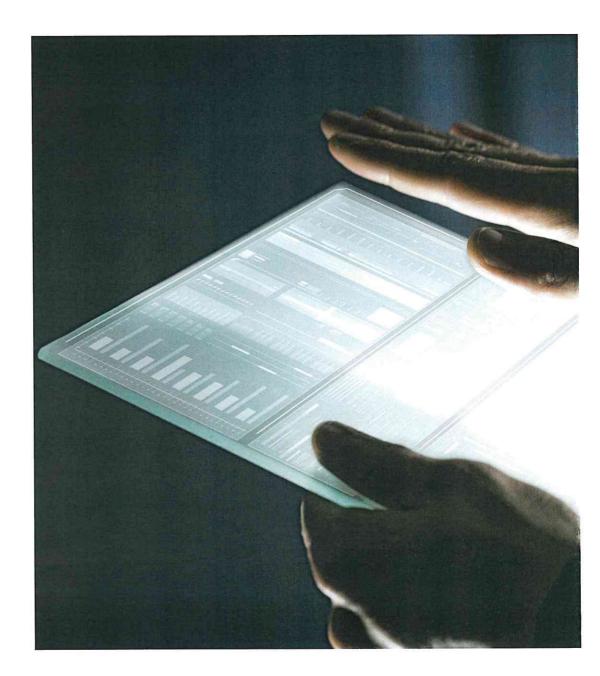
Top 5 Settings	No. of Cases	No. of Outbreaks
Extended family	242	19
Community outbreak	117	8
Private house	66	34
Social gathering	51	5
Notable events	Date	No. of cases
Extended family	23/09/2020	141
Community outbreak	08/10/2020	94
	SCHOOL NEWS	
Residential institution	13/10/2020	31
Social gathering	15/10/2020	25

Average Daily Change in 14 day incidence by restriction



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Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties - highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries

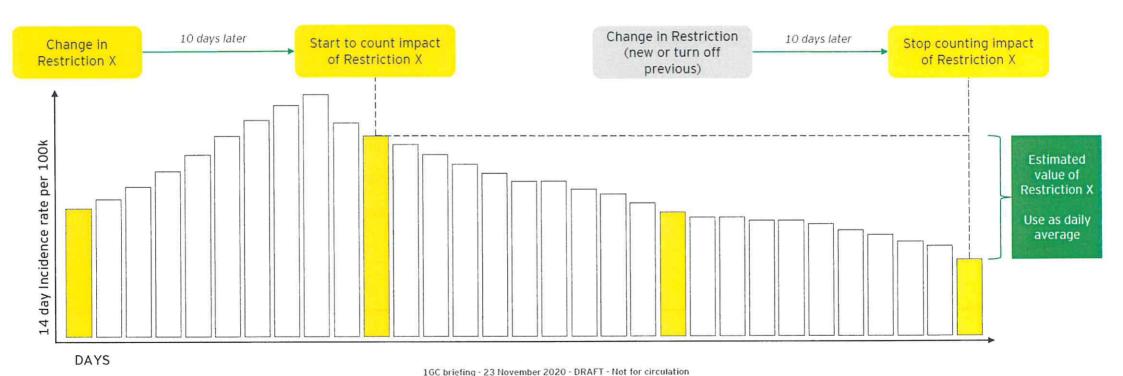


International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular 1GC COVID-19 insights publication and with new research included today

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There has been relatively few changes, which are generally applied in combination, hiding the unit value per restriction. There is also time a lag between a restriction change and the impact being seen. However, it is also clearly important that restrictions decisions are made with the maximum understanding of the impact. Hence, 1GC has used the below methodology to quantify changes in restrictions. This calculation has been applied for both Ireland and select international countries. The outputs should be seen as directionally useful rather than precise statistical outputs. They are also presented alongside international academic research to provide a broad view to support decisions.



Summary of Restrictions Analysis

Summary slide showing findings per restriction. Basically, one row per restriction

Include Irish, International and academic findings per restriction

Include "Northern Ireland restrictions" as one of the rows

May not include, but good we have a common view

Ireland - restrictions analysis

Interactive demo showing restrictions impact analysis by county



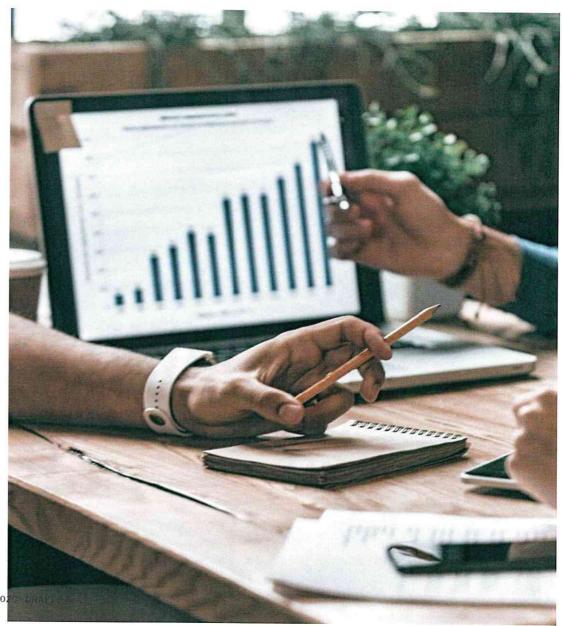
1GC briefing - 23 November 202

Track and Trace Free Text Analysis

The HSE Track and Trace system captures the information for each citizen being tested for C-19. This includes a contact type field, which explains the contact between citizens that the test resulted from. Contact categories are selected by the contact tracer from a drop down list, including "social", "work", etc.

There is also a free text field where the contact tracer may add further details. For example, if the category was "social" then the free text field may say "attended sports game together".

A selection of the analysis of this free text field is shown in this section. Note it is a relatively small sample of data and should be treated only as directionally informative.



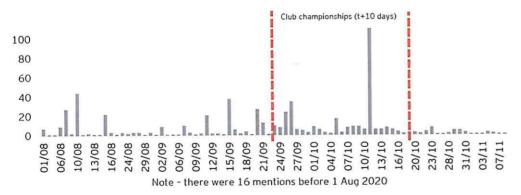
1GC briefing - 23 November 20

GAA-related events generated clusters of contacts, but absolute levels remain low

GAA and related terms mentioned in free text (by county)



GAA and related terms mentioned in free text (over time)



Key message: GAA events and celebrations appear to have generated incidences of high numbers of contacts with positive individuals. However, overall levels appear low.

Clare

24 GAA contacts on 7 Aug 33 GAA contacts on 10 Aug

Galway

34 contacts on 15 Sep Mention a specific GAA team

End of July start for club games in Clare as master fixtures committee recommend new formats

Westmeath

52 GAA contacts on 11 Oct

GAA related

Dublin

17 contacts on 15 Aug

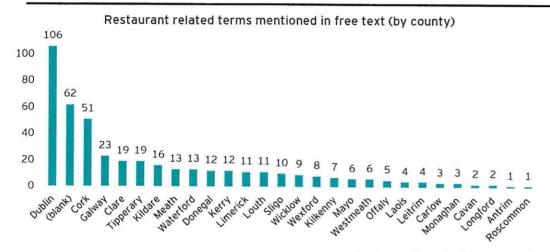
Mention a specific GAA camp

Football senior finals on 27 Sep Camps took place between 22 July and 23 Aug

Source: Contact tracing analysis Terms searched: terms 'GAA', 'Gaelic', 'County Final', 'County Championship', Hurling' and 'Football' Football and hurling championships took place between 13 Sep and 9 Oct 2020

Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

Contacts generated in restaurant settings, however overall levels remain low Restaurants mentioned 439 times since March



Key message: Restaurants generated contacts, however absolute levels remain relatively low given data available.

Dublin

18 contacts relating to a coffee chain 17-19 Aug

5 contacts relating to Dublin restaurant chain 24-25 Sep

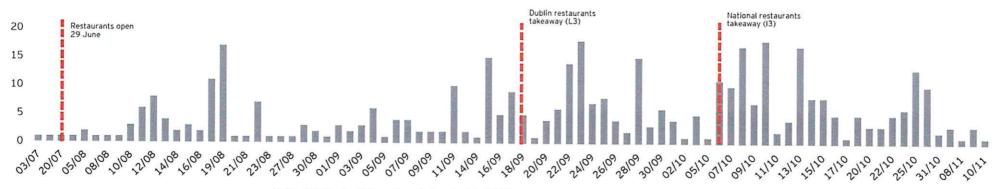
Cork

5 contacts relating to a restaurant chain 28 Sep

4 contacts relating to one restaurant

4 contacts relating to a fast food chain 9-10 Nov

Restaurant related terms mentioned in free text (over time)

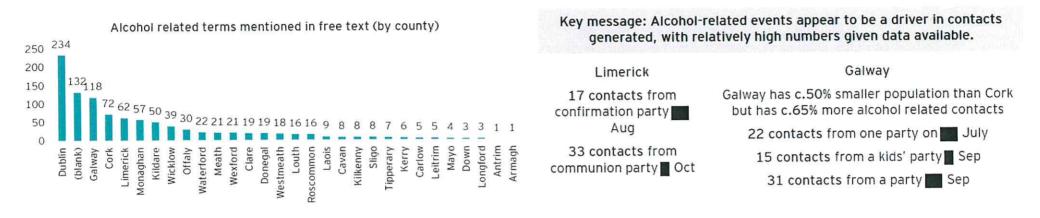


Note - there were 18 mentions before 1 July 2020

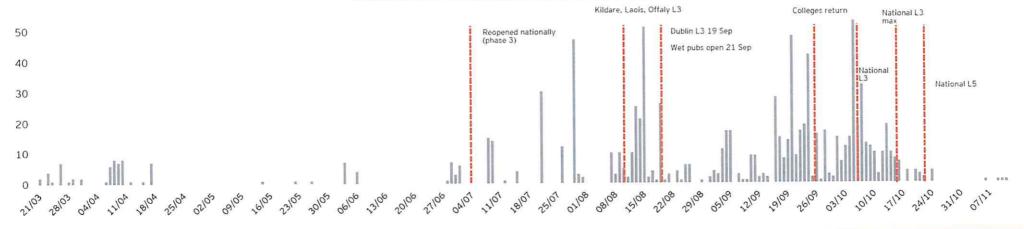
Source: Contact tracing analysis
Terms searched: Restaurant, eating out, out for a meal, and a list of all national chains in Ireland

Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

Alcohol and social gatherings generated contacts with positive individuals Alcohol and party-related terms mentioned 1,017 times since March



Alcohol related terms mentioned in free text (over time)

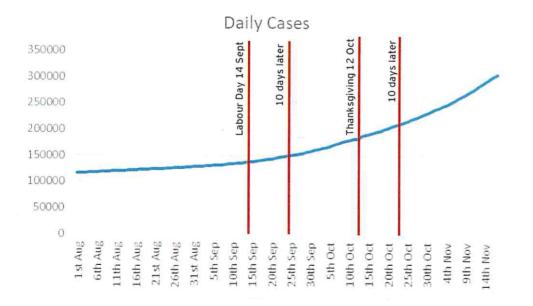


Source: Contact tracing analysis Terms searched: alcohol', 'drink', 'party', 'celebration', 'booze', 'beer', 'wine', 'cans', 'pint' Note: Analysis completed using the small available sample of track and trace free text data. Treat only as directionally informative

Canadian Thanksgiving: Test & Trace data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb; 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Track & Trace records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the rate of transmission after Thanksgiving." The percentage increase in cases dramatically changed after Thanksgiving, with a 14% increase in positive cases between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 14 September, 14 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.).

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

Selected cities - cases generated and positivity rates

San Fr	ancisco	Chi	cago	New	York
Cases	Positivity rate	Cases	Positivity rate	Cases	Positivity rate
+12k	0.09%	+89k	0.33%	+199k	0.22%
+1k	0.02%	+20k	0.13%	+70k	0.20%
+479	0.04%	+9k	0.28%	+30k	0.49%
+290	0.01%	+14k	0.14%	+19k	0.11%
+150	0.01%	+3k	0.19%	+11k	0.15%
+40	0.00%	+540	0.02%	+1k	0.03%
+40	0.01%	+250	0.02%	+1k	0.02%
	Cases +12k +1k +479 +290 +150 +40	+12k 0.09% +1k 0.02% +479 0.04% +290 0.01% +150 0.01% +40 0.00%	Cases Positivity rate Cases +12k 0.09% +89k +1k 0.02% +20k +479 0.04% +9k +290 0.01% +14k +150 0.01% +3k +40 0.00% +540	Cases Positivity rate Cases Positivity rate +12k 0.09% +89k 0.33% +1k 0.02% +20k 0.13% +479 0.04% +9k 0.28% +290 0.01% +14k 0.14% +150 0.01% +3k 0.19% +40 0.00% +540 0.02%	Cases Positivity rate Cases Positivity rate Cases +12k 0.09% +89k 0.33% +199k +1k 0.02% +20k 0.13% +70k +479 0.04% +9k 0.28% +30k +290 0.01% +14k 0.14% +19k +150 0.01% +3k 0.19% +11k +40 0.00% +540 0.02% +1k

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

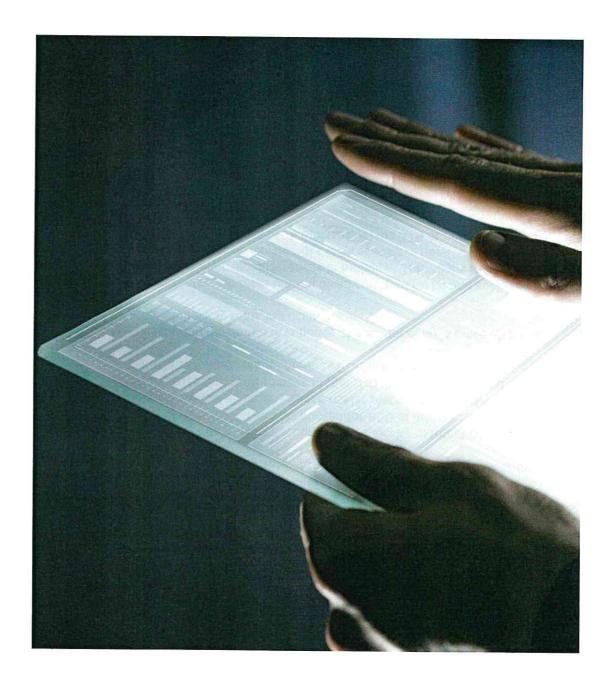
http://hirr.hartsem.edu/research/fastfacts/fast_facts.html

Note: Calculation of positivity rate using cases generated as a proportion of visits generated

Key findings

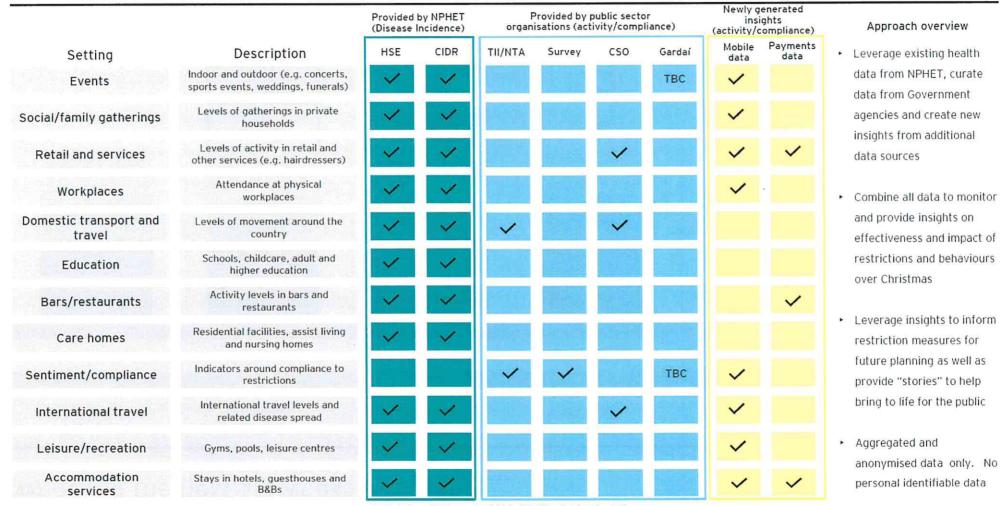
- The table depicts the expected additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10)
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more

Roadmap for next six weeks



Approach to Christmas monitoring

We will combine a variety of data sources to monitor activity over the Christmas period



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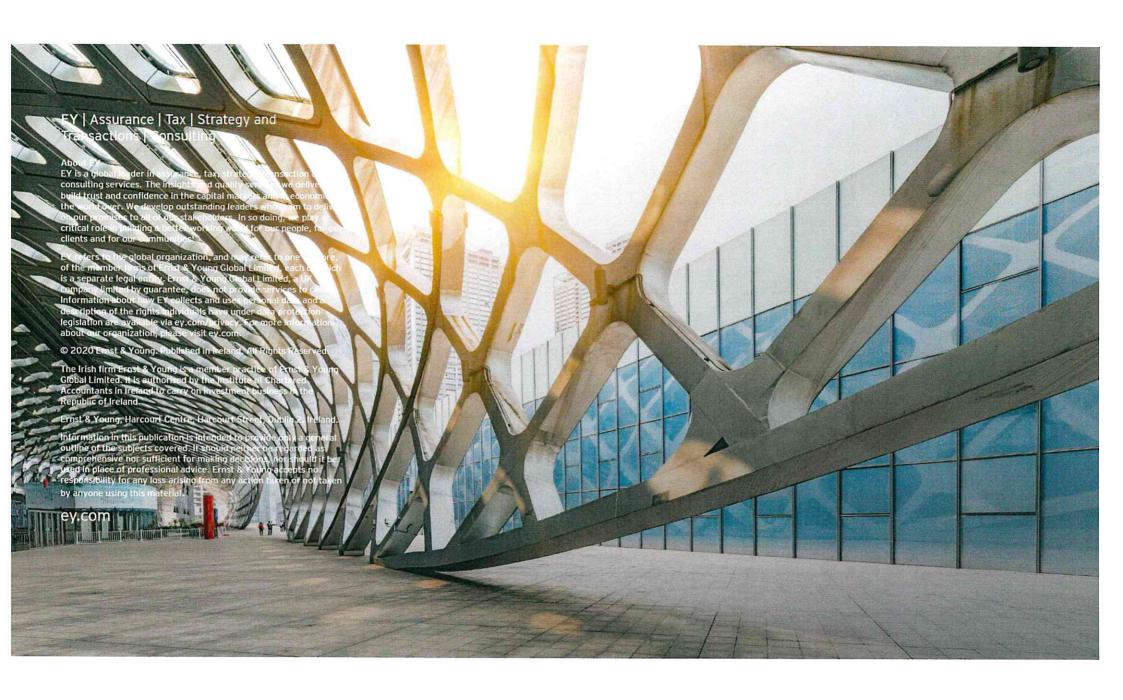
What will the next six weeks look like?

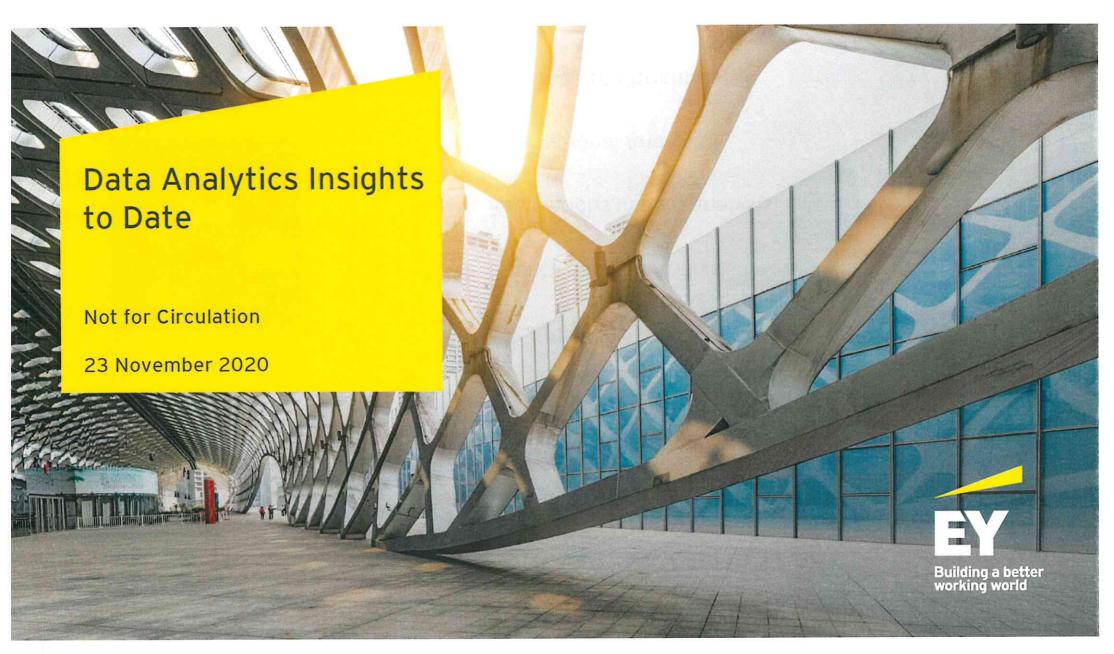
Data is anonymised and aggregated to LED or country and by industry type. No personal identifiable information

This week W/c 16 Nov	Week 2 W/c 23/11	Week 3 W/c 30/11	Week 4 W/c 7/12	Week 5 W/c 14/12	Week 6 W/c 21/12
		Proposed brief	_		
Weekly/ ad-hoc	Weekly / ad-hoc	Weekly / ad-hoc	Daily / ad-hoc	Daily / ad-hoc	Daily / ad-hoc
County dashboard	County dashboard	County dashboard	County dashboard	County dashboard	County dashboard
Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers
Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact
Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysi
	Transport	Transport	Transport	Transport	Transport
	Facebook survey	Facebook survey	Facebook survey	Facebook survey	Facebook survey
ase monitoring	Spending data	Spending data	Spending data	Spending data	Spending data
rictions		Stay at home index	Stay at home index	Stay at home index	Stay at home index
marice		1GC briefing - 23 November 2020) - DRAFT - Not for circulation	Social distance index	Social distance index

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





1GC update - Week 6

Agenda

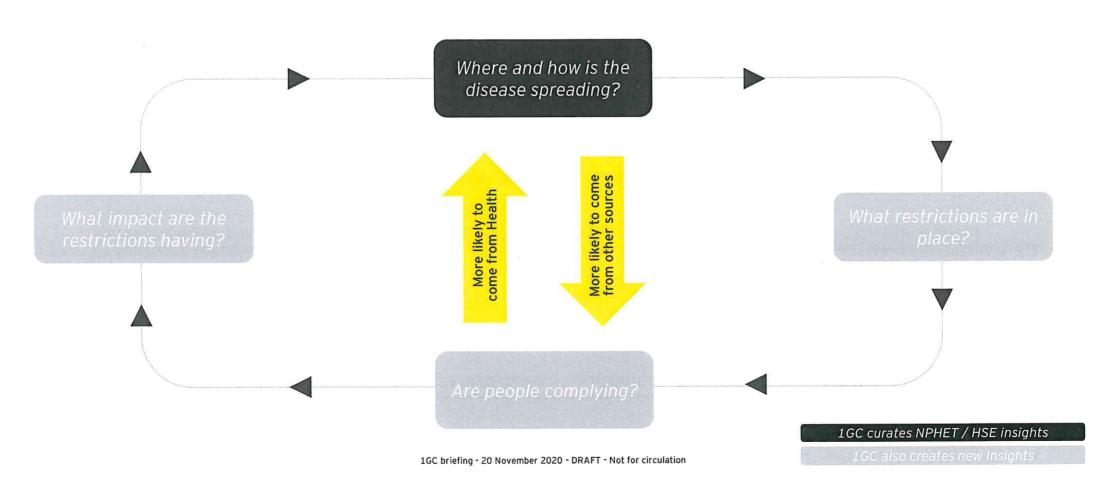




- ❖ 1GC Intro
- County Specific Analysis
- Restrictions Impact analysis
- ❖ International Analysis
- Roadmap to Christmas

Answering four key questions to support government decision making

Helping improve visibility and decision making by combining and analysing data across government

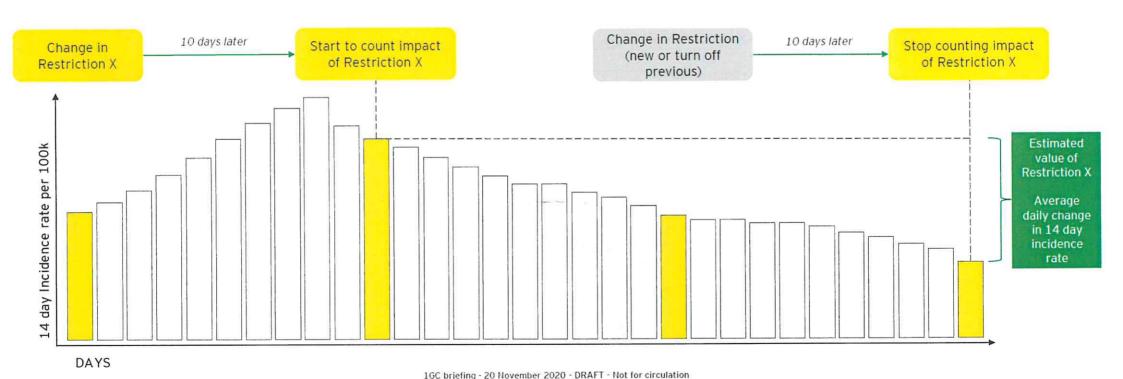


Summary of Initial Findings

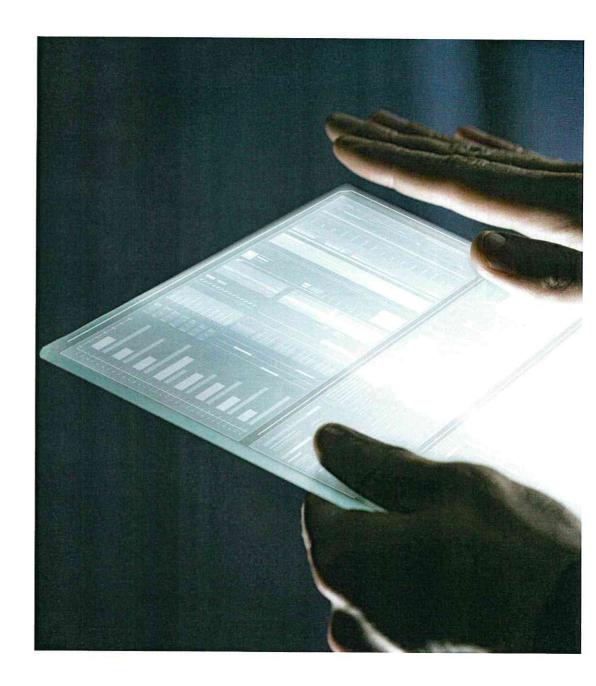
- Extending county analysis to Local Election Areas (LEA) help provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Proximity to the border
 - 2. Significant known outbreak event(s)
 - 3. Following the national profile
 - 4. Dublin
- We now have a far more expansive testing regime. This means it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of cases from Wave 1 to Wave 2
- · Social gatherings, citizen congregations, alcohol and specific local events have all appeared to have contributed to Wave 2 outbreaks
- · Level 3 appears to have only started to reduce actual cases following the introduction of further household restrictions in mid October
- The wet pubs opened across the country, but not Dublin in late September. There in an accelerated increase in the 14 day disease incidence rate per 100k 10 days later in most counties. This increase has not been seen to the same extent in Dublin
- The LEAs containing University College Cork and National University of Ireland Galway both saw higher case increases than the rest of their city with the universities opening. This difference was reduced when the universities went online. Wet pubs also opened in both cities the week after universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that is seen in other border counties. The introduction of Level 4 in Donegal coincided with a reduction in mask wearing. This goes against national trends
- The reopening of construction, non-essential retail and the wider Phase 3 changes did not appear to have a material impact on the cases nationally or in larger counties

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There has been relatively few changes, which are generally applied in combination, hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen. However, it is also clearly important that restrictions decisions are made with the maximum understanding of the impact. Hence, 1GC has used the below methodology to quantify changes in restrictions. This calculation has been applied for both Ireland and select international countries. The outputs should be seen as directionally useful rather than precise statistical outputs. They are also presented alongside international academic research to provide a broad view to support decisions.



County specific analysis



	Border County		Dublin and Surrounding Area		WIP formatting	Wave Two Dutbreak Sources	14 Day Incidence Rate (26/07 - 17/11)
						ouse, Community Outbresk, Norsing	
Kerry		1					
Limerick		· ·				Family, Community Outbreak, Private	
Mayo						Susu, Nutsing Home, School,	
Meath		1	1			Suses, Nursing Homes, Community	
Sligo*						use, Extended Family, Other Ceremony	
Westmeath*						ouse, Nursing Homes, Workplace	
Wexford						euse, Social Gathering, Nursing Home	
Kilkenny*		1				ouse, Workplace, Hospital	
Carlow*		1				House, Workplace, Hospital	
Clare	-	1			Nursing Home, Private Houses, Extended	Private House, Extended Family, Community Outbrasks	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		1		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing	
Longford*		/			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	
Roscommon	-	/			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		1		<u> </u>	Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	
Laois*		1			Workplace, Hospital, Community	Private House, Workplace, Nursing Home	
Waterford		/			Hospital/Long-Stay Unit Vorkplace, Private House, Nursing Home	Private House, Workplace, Community Outbreak:	
Tipperary		/			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential	Priste House, Workplace, Nursing Homes	
Louth	-	-		1	Institution Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	-	-		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*		1			Nursing Home, Private House, Travel Related	Private Houses, Extended Family,	
Monaghan	-	1			Nursing Home, Workplace, Residential	Religious/Other Ceremony Private Houses, Workplaces, Residential	
Donegal		-	-	-	Institution Travel Related, Nursing Home, Community	Private Houses, Hospitals, Extended Family	
Wicklow**	- ·			-	Hospital/Long-Stay Unit Workplace, Private House, Residential	Private House, Nursing Home, Workplace	
Dublin		1	-	•	Institution Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

 $^{^*} Carlow\text{-}Kilkenny, Laois\text{-}Offaly, Longford\text{-}West meath and Sligo\text{-}Leitrim are combined in CIDR$

^{**}Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow Wave 1: 03/03-25/07 Wave 2: 26/07-20/11

County Analysis Summary

County	Border county	Major Incident	Dublin and surrounding area	Following national restrictions trend	Wave One - main outbreak sources	Wave Two - main outbreak sources	14 day incidence rate per 100k (26/07 - 17/11)
Kerry	1	/		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		/		/	Nursing Home, Private Houses, Residential	Home Extended Family, Community Outbreak, Private	
Mayo				1	Institution Nursing Home, Hospital, Community	House Private House, Nursing Home, School,	
Meath		1	1	1	Hospital/Long-Stay Unit Nursing Home, Private Houses, Workplace	Workplace Private Houses, Nursing Homes, Community	
Sligo*	•)			~	Nursing Home, Private House, Travel Related	Outbreak Private House, Extended Family, Religious/Other Ceremony	
Westmeath*				✓	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Kilkenny*		1			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		1			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		1		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		1			Workplace, Nursing Homes, Hospital	Privata House, Nursing Homa, Workplace	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Laois*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		·			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		1			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential	Priate House, Workplace, Nursing Homes	
Louth	1	1		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	1		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	1	1			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	1	1			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Institutions Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dubiln		√	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source: Outbreak sources - CIDR, Incidence rate -based on daily cumulative case data published on GeoHive to 17 November 2020.
This data is published daily. Note: Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11
*Carlow-Kilkenny, Laois-Olfaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of 14 day incidence rate per 100k

The below heatmap shows the county 14 day incidence rate per 100k over the last two months. The overall reduction in cases has levelled in the week with some counties now increasing.

Two Weekly Incidence Rate Per 100k	Population	20-Sep 21-Sep	22-Sep	23-Sep			27-Sen	28-Sep	29-Sep		01-Oct		04-Oct	-	06-Oct	04-Oct	09-Oct	10-Oct	11-0ct	o o	13-Oct	15-0ct	16-Oct		19-Oct	20-Oct	21-Oct	22-Oct		25-Oct	26-Oct	28-Oct	29-Oct	30-Oct	01-Nov	02-Nov		05-Nov	06-Nov	08-Nov	09-Nov	10-Nov	11-Nov	13-Nov	14-Nov	15-Nov 16-Nov	17-Nov	Change Last 3 Days
Kerry	147,707	18 19	19	19	24	22	24 2	5 22	20	21	26	0 46	52	62	64	73 9	1 106	110	113	144 1	153 17	77 174	197	215 2	40 246	263	269 2	257 26	9 291	299	279 28	1 269	271 2	236 22	0 198	183 1	78 19	190	177 1	62 15	3 139	139	129 t	8 128	127	123 122	115	-11%
Limerick	194,899	44 39	39	36	34	35	33 3	3 34	39	37	45 5	8 69	90	96	107 1	114 11	9 145	160	167	182 1	189 20	07 208	231	246 2	48 27	280	290	301 28	38 293	306	299 31	0 306	312 2	277 26	9 262	228 2	27 22	9 221	216 2	218 21	1 207	198	195 1	95 211	201	222 238	236	15%
Mayo	130,507	26 31	30	29	32	31	32 3	0 28	26	28	24 2	6 30	33	32	36	42 4	2 54	67	75	80	90 10	7 123	131	150 1	67 185	208	228 2	243 25	50 246	256	266 25	9 248	242	261 24	6 232	216 1	98 18	3 184	185 1	76 16	2 147	151	145 1	118	113	110 110	109	-4%
Meath	195,044	32 35	38	37	44	42	47 4	4 47	51	62	67	71 68	85	90	96 1	115 12	9 164	183	199	213 3	306 35	57 403	452	490 4	88 59	629	657 6	556 64	48 649	661	651 59	0 558	531	481 45	0 448	352 3	14 28	2 272	249 2	32 20	4 201	172	154 1	41 140	133	139 128	134	196
Sligo	65,535	17 15	17	17	17	18	24 3	2 27	27	31	27	8 55	64	75	90 1	107 13	7 150	163	175	186 2	208 24	41 291	304	294 3	25 35	366	395 4	406 40	09 423	438	438 42	3 397	359 3	354 35	6 333	304 2	85 25	9 220	211 1	189 15	9 154	154	154 1	10 128	114	104 95	93	-23%
Westmeath	88,770	51 52	51	48	50	55	54 5	5 47	48	52	62 6	6 64	68	80	88	96 10	0 105	115	148	167	171 21	17 211	251	294 3	24 33	425	435 4	153 48	55 460	453	461 46	5 415	440	102 36	9 372	354 2	66 25	5 229	216 2	108 18	4 158	151	162 1	33 150	150	113 117	113	-33%
Wexford	149,722	33 23	23	25	28	28	27 2	7 35	33	33	35	0 41	48	57	73	80 8	5 98	112	130	160 1	173 18	8 202	250	271 2	72 29	298	301 3	322 3	18 313	301	268 25	7 258	242	192 17	172	141 1	24 12	6 96	89	83 7	4 67	67	48 4	9 49	49	47 45	46	-7%
Kilkenny	99,232	26 21	22	21	19	24	26 2	6 26	26	29	38	0 45	42	43	51	51 5	9 61	73	87	98 1	105 10	9 123	142	146 1	54 165	165	177	174 18	30 175	176	173 17	1 168	150	133 13	1 139	134 1	36 13	4 134	141	141 13	3 128	130	125 1	26 129	126	118 116	116	-9%
Carlow	56,932	37 39	40	42	44	42	40 3	9 39	26	33	35	4 44	44	42	42	40 4	2 54	61	74	77	83 8	4 119	116	149 1	57 198	204	242 2	242 27	70 292	306	311 32	7 327	293 2	299 27	0 278	249 2	42 21	4 213	177 1	60 13	7 126	105	95 9	8 91	88	72 77	81	-9%
Clare	118,817	44 41	44	40	40	41	47 5	50 53	63	76	76	7 96	121	144	158 1	183 19	9 246	261	268	304	310 30	06 309	322	326 3	27 32	313	304	311 27	72 264	281	252 24	8 253	255 2	235 22	9 209	189 1	86 18	1 173	171 1	60 13	9 132	122	109 1	04 104	93	103 111	112	17%
Cork	542,868	27 32	36	42	47	52	62 6	6 71	81	88	97 1	02 105	5 110	111	119 1	27 14	0 155	159	181	199 2	209 23	32 237	256	275 3	08 32	336	340	327 33	34 347	337	335 33	3 331	334	318 30	5 276	258 2	42 23	3 239	216 1	95 17	9 158	143	119 1	08 102	89	83 86	82	-8%
Galway	258,058	30 32	39	39	45	46	54 6	2 65	74	81	79	85 89	93	92	97 1	107 11	3 137	153	155	165 1	173 20	03 228	262	273 2	88 314	326	355	372 36	68 373	382	384 37	0 354	341	313 29	6 282	255 2	43 2	1 187	171 1	44 12	6 109	108	97 8	83	86	80 84	78	-10%
Longford	40,873	37 39	39	34	32	37	39 4	9 59	73	98	120 1	27 132	147	152	154 1	169 16	9 176	208	193	196	181 19	93 176	213	240 2	54 27	291	281	308 29	96 281	289	291 30	6 279	294 2	259 24	5 223	193 1	181 19	3 166	164 1	157 15	2 142	132	127 1	15 115	103	103 100	100	-296
Roscommon	64,544	45 54	57	62	67	64	76 8	34 99	102	121	133 1	13 161	155	155	170 1	166 16	6 192	184	200	181 1	187 2	01 198	201	223 2	32 22	239	260	271 26	60 276	263	263 25	9 231	240 2	229 20	3 225	229 2	18 19	5 189	174	153 15	2 175	170	175 1	3 166	169	141 169	161	-5%
Offaly	77,961	60 62	56	59	56	59	56 6	3 62	65	67	74	77 77	99	103	104 1	110 12	3 130	136	140	145	141 15	51 140	177	201 1	95 210	224	222 2	224 2	14 224	217	222 22	7 218	236	191 16	2 153	130 1	12 10	6 100	96	97 9	9 85	99	94 8	7 95	114	112 117	122	6%
Laois	84,697	44 46	47	40	33	34	31 3	32 32	35	43	43	76 76	89	87	96 1	105 12	3 124	133	135	139 1	136 16	61 169	151	174 1	35 20	214	222 2	220 2	20 233	242	251 25	6 231	235 2	227 20	8 204	197 1	79 17	0 174	175	74 16	3 157	155	149 1	36 136	137	116 107	104	-32%
Waterford	116,176	95 97	97	87	88	86	67 6	7 59	53	44	38	35 34	28	31	32	40 4	6 56	64	61	66	70 8	33 109	131	132 1	43 158	160	173	176 19	94 205	215	226 22	5 228	210	205 20	1 201	195 1	94 18	7 176	163	46 13	6 128	134	114 1	12 141	156	163 163	164	5%
Tipperary	159,553	18 16	17	16	19	18	21 2	4 24	25	31	32	36 40	48	53	55	58 5	8 66	70	71	78	83 7	9 88	93	110 1	13 115	118	120	126 12	24 134	139	133 13	9 145	133	139 13	1 130	130 1	30 13	2 130	128	122 11	7 123	118	113 1	17 114	101	105 110	107	5%
Kildare	222,504	67 67	69	71	75	76	75 7	78 77	85	82	80	97 95	94	87	98	99 10	8 125	146	154	168	188 19	98 204	208	244 2	57 27	293	305	303 2	98 301	306	298 28	9 290	292	270 24	2 231	210 1	86 17	7 169	156	143 12	1 118	103	94 8	5 93	89	88 85	86	-3%
Louth	128,884	102 98	107	109	101	95 1	104 9	92 80	76	75	74	79 77	88	90	85	85 8	9 116	109	116	115	152 16	61 181	185	188 1	78 22	261	293	283 27	72 286	299	311 28	9 296	293	285 29	7 297	257 2	19 19	3 202	189	177 15	9 155	157	156 1	7 151	151	160 157	168	10%
Cavan	76,176	24 22	22	32	37	37	49 5	51 47	56	67	79	84 88	114	134	144 1	164 20	0 303	339	386	412	571 6	41 735	760	811 8	24 910	1012	1058 1	058 9	83 966	967	964 81	0 752	668 6	645 58	9 562	474 3	65 29	5 263	232 2	206 15	9 143	133	119 1	12 102	108	98 87	95	-14%
Leitrim	32,044	41 44	44	44	41	34	37 3	37 25	5 19	25	25 ;	28 31	31	28	34	34 5	3 81	97	125	137	147 16	2 218	218	225 2	40 25	262	272	278 2	59 247	222	209 20	0 178	125	122 10	9 97	84	69 5	31	28	34 3	7 37	47	56	81 81	87	94 94	100	13%
Monaghan	61,386	39 37	37	54	60	68	93 11	16 135	5 134	166	173 1	89 178	207	226	257 2	257 27	0 303	319	331	313	362 35	50 368	350	375 3	65 40	2 389	406	409 3	84 375	349	363 32	3 310	305	303 28	8 269	218 2	05 17	1 176	166	142 13	7 121	122	116 1	17 124	112	114 104	104	-8%
Donegal	159,192	97 106	122	148	159	178 1	185 15	91 204	4 211	219	233 2	58 265	5 273	293	312 3	319 32	6 324	345	355	355	354 38	67 365	356	344 3	47 32	320	320	312 3	24 322	329	318 31	3 317	322	310 32	0 309	305 2	86 30	0 297	290 2	293 27	5 285	273	281 2	71 272	2 275	269 28	1 293	6%
Wicklow	142,425	72 70	77	74	71	69	65 6	7 70	73	65	72	74 77	78	78	77	76 7	6 80	84	88	91	87 8	9 91	103	119 1	20 12	124	129	145 14	15 149	149	145 14	7 149	141	130 11	7 116	107 1	04 10	6 91	88	89 8	2 77	89	86 1	34 85	85	82 86	83	-3%
Dublin	1,347,359	137 136	140	144	146	148 1	152 16	60 154	159	163	168 1	72 161	1 166	162	171 1	165 16	3 173	174	177	180	184 19	93 197	201	223 2	31 23	241	252	257 2	53 255	255	258 25	5 252	252	237 22	0 226	217 2	09 20	0 199	191	185 17	2 161	151	142 1	34 139	136	119 118	115	-18%
National	4,761,865	70 71	74	76	79	80	84 8	88 88	92	96	101 1	08 107	7 114	116	124 1	128 13	4 150	158	167	177	190 21	07 217	231	251 2	61 27	290	302	305 3	02 307	309	307 29	8 291	286	268 25	3 247	226 :	211 20	1 195	184	173 15	9 150	142	133 1	27 128	124	117 118	117	-6%

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.

...write something ???

	29/02/2020	12/03/2020	15/03/2020	04/03/20		27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/01/2020	08/08/2020	19/08/2020	21/08/2020		31/08/2020	CCC/60/61	21/09/2020	25/09/2020	01/10/2020	07/10/2020	0000700791	and and an	22/10/2020
Average Daily Impact of Restriction	ž	Childcare closed, School Closed	Bars dosed	Retail, restaurants closed etc,	ē	Stay at home order (2km)	Stay at home increased to 5km	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown extended for Kildare	Schools + childcare opened	Schools + childcare opened (IE+NI)	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donogal	Restrictions on Derry and Strabane	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan,	Level 5 National
Carlow	0	100	1		-2	2		1	-2	-1	0	0	2		-4		1	"		5			17	-7		-14
Cavan	0	0	8			0		-3	-3	0	0	0	0		0			3		43			17		-62	-28
Clare	1	4	3		0	1	-4	2	-4	0	0	2	0		0		2			15			-5	-4		-28 -10
Cork	2	2	3		-3	-1		-2	-1	0	0	0	0		0		4			10			7	-5		-14
Donegal	0	0	5	1.5		-2		0	0	0	0	0	1		0			9		12	7	0	-2		0	-15
Dublin	3	6	11		1	-2		-3	-1	0	0	0	1		2		4		2	2			4	-6		-11
Galway	1	1	2		-2	0	0	-1	-1	0	0	0	0		1		3			11			12	-15		-14
Kerry	1	5	3		4	-1	. 0	0	0	0	0	0	0		1		0			11		1	9	-10		-10
Kildare	1	2	5		3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1			8			7	-9		-12
Kilkenny	1	1	4		-3	-1	0	-3	0	0	0	0	1		0		0			6			3	-7		-7
Laois	1	0	1		0	0	-2	0	0	0	0	2	2	-2	-2	0	1			7			2	-10		-10
Leitrim	1	0	3		2	0	-1	-1	0	1	-1	0	0		4		-1			12			0	-17		-5
Limerick	1	1	5		-1	-1		-1	0	0	0	1	1		2		-1			12			7	-5		-13
Longford	1	1	3		4	7	-20	-1	-1	0	0	0	0		2		2			6			5	-8		-13 -11 -15 -12
Louth	1	1	3		1	0		0	-1	0	0	0	1		1		2			7			12	-2		-15
Mayo	0	1	4	1	10	-1	-2	-2	0	0	0	0	0		0		1			7			12 12	-3		-12
Meath	1	2	3		8	0	-3	-1	0	0	0	0	0		1		2			24		i	19	-34		-22
Monaghan	0	0	3	17		0	-2	-2	-3	0	0	0	1		1			7		11			-3		-12	-22 -13
Offaly	1	1	6		-2	2	2	-12	0	0	0	0	7	-9	-1	2	1			6			-3	-9	- Control Control	-8
Roscommon	0	1	1		2	6	-14	0	-2	0	0	0	1	-	0		5			4			4	-10		-11
Sligo	1	0	3		-4	0	-2	0	0	2	-2	0	0		0		1			17			16	-14		-17
Tipperary	1	1	5		-1	1	-5	0	-1	0	0	0	3		-4		0			4			3	0		-6
Waterford	1	3	2		-3	-1	0	0	0	0	0	0	1		1		1			6			9	-4		-10
Westmeath	2	3	7		2	3	-13	-1	-1	0	0	0	0		1		1			12			18	-15		-19
Wexford	0	0	1		-1	0	-1	0	0	0	0	0	1		ō		0			13			31	-16		-9
Wicklow	1	5	5		3	-1	-3	-1	0	0	0	-1	1		1		1			2			3	-5		-6
National	1	3	6		1	-1		-2	-1	0	0	0	1		1		5						6	-9	-	-12

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.

Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend

Cavan profile:

- Cavan has experienced a higher 14 day disease incidence rate per 100k during the second wave than the national average
- Part of Cavan borders with NI where different restrictions are in place

Summary analysis:

- Cavan-Belturbet LEA is the only part of Cavan with a NI border. This LEA is experiencing a higher disease incidence than the national average
- Ballyjamesduff LEA has the highest incidence rate. The timing of the acceleration of growth rate in this LEA appears to correlate with reports of celebrations and 'lock ins' for Crosserlough county final win
- Levels of private house outbreaks rose during September and October
- Travel along the Belturbet by-pass fell 33% during October (Source TII Road Travel data)

Restriction impact:

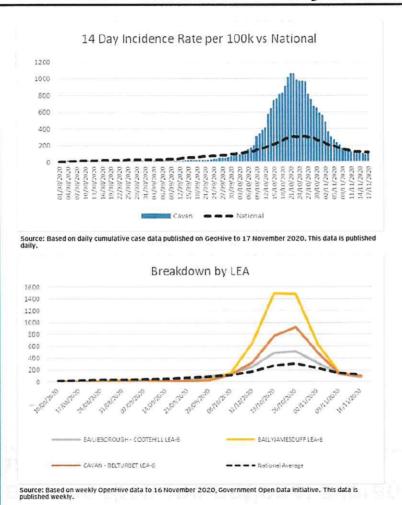
- The timing of the growth of cases appears to correlate with the events listed above and changes to restrictions in wet pubs
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence level in Cavan
- Level 5 restrictions continue to drive incidence level further

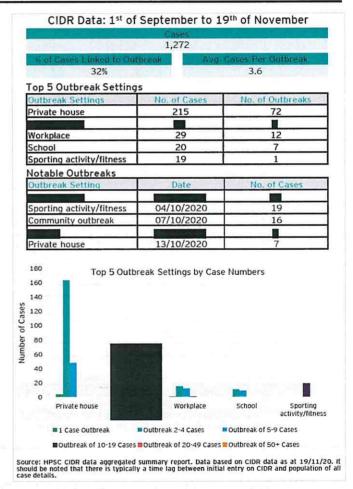
Employment Summary:

Cavan had c.47% of its workforce on PUP or TWSS (15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP (17 Nov) which is down from 9.7k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compilance or does not take behavioural aspects into consideration





Meath is seeing more cases than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Dublin borders including a significant commuter population

Summary analysis:

- Ratoath LEA has the highest incidence rate. The timing
 of the acceleration of growth rate appears to correlate
 with reports of celebrations for Ratoath county final
 win
- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak of 51 cases in
- . One significant community outbreak of 29 cases

Restriction impact:

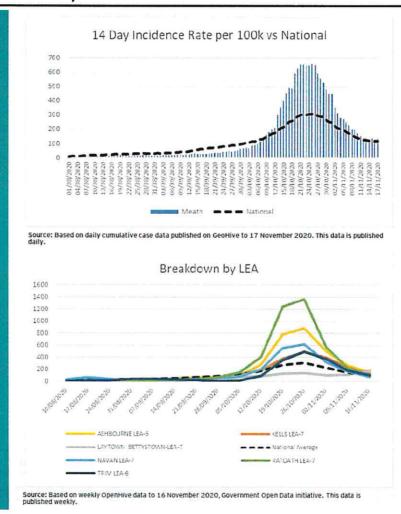
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- Level 5 restrictions continue to drive incidence level down further

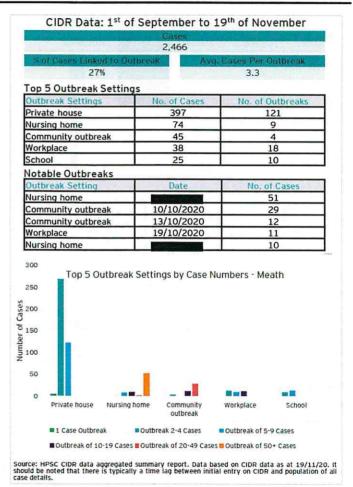
Employment summary

 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.





The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

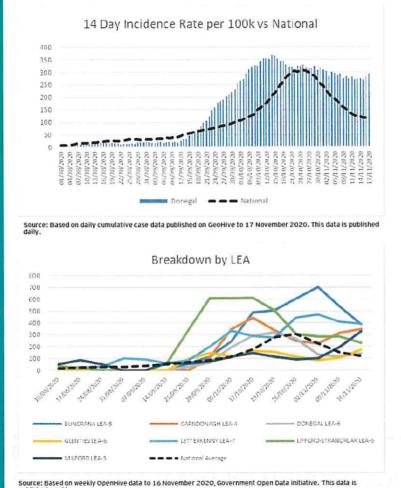
- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

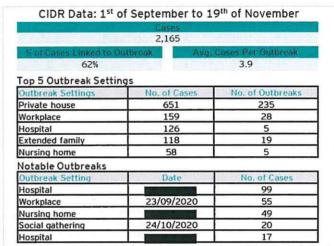
Restriction impact:

- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have had impact
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal continue to decline at a far lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (based on Facebook survey data)

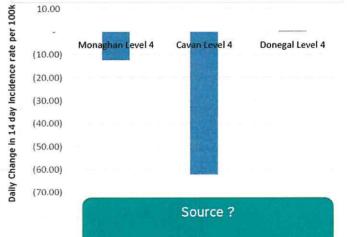
Employment summary

 Donegal had c.49% of its workforce on PUP or TWSS (30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17





Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details.



Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started on 21/28 Sept for continuing/new students respectively), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

- Cases in Cork city rose as wet pubs reopened (21 Sept).
 Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

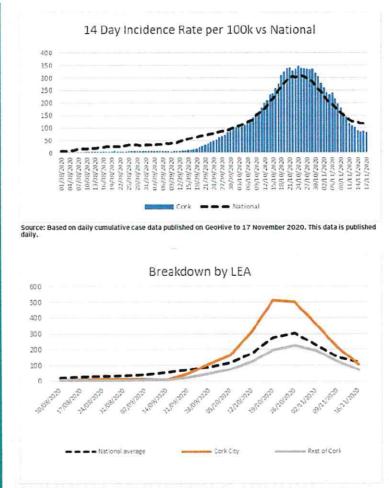
Employment summary:

 At peak, c.39% of Cork's workforce were on PUP or TWSS (96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

ACTION Move top right Trend vs National ave here



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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	Cases		A SHARE WAS ASSESSED.
Late Market Report TO	4,492		New York Control of the Control of t
% of Cases Linked to Ot	rtbreak Avg.	Cases Per 0	Dutbreak
45%		3.7	
Top 5 Outbreak Setting	gs		
Outbreak Settings	No. of Cases	No. of O	utbreaks
Private house	929	3	54
Community outbreak	411		57
Nursing home	114		9
School	113	2	24
Extended family	90	2	22
Notable Outbreaks			
Outbreak Setting	Date	No. of	Cases
Community outbreak	26/10/2020	- 6	58
Nursing home	THE REAL PROPERTY.	4	46
Restaurant / Cafe	17/09/2020		38
Alumaia a bassa			30
Nursing home			
Community outbreak	22/09/2020 ak Settings by Case No		29
Community outbreak			29
Top 5 Outbreak Top 5 Outbreak	ak Settings by Case No	umbers - Co	ork
Community outbreak 800 700 600 500 400 300 200 100 Private house comm			29
Community outbreak 800 700 600 500 400 300 200 100 Private house comm	ak Settings by Case No	umbers - Co	erk Extended family

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October.

had a confirmed outbreak in

mid-October

Throughout November, private household cases were responsible for 49% of outbreak cases, with the and community outbreaks making up a large proportion of the remaining percentage

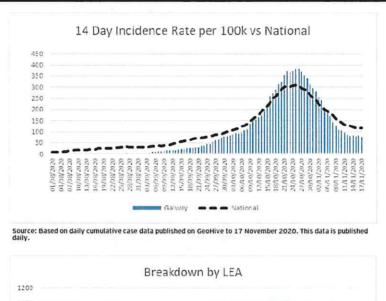
Restriction impact:

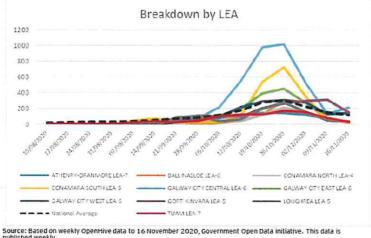
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary

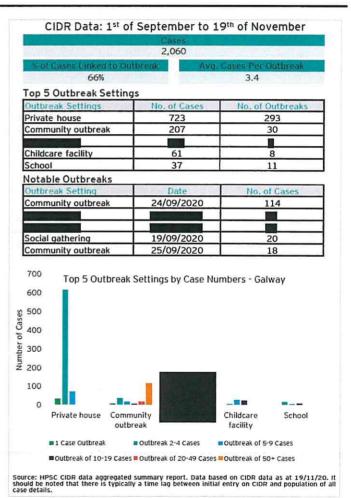
Galway had c.39% of its workforce on PUP or TWSS (49k) at the peak in early May (EY 2019) employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO.

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





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Dublin - local authority breakdowns over time

...write something ???

		10/08/202	17/08/11	24/08/20.X	31/08/20X	07/09/20X	14/09/20X	21/09/202	28/09/20X	05/10/202.	12/10/203	19/10/2X	36/10/20X	20/11/20	09/11/20X	16/11/20X
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-S	31	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
1200	CABRA-GLASNEVIN LEA-7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
£	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
Dublin	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
g	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
Δ	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-S	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
4	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
e c	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
n Laoghaire Rathdown	DUNDRUM LEA-7	3 1	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
th d	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
Dun L Ra	KILLINEY-SHANKILL LEA-7	3	3	3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	107.7	70.9	44.6	52.5
ă	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Finga	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
证	ONGAR LEA-5	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-S	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
101-2-1	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
NIP.	FIRHOUSE-BOHERNABREENA LEA-S	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
iii	LUCAN LEA-5	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublir	PALMERSTOWN-FONTHILL LEA-S	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
F	RATHFARNHAM-TEMPLEOGUE LEA-7	3		12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
So	TALLAGHT CENTRAL LEA-6	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

There is a moderate correlation between areas hit hard in Wave 1 and Wave 2, with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin, Artane-Whitehall, etc. Note these areas contain many more EDs that were classified as "marginally disadvantaged" or "disadvantaged" on the Pobal HP Social Deprivation Index than areas with lower incidence rates, which contained many EDs classified as "affluent".

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County view - Dublin (19/11)

average and make title consistent

Source?

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council areas of Dublin with Dún Laoghaire-Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

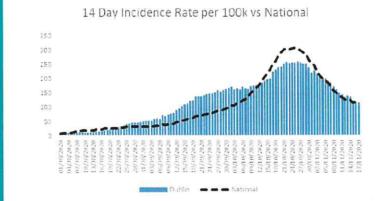
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average. Dublin's incidence rate rose by 2% per day on average in the 10 days after this restriction change, while the national incidence rate grew by 4.5% per day on average over the same period

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates).
 Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Notes

ACTION top right Trend vs tional ave here on disease incidence combined with the dates is not a measure of compilance or does not ansideration.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November

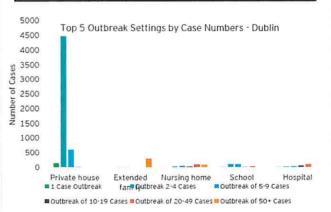
06
Avg. Cases Per Outbreak
2.9

Top 5 Outbreak Settings

Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Extended family	24/09/2020	288
Nursing home		75
Hotel	12/09/2020	38
Childcare facility	20/10/2020	38
Residential institution	02/10/2020	30



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details.

Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

Limerick has experienced a higher 14 day disease er 100k during second wave than the

WORK IN PROGRESS

f the cases in Limerick not declining to

tne same extend in the rest of the country

Summary analysis:

- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November. Both are close to Listowel in Kerry, which experienced the highest incidence levels in that county
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

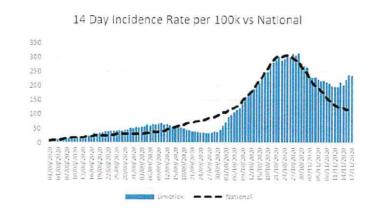
Employment summary:

 Limerick had c.43% of its workforce on PUP or TWSS (34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Notes

The rest combine not a me aspects

ACTION Move top right Trend vs National ave here



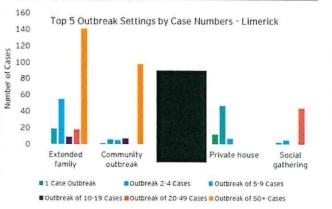
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November 1,771 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks xtended family 242 19 Community outbreak 117 8 Private house 66 34 Social gathering 51 5 Notable Outbreaks Outbreak Setting No. of Cases xtended family 23/09/2020 141 08/10/2020 94 Community outbreak Residential institution 13/10/2020 31 Social gathering 15/10/2020 25



Source: HPSC CIDR data aggregated summary report, Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all care datality.

Kerry is seeing lower cases than the nati Limerick having the highest number of r

ACTION Make titles consistent with others

e, with Listowel bordering

Kerry profile:

 Kerry has experienced a similar 14 day disease incidence rate per 100k during second wave to the national average. However, Listowel LEA has seen a sharp increase in its rate since early October

Summary analysis:

- North Kerry (Listowel) is most severely affected. This
 coincides with outbreaks southern parts of Limerick such
 as Newcastle West and Adare-Rathkeale, as well
 as Limerick city
- Killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- The remainder of county (further south, smaller towns) is generally less affected
- Private homes account for 33.68% of all outbreak cases since Sept 1st
- Listowel's incidence levels were three times higher than the next worst-afflicted LEA. Note the small population of -29,000 people meant 182 cases over a 2-week period prior to 26 Oct created a very high incidence rate

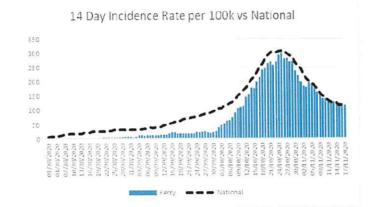
Restriction impact:

- The number of cases in Kerry started to grow around the time level 3 was introduced - two weeks later, this high growth rate had largely ceased
- Improvements have levelled off somewhat across LEAs such as Tralee, Killarney and Listowel

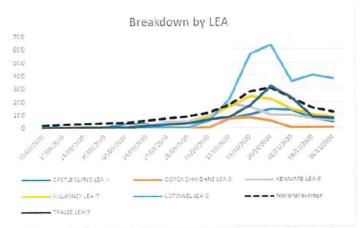
Employment summary:

 Kerry had c.49% of its workforce on PUP or TWSS (32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO,

> ACTION Move top right Trend vs National ave here



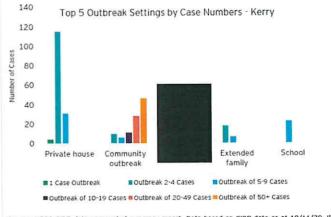
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

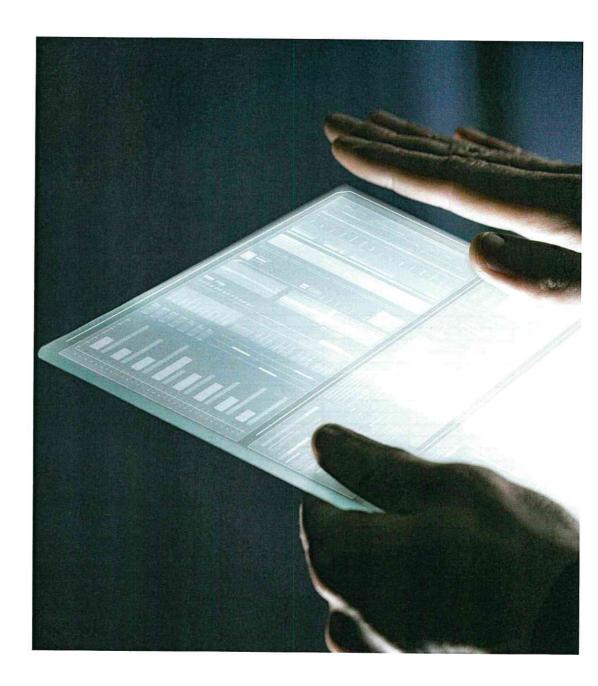
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CIDR Data: 1st of September to 19th of November 963 Top 5 Outbreak Settings Outbreak Settings No. of Cases 150 Private house 101 14 Community outbreak 25 Extended family 23 Notable Outbreaks Date No. of Cases Outbreak Setting 43 Community outbreak 03/09/2020 25 23/10/2020 Community outbreak 16/10/2020 11 Religious/Other ceremony 11/09/2020 11 Restaurant / Cafe



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all care details.

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties - highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular 1GC COVID-19 insights publication and with new research included today

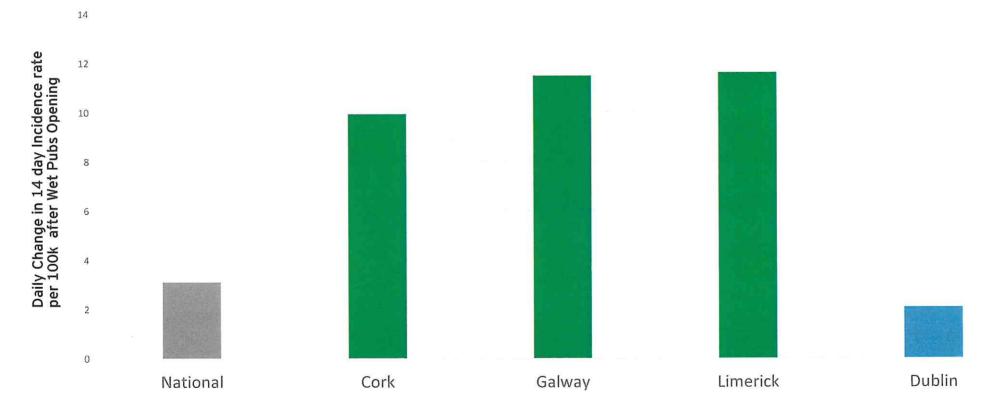
Ireland - restrictions analysis

Interactive demo showing restrictions impact analysis by county



Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's cases then slowed when compared with other counties

Case growth in Dublin after the Wet Pubs opening in other counties was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Note this coincides with universities opening, which impacts Cork, Galway and Limerick



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The three phases of re-opening during late May to early July did not have a significant impact on cases

The reopening of construction, non-essential retail and the wider Phase 3 changes did not appear to have a material impact on the cases nationally or in larger counties



^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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Track and Trace Free Text Analysis

The HSE Track and Trace system captures the information for each citizen being tested for C-19. This includes a contact type field, which explains the contact between citizens that the test resulted from. Contact categories are selected by the contact tracer from a drop down list, including "social", "work", etc.

There is also a free text field where the contact tracer may add further details. For example, if the category was "social" then the free text field may say "attended sports game together".

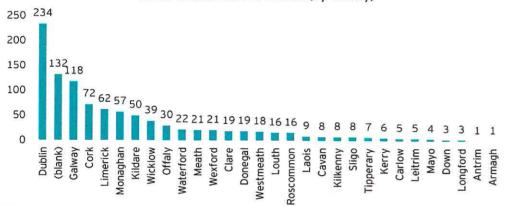
A selection of the analysis of this free text field is shown in this section. Note it is a relatively small sample of data and should be treated only as directionally informative.



Alcohol/social gatherings contacts with positive individuals Alcohol and party-related terms mentioned 1,014 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only

Contacts with positive individuals: Alcohol/Social Gathering related terms mentioned in free text (by county)



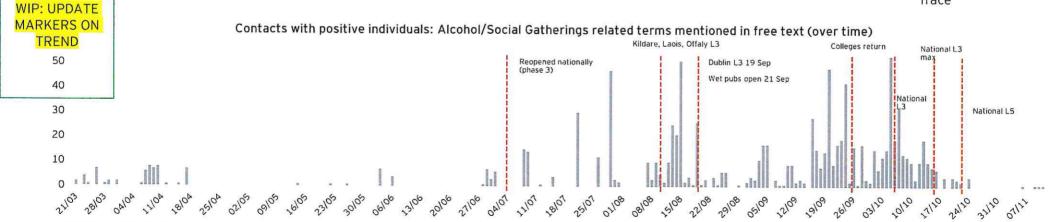
Terms searched: alcohol', 'drink', 'party', 'celebration', 'booze', 'beer', 'wine', 'cans', 'pint

Key message: Alcohol-related events appear to be a driver in contacts generated, with relatively high numbers given data available.

Limerick: 17 contacts from confirmation party in Aug; 33 contacts from communion party in Oct

Galway: has c.50% smaller population than Cork but has c.65% more alcohol related contacts; 22 contacts from one party in Jul; 15 contacts from a kids' party in Sep; 31 contacts from a party in Sep Positivity Rate: 600 contacts made between Sep-Oct resulting in 26 positive tests giving a positivity rate of 4.3%

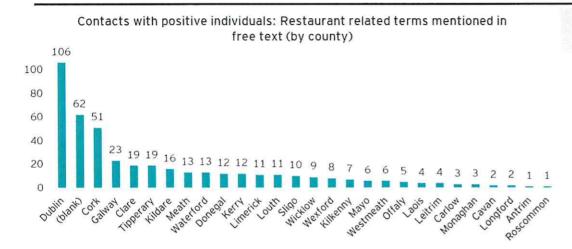
CIDR data shows that 540 positive cases occurred in the same period across 60 outbreaks for categories 'Social Gatherings' and 'Public House' compared to 80 cases in Jul-Aug similar to large increase in contacts shown from late Sep within Track and Trace



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Contacts with positive individuals generated in restaurants Restaurants mentioned 439 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only



Key message: Restaurants generated contacts, however absolute levels remain relatively low given data available.

Dublin: 18 contacts relating to a coffee chain over three days in August; 5 contacts relating to Dublin restaurant over 2 days in Sep

Cork: 5 contacts relating to a restaurant chain in one day in Sep; 4 contacts relating to a fast food chain over two days in Nov

Positivity Rate: 330 contacts made between Sep-Oct resulting in 6 positive tests giving a positivity rate of 1.8%

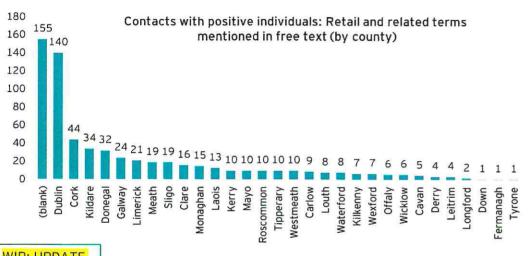
CIDR: Shows 221 positive cases across 35 outbreaks during Sep-Oct compared to 44 positive cases in Jul-Aug largely consistent with the increase in contacts shown from mid Sep in Track and Trace



Source: Contact tracing analysis Terms searched: Restaurant, eating out, out for a meal, and a list of all national chains in Ireland Note - there were 18 mentions before 1 July 2020

Retail contacts with positive individuals Retail and related terms mentioned 651 times between Mar - 12th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only



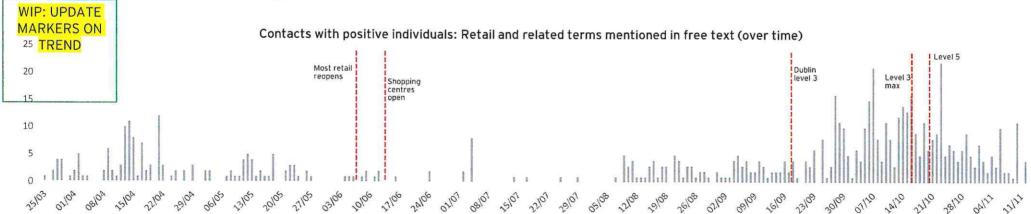
Retail store cases appear to be driving smaller number of contacts rather than large clusters

Dublin: No large clusters, largest number of contacts on a single day was 5; 5 contacts in specific supermarket on a day in May

Kildare: No large clusters, largest number of contacts on a single day was 3

Cork: No large clusters largest number of contacts on a single day was 5; 5 contacts in a chain supermarket on a day in Nov Positivity Rates: 376 contacts made between Sep-Oct resulting in 5 positive cases giving a positivity rate of 1.3%

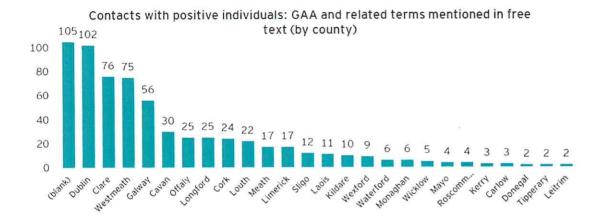
CIDR: 48 positive cases across 15 outbreaks in period Sep-Oct for 'Retail outlet'. This is higher than Jul-Aug (9 cases). This largely



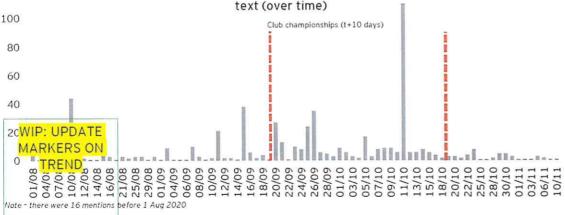
Source: Contact tracing analysis
Terms searched: shop, SuperValu,Lidl,Tesco,Aldi,Dunnes Stores,Eurospar,Iceland,Marks & Spencer, Donnybrook Fair, Joyces,Fresh, Spar,Centra,Londis,Mace,Gala,Daybreak,Costcutter,Applegreen, Newsagent

GAA-related events contacts with positive individuals GAA-related terms mentioned 653 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only







Source: Contact tracing analysis
Terms searched: terms 'GAA', 'Gaelic', 'County Final', 'County Championship', Hurling' and 'Football'
Football and hurling championships took place between 13 Sep and 9 Oct 2020

Key message: GAA events and celebrations appear to have generated incidences of high numbers of contacts with positive individuals. However, overall levels appear low.

Clare: 24 contacts on day in Aug for GAA Training; 33 contacts on day in Aug for GAA; End of Jul start for club games in Clare as master fixtures committee recommended new formats

Westmeath: 52 GAA contacts on single day in Oct; Senior football finals occured on 27th Sep

Galway: 34 contacts on day in Sep mentioning a specific GAA team

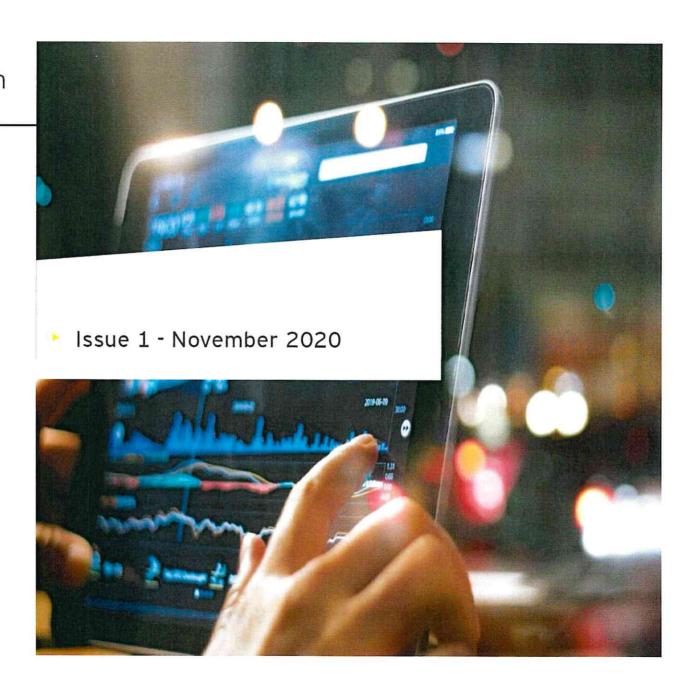
Dublin: 17 contacts on day in Aug mentioning a specific GAA camp; Camps took place between 22nd Jul -23rd Aug Positivity Rate: 490 contacts made between Sep-Oct resulting in 11 positive tests giving a positivity rate of 2.2% CIDR:

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International Desktop Research

Please see the associated magazine.

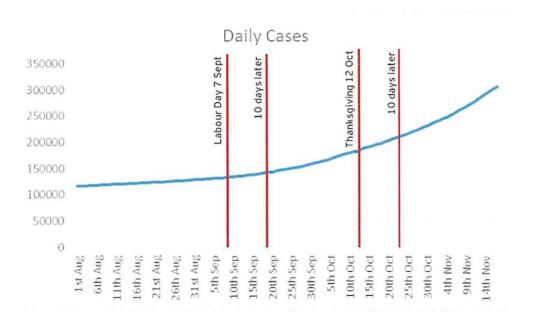
Additional examples are also shown here.



Canadian Thanksgiving: Test & Trace data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

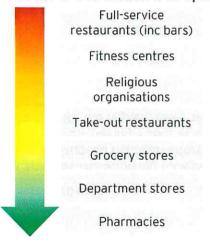
- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb; 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Track & Trace records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the rate of transmission after Thanksgiving." The percentage increase in cases dramatically changed after Thanksgiving, with a 14% increase in positive cases between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.).

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI ranked in decreasing order of associated additional cases that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that full-service restaurants followed by fitness centres and religious organisations led to the highest positivity rates based on number of cases per total visits to the location.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

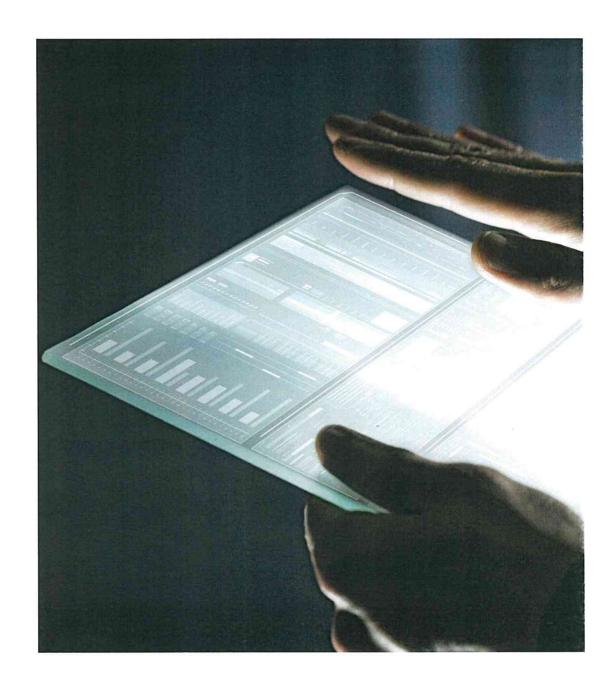
Key findings

- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modelling, http://covid-mobility.stanford.edu/ http://covid-mobility.stan

Note: Calculation of positivity rate using cases generated as a proportion of visits generated

Roadmap for next six weeks



Approach to Christmas monitoring We will combine a variety of data sources to monitor activity over the Christmas period

			lby NPHET Incidence)		Provided by isations (ac			insi	enerated ghts compliance)	Approach overview
Setting	Description	HSE	CIDR	TII/NTA	Survey	cso	Gardaí	Mobile data	Payments data	 Leverage existing health
Events	Indoor and outdoor (e.g. concerts, sports events, weddings, funerals)	~	~				ТВС	~		data from NPHET, curate
Social/family gatherings	Levels of gatherings in private households	~	~					~		agencies and create new
Retail and services	Levels of activity in retail and other services (e.g. hairdressers)	~	~			~		~	~	insights from additional data sources
Workplaces	Attendance at physical workplaces	~	~					~		 Combine all data to monitor
Domestic transport and travel	Levels of movement around the country	~	~	~		~				and provide insights on effectiveness and impact of
Education	Schools, childcare, adult and higher education	~	~							restrictions and behaviours over Christmas
Bars/restaurants	Activity levels in bars and restaurants	~	~						~	
Care homes	Residential facilities, assist living and nursing homes	~	~							 Leverage insights to inform restriction measures for
Sentiment/compliance	Indicators around compliance to restrictions			~	~		ТВС	~		future planning as well as provide "stories" to help
International travel	International travel levels and related disease spread	~	~			~		~		bring to life for the public
Leisure/recreation	Gyms, pools, leisure centres	~	~					~		 Aggregated and anonymised data only. No
Accommodation services	Stays in hotels, guesthouses and B&Bs	~	~					~	~	personal identifiable data

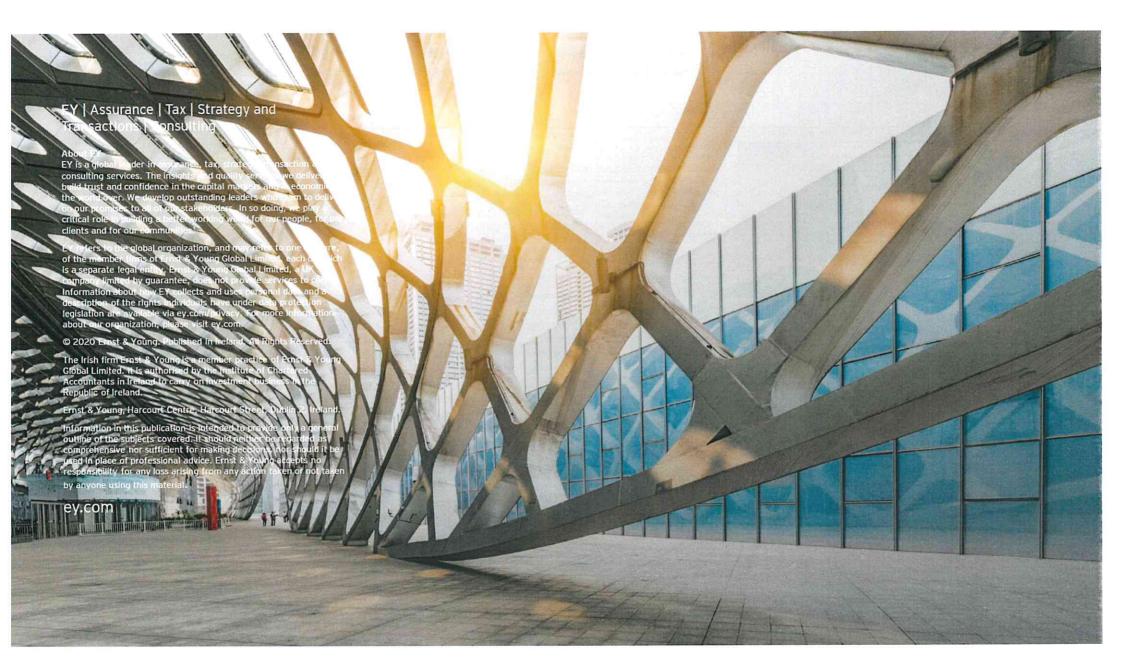
What will the next six weeks look like?

Data is anonymised and aggregated to LEA or country and by industry type. No personal identifiable information

This week W/c 16 Nov	Week 2 W/c 23/11	Week 3 W/c 30/11	Week 4 W/c 7/12	Week 5 W/c 14/12	Week 6 W/c 21/12
		Proposed brief	ing frequency		
Weekly/ ad-hoc	Weekly / ad-hoc	Weekly / ad-hoc	Daily / ad-hoc	Daily / ad-hoc	Daily / ad-hoc
		Insights o	lelivered		
County dashboard	County dashboard	County dashboard	County dashboard	County dashboard	County dashboard
Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers
Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact
Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysi
	Transport	Transport	Transport	Transport	Transport
	Facebook survey	Facebook survey	Facebook survey	Facebook survey	Facebook survey
ease monitoring	Spending data	Spending data	Spending data	Spending data	Spending data
trictions		Stay at home index	Stay at home index	Stay at home index	Stay at home index
pliance		1GC briefing - 20 November 2020) - DRAFT - Not for circulation	Social distance index	Social distance

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- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information



County Analysis Summary

	Border County		Dublin and Surrounding Area	Following National Restrictions Trend	Wave One Outbreak Sources	Wave Two Outbreak Sources	Change in 14 day incidence rate (14/11-17/11)	Wave 2 Incidence rate
Cavan	· ·	1		/	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	-0.14	
Louth	✓	✓		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	0.1	
Donegal	1	1			Travel Related, Nursing Home,	Private Houses, Hospitals, Extended Family	0.06	
Monaghan	1	1			Community Hospital/Long-Stay Unit Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	-0.08	
Leitrim*	1				Nursing Home, Private House, Travel	Insitutions Private Houses, Extended Family,	0.13	
Meath		~	/	1	Related Nursing Home, Private Houses,	Religious/Other Ceremony Private Houses, Nursing Homes, Community	0.01	
Dublin		1	1		Workplace Nursing Home, Private Houses, Residential Institution	Outbreak Private Houses, Extended Family, Nursing	-0.18	
Kildare**		1	/		Nursing Home, Private Houses,	Priate House, Workplace, Nursing Homes	-0.03	
Cork		/		1	Residential Institution Workplace, Private Houses, Nursing	Private House, Community Outbreak, Nursing	-0.08	
Galway		1		1	Homes Hospital, Nursing Home, Private	Private House, Community Outbreak, Nursing	-0.1	
Kerry		1		1	Private Houses, Residential	Private House, Community Outbreak, Nursing	-0.11	
Limerick		1		1	Insitutions Hospital Nursing Home, Private Houses,	Home Extended Family, Community Outbreak,	0.15	
Carlow*		1			Residential Institution Hospital, Nursing Home, Private	Private House Private House, Workplace, Hospital	-0.09	
Clare					Houses Nursing Home, Private Houses,	Private House, Extended Family, Community	0.17	
Laois*		1			Extended Family Workplace, Hospital, Community	Outbreaks Private House, Workplace, Nursing Home	-0.32	
Longford*		/			Hospital/Long-Stay Unit Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	-0.02	
Offaly*		1			Workplace, Hospital, Community	Private House, Workplace, Nursing Home	0.06	
Roscommon		1			Hospital/Long-Stay Unit Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended	-0.05	
Tipperary		1			Workplace, Private Houses, Nursing	Private House, Workplace, Nursing Home	0.05	
Waterford					Homes Workplace, Private House, Nursing	Private House, Workplace, Community	0.05	
Kilkenny*		1			Home Hospital, Private House, Community	Outbreaks Private House, Workplace, Hospital	-0.09	
Wicklow**					Hospital/Long-Stay Unit Workplace, Private House, Residential	Private House, Nursing Home, Workplace	-0.09	
Mayo					Nursing Home, Hospital, Community	Private House, Nursing Home, School,	-0.03	
Sligo*					Hospital/Long-Stay Unit Nursing Home, Private House, Travel	Private House, Extended Family,	-0.04	
Westmeath*				,	Related Workplace, Nursing Home, Hospital	Religious/Other Ceremony Private House, Nursing Homes, Workplace	CONTRACTOR OF THE PARTY OF THE	
Wexford					Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing	-0.33 -0.07	

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR
**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow Wave 1: 03/03-25/07 Wave 2: 26/07-20/11 1GC briefing - 20 November 2020 - DRAFT - Not for circulation

Summary of 14 day incidence rate per 100k

UPDATE FOR NEW DATA

The below heatmap shows the county incident rate per capital over the last two months. The overall reduction in cases has levelled in the week with some counties now increasing.

Two Weekly Incidence Rate Per 100k	17-Sop	18-Sep	19-Sep		dac-17	dac-77	dac-c>	74-Cep	25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Sep	01-Oct	02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	07-061	5 0 0	20.00	5 6	10-02	11-04	12-Oct	13-Oct		15-Oct	16-Oct	17-0ct	18-Oct	19-Oct	70-00	Z1-Oct	77-Oct	23-Oct	24-05	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-0ct	01-Nov	02-Nov	03-Nov	OF Nov	A01-00	00-170	N N N	09-NoV	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	N-9L	hange Last 3 Days
Offaly	62	60	64	60	62	E6	59	56	59	56	61	62	65	67	74	7	7 7	7 9	99 10	3 1	14 1	10 1	23 1	30	136	140	145	141	151	140	177	261	195	210	224	222	224	214	224	217 2	22 22	27 21	8 236	191	162	153	130	112	106	100	96	97	99 1	85 \$	9 9	4 8	7 95	114		200	19%
Leitrim	78	72	75	41	44	44	14	41	34	37	37	25	19	25	25	5 25	8 3	31	31 2	8 3	34	34	53	81	97	125	137	147	162	218	218	225	240	253	262	272	278	259	247 2	22 2	09 20	00 17	8 125	122	109	97	84	63	56	31	28	34	37	37	7 5	6 8	31 81	87	100	Carl	13%
Waterford	34	85	89	95	97	97	37	88	86	67	67	59	53	44	38	3	5 3	4 2	23	31 3	32	40	46	56	64	61	66	70	83	109	131	132	143	55	160	173	176	194	205	215 2	26 22	25 22	8 210	205	201	201	195	194	187	76	163	46 1	36 1	23 1	14 11	14 14	2 14	156	ADD		13%
Limerick	53	49	45	44	39	39	36	34	35	33	33	34	39	37	45	5 5	8 6	9 9	9) (6 1	7 1	14	119 1	45	160	167	132	189	207	208	23	246	248	277	280	290	301	298	293 3	06 2	99 3	10 30	6 312	2 277	269	262	228	227	229	221	216	218	211 21	07 1	18 19	5 19	5 21	201	222 2	208	11%
Clare	35	38	42	44	41	44	10	40	41	47	50	53	63	76	76	8	7 9	€ 1	21 14	4 1	1 86	83 1	99 2	46	261	268	314	310	306	309	322	326	327	322	313	304	311	272	264	281 2	52 24	18 25	3 258	235	229	209	189	186	131	173	171	E0 1	39 1	32 1	22 10	19 10	4 104	93	103	311	796
Louth	34	96	102	102	98	107	109	101	95	104	92	80	76	75	74	7	9 7	7 8	33 :	0 8	35	85	89	116	103	16	115	152	161	181	185	183	178	221	261	293	283	272	286 2	299	311 28	33 29	6 233	3 285	297	297	257	213	193 2	02	189	177 1	59 1	55 1	57 5	6 14	7 15	151		157	451
Donegal	64	73	84	97	106	122	148	159	178	185	191	201	211	219	233	3 25	8 26	5 27	73 2	3 1	12 3	19 3	26 3	24 3	345	355	355	254	367	365	356	341	347	328	320	320	312	324	322 3	329 3	18 3	13 31	7 322	310	320	309	305	286	300 2	97	30 2	93 2	75 2	85 2	73 21	81 27	71 272	275	and the same	231	3%
Galway	29	27	28	30	32	39	39	45	46	54	62	65	74	81	75	8 8	5 8	9 5	93 :	2	97 1	07	113 1	37	150	155	165	173	203	228	262	273	288	314	326	355	372	368	373 3	382 3	84 37	78 35	4 34	1 313	296	282	255	243	211	187	171	144 1	26 1	03 1	18 9	7 8	6 83	86	= (5.5 A (1)	84	256
Rescommen	31	33	33	45	54	57	52	67	64	76	84	93	102	121	133	3 14	3 16	31 1	55 1	5 1	70 1	66 1	66 1	92	184	200	181	187	201	198	201	223	202	228	239	260	271	260	276 2	263 2	63 25	59 23	1 240	229	203	225	229	213	135	189	174	53 1	52 1	75 1	70 17	5 16	3 166	169	141	169	296
Wicklew	70	70	70	72	70	77	74	71	69	65	67	70	73	65	72	2 7	4 7	7	73	18	77	76	76	80	84	88	91	87	89	91	100	119	120	124	124	129	145	145	149	149 1	45 14	17 14	9 4	1 130	117	116	107	104	106	91	88	89	82	77	89 8	8 98	4 85	85	82	88	196
Tipperary	19	19	19	18	16	7	16	19	18	21	24	24	25	31	32	2 3	6 4	0	13 1	3 5	55	58	58	66	70	71	78	83	79	88	90	110	113	115	118	120	126	124	134	139 1	33 13	39 14	5 133	3 139	131	130	130	130	132	30	128	22	117 1	23 1	18 1	13 11	7 114	101		1.0	-4%
Kerry	19	18	19	18	19	9	19	24	22	24	25	22	20	21	26	6 4	0 4	6. 1	52	2	34	73	91 1	90	110	113	144	153	177	174	197	215	240	246	263	269	257	269	291 2	299 2	79 2	81 26	9 27	1 236	220	198	180	173	194	90	177	162 1	53 1	39 1	19 12	9 12	8 128	127	123	122	-5%
Mayo	26	27	26	26	31	30	29	32	31	32	30	23	26	28	24	1 2	6 3	0	33	12 1	36	42	42	54	67	75	80	90	107	123	131	150	167	185	208	228	243	250	246 2	256 2	66 25	53 24	8 24	2 261	246	232	216	193	183	184	185	176 1	62 1	47 1	51 4	5 14	11 118	113	110	1:0	-755
Wexford	35	36	34	33	20	23	25	28	28	27	27	35	33	33	3!	5 4	0 4	11 4	49 !	7	73	90	85	98	112	130	160	173	188	202	250	271	272	297	298	301	322	218	313	301 2	68 25	57 25	8 24	2 192	174	172	141	124	126	96	89	83	74	67	67 4	8 4	9 45			45	-9%
Meath	28	27	32	32	35	38	37	44	42	47	44	47	51	62	6	7 7	n e	8	85	90	36	115 1	29 1	64	183	199	213	106	357	403	452	490	488	591	529	657	939	648	649	661 6	51 59	90 55	8 53	1 481	450	448	352	314	282 2	272	49 2	32 2	04 2	261 1	72 18	4 14	11 140		10000	128	-9%
Kildare	63	58	59	67	67	69	71	75	76	75	78	77	85	82	81	0 9	7 9	5	94	17	38	99 1	08	25	146	154	158	188	198	204	208	244	257	278	293	305	303	238	301 3	306 2	98 28	39 29	0 23	2 270	242	231	210	186	177	69	156	143	121	113 1	03 5	34 8		100		85	-10%
Kilkenny	21	24	22	26	21	22	21	19	24	26	26	25	26	29	31	8 4	0 4	5	42	43	51	51	59	61	73	87	98	105	109	123	142	146	154	165	165	177	174	130	175	176 1	73 1	71 16	8 15	133	131	139	134	136	134	34	141	141 1	33 1	23 1	20 12	25 12	6 128	To Market		1:6	-11%
Longford	49	49	46	37	39	39	34	32	37	39	45	59	73	98	121	0 12	7 13	2 1	47 1	52 1	54 1	69 1	69	76	208	153	136	181	193	176	213	240	254	279	291	281	308	296	281 2	289 2	291 30	06 27	9 23	259	245	223	190	181	193	166	164	157 1	52 1	42 1	32 2	27 11	15 115	103	100		-15%
Dublin	121	123	136	137	136	140	144	146	148	152	160	154	159	163	161	8 17	2 1	61 t	65 1	62	71 1	65 1	63	173	174	177	130	184	193	197	201	223	231	238	241	252	257	253	255 2	255 2	58 25	55 25	2 25	2 237	220	226	217	203	200	199	191	185 1	72	161	51 14	12 13	4 135	136	113		-18%
Cavan	22	21	24	24	22	22	32	37	37	49	51	47	56	67	7:	9 8	4 8	18	114 1	34 1	14 1	64 2	00 3	03	339	386	412	571	641	735	760	811	824	910	012	058	1058	933	366 5	967 9	64 8	10 75	2 65	8 645	589	562	474	365	295	263	232 2	206 1	59 1	43 1	33 1	19 11	12 102	2 108	93	ARCE.	-18%
Carlow	33	35	35	37	33	40	12	44	42	40	39	33	26	33	3!	5 4	4 4	4	44	42	12	40	42	54	61	74	77	83	84	119	116	143	167	198	204	242	242	270	292 3	306	311 32	27 32	7 23	3 299	270	278	249	242	214	213	177	160 1	37 1	23 1	05 9	95 9	18 9	1 88	72	100	-18%
Cork	14	17	23	27	32	36	12	47	52	62	66	71	31	88	9	7 10	2 10	5 1	110	111	19 1	27	40	155	153	131	139	209	232	237	25€	275	308	322	336	340	327	334	347	337 3	35 33	30 30	33	4 318	305	276	258	242	233	239	216	195 1	79 1	53 1	13 1	19 10	18 102	2 89	83	(A) (A)	-19%
Monaghan	26	24	39	39	37	37	54	60	68	93	116	135	134	166	17:	3 18	9 17	E 2	07 2	26 2	57 2	57 2	70 3	103	319	331	313	362	350	368	350	375	365	402	389	40E	409	384	375	349 3	63 32	23 3	0 30	5 103	288	269	218	205	171	176	166	142 1	37	121 1	22 1	16 11	17 124	112	114	10000	-19%
Laois	46	44	44	44	46	47	10	33	34	31	32	32	35	43	4	3 7	6 7	6	89	٤7 :	96 1	05	23	124	133	135	139	36	161	169	151	174	185	201	214	222	220	220	233 2	242 2	251 25	56 23	1 23	5 227	208	204	197	173	170	74	175	174 1	63 1	57 1	55 H	19 13	16 136	137	113	7.5	-26%
Westmeath	47	48	52	51	52	51	18	50	55	54	55	47	48	52	6:	2 6	8 8	4	63	03	38	96	00	105	115	148	167	171	217	211	251	294	324	337	125	435	453	455	160 1	453 4	161 41	65 4	5 44	0 402	369	372	354	266	255	229	216 2	208 1	84 1	53	151 TE	32 13	13 150	31775	113	div.	-2816
Sligo	12	n	15	17	15	7	17	17	18	24	32	27				_	_	5			_												325				_	_	_	438 4	_				_		_		259	-			_		-		_		104	\$5	-35%
National	62	63	68	70	71	74	76	79	80	84	88	83	32	96	10	1 10	18 10	17	114	16 1	24 1	28	34	150	158	167	177	190	207	217	23	251	261	279	290	302	305	302	307	309 3	07 2	98 25	91 23	6 268	253	247	22€	211	201	95	184	173 1	59 1	50 1	42 T	33 12	7 128	124	117	18	-8%

County view - Roscommon (20/11)

ACTION Add national average and make title consistent

Total Confirmed Cases

Trend vs. National

925

ACTION Add trend vs national

Roscommon profile:

Roscommon experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Roscommon rising above the national rate in mid-November

Summary analysis:

- The main driver of outbreaks within the county since the start of November are those seeded in nursing homes representing 64%. Private house outbreaks make up a significant portion of remaining outbreaks, at 33% of new outbreaks
- An earlier increase was seen in Athlone LEA-6 in the week following the football final held 20 September. The winning team was located in this LEA. However other events coincided with this date including the reopening of wet pubs

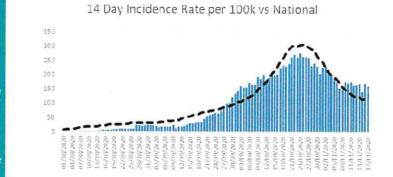
Restrictions impact:

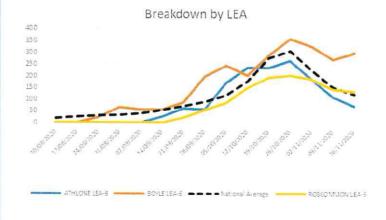
- Level 3 (max) restrictions put in place as of 16 October can be seen to align with a reduction in incidence rate ten days later
- In some instances, this reduction can be seen to accelerate again with the introduction of level 5 restrictions on 22 October (Athlone LEA-5, Roscommon LEA-6, Boyle LEA-6)

Employment summary

Roscommon had c.37% of its workforce on PUP or TWSS (11k) at the peak in early May (EY 2019 employment estimates). There are currently 3k on PUP (17 Nov) which is down from 7k in May (CSO, DSP)

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is made

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Since the 1st of September

557 cases, with 68% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	194	78
Nursing home	82	5
Extended family	30	- 5
S. Francisco		
Workplace	14	8
Notable events	Date	No. of cases
STATE OF THE STATE	WALKS W	
THE RESTRICT	Latitude School	
Extended family	09/10/2020	18
orie supp	PART - STATE	
Private house	14/10/2020	7

ACTION Replace with Eve employment / econometric stuff

6,248



Laois, Offaly and Kildare profile:

County View - Laois, Offaly and Kildare (17/11)

TBC using updated graph

Summary analysis:

- · Increasing case number trend emerges in July
- Outbreaks concentrated in food and meat processing plants
- Highest numbers in Offaly in Edenderry (93 of 103 cases) in two weeks preceding 17 August, with Kildare largely focused in Athy/Kildare (129/151 of 437)

Restrictions impact:

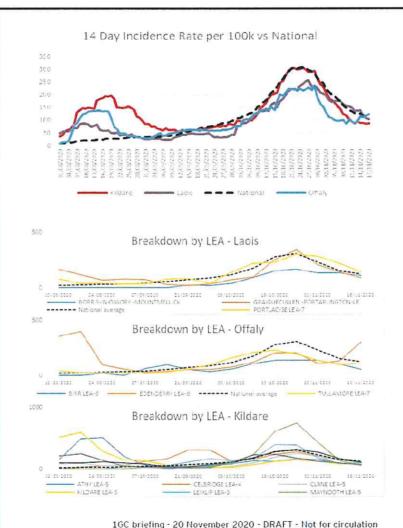
- County lockdowns for Laois, Offaly and Kildare from 8 August
- Offaly and Laois leave lockdown on 21 August and the following week cases begin to rise in Laois with minimal decrease in Offaly - note Laois had relatively few cases prior to lockdown
- Kildare lockdown extended for an additional 10 days
- Case numbers fall, however prevalence appears to shift from the south and middle of the county (Athy. Kildare Town and Newbridge) to the north of the county (Naas, Maynooth and Celbridge)
- As cases increase in North Kildare from October, a similar trajectory of case growth appears in Dublin West

Employment summary

 These counties had c.40% of their combined workforce on PUP or TWSS (c.73k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain significantly lower than peak (24k versus 44k) (CSO, DSP).

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or



Since the 1st of September

2,859 cases, with 57% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	870	342
Nursing home	216	13
Hospital	162	16
School	84	23
Extended family	81	13

Notable events	Date	No. of cases
Nursing home	\$1.5 = ".	52
Hospital		49
Nursing home		46
Nursing home		38
Nursing home	WINE STOR	38

ACTION
Replace with Eve
employment /
econometric stuff

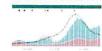
County view - Waterford (20/11

ACHON Add national Source?

Total Confirmed Cases

Trend vs. National

975



Waterford profile:

Waterford experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Waterford rising above the national rate in mid-November

Summary analysis:

- Cases rose in early September in Waterford City East, South and Tramore-Waterford City West. There was a meat factory outbreak around this time resulting in 50 cases
- Workplace outbreaks have been prominent in Waterford, making up 30% of outbreak-related cases in November, with the largest resulting in 24 cases
- Private households make up another 63% of outbreakrelated cases during this period
- Outbreaks in September and October were both driven by cases occurring in Waterford city. Unlike other counties, these do not seem to spread throughout Waterford to the same degree, with LEAs outside Waterford City maintaining lower cases compared to national levels

Restrictions impact:

- Cases stabilised in the ten days after Level 3 restrictions came into effect
- While falling steadily throughout November, cases henan to rise again towards the middle of the month

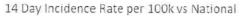
ACTION Move top right Trend vs National ave here

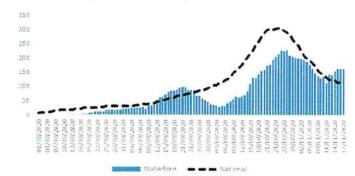
JP or

urrently 8k on ay (CSO,

Notes

The restriction impact is based on disease incidence combined with the dates
the restrictions are imposed, it is not a measure of compliance or does not
take behavioural aspects into consideration





Breakdown by LEA



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is made available publicly

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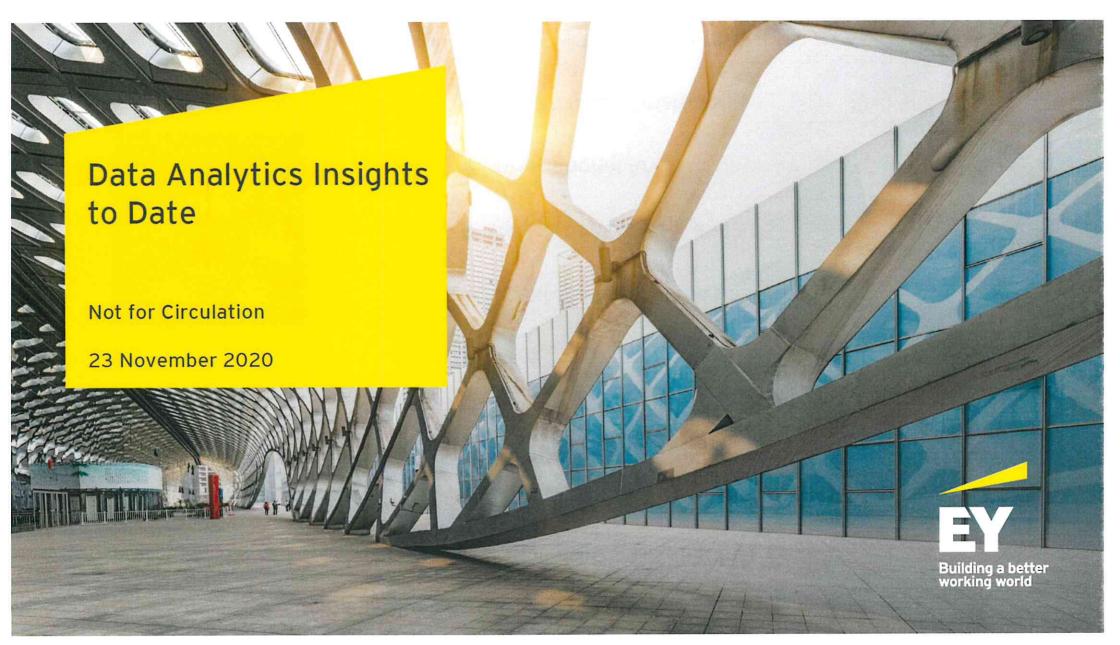
Since the 1st of September

777 cases, with 63% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	329	135
Workplace	84	8
Community outbreak	20	2
Other	12	2
Extended family	11	3

Notable events	Date	No. of cases
Workplace	04/09/2020	49
Workplace	03/11/2020	21
Community outbreak	02/10/2020	16
Private house	09/09/2020	10
Other	28/10/2020	9

ACTION Replace with Eve employment / econometric stuff



Update - Week 6

Agenda



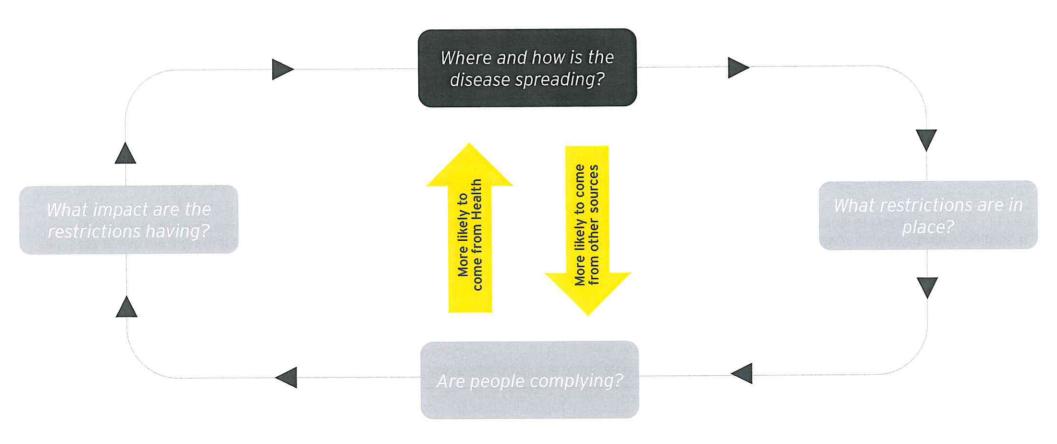


- Intro
- County Specific Analysis
- Restrictions Impact analysis
- ❖ International Analysis
- Roadmap to Christmas

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Answering four key questions to support government decision making

Helping improve visibility and decision making by combining and analysing data across government



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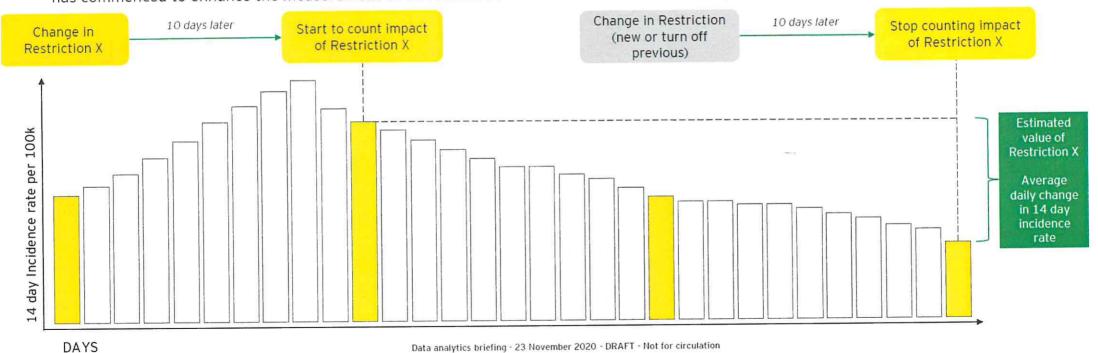
Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - Proximity to the border
 - Following the national profile
 - Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting that there was a shift in outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of cases from Wave 1 to Wave 2 (Source: CSO)
- · Social gatherings, citizen congregations, alcohol and specific local events all appeared to have contributed to Wave 2 outbreaks
- Level 3 appears to have only started to reduce actual cases following the introduction of further household restrictions (Level 3 Max) from mid-October
- Wet pubs opened in all counties except Dublin in late September. There was an accelerated increase in the 14 day disease incidence rate per 100k 10 days later in most counties. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher case increases than the rest of their county when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties. The introduction of Level 4 in Donegal coincided with a reduction in mask wearing (facebook survey data), which goes against national trends
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties

Overview of Restriction Analysis Methodology

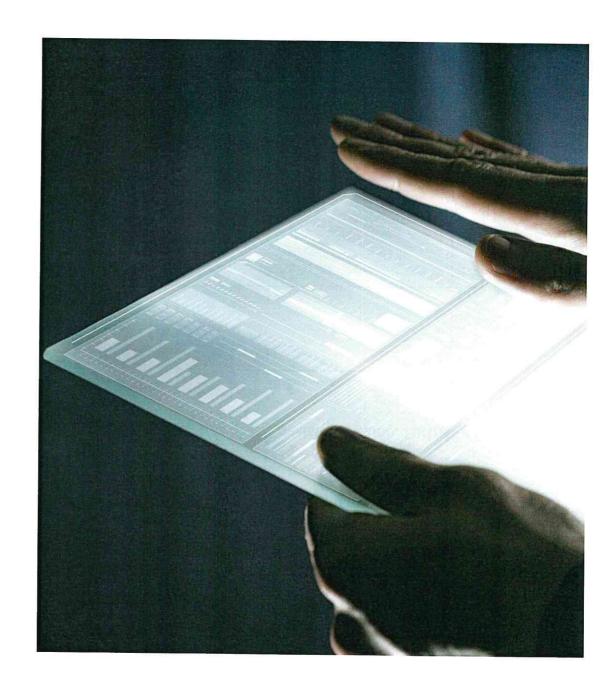
It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen. However, it is also clearly important that restrictions decisions are made with the maximum understanding of the impact. Hence, we have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



The same

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 - 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing Home	
Limerick		1		1	Nursing Home, Private Houses, Residential Institution	Extended Family, Community Outbreak, Private House	
Mayo					Nursing Home, Hospital, Community	Private House, Nursing Home, School, Workplace	
Meath		1	1	1	Hospital/Long-Stay Unit Nursing Home, Private Houses, Workplace	Private Houses, Nursing Homes, Community	
Sligo*		······		-	Nursing Home, Private House, Travel Related	Outbreak Private House, Extended Family, Religious/Other	
				1	Workplace, Nursing Home, Hospital	Ceremony Private House, Nursing Homes, Workplace	
Westmeath*				-	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Wexford				<u> </u>	Hospital, Private House, Community	Private House, Workplace, Hospital	
Kilkenny*		✓			Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		/		-	Hospital, Nursing Home, Private Houses	Private House, Extended Family, Community	
Clare		1			Nursing Home, Private Houses, Extended Family	Outbreaks Private House, Community Outbreak, Nursing	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Home Private House, Community Outbreak, Nursing	
Galway		✓		✓	Hospital, Nursing Home, Private Houses	Home Community Outbreak, radising	
Longford*		1			Workplace, Nursing Homes, Hospital	Privata Heura, Nurring Homa, Werkplaca	
Roscommon		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Laois*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		1			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		/			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential Institution	Priate House, Workplace, Nursing Homes	
Louth	1	✓		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	/		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	1	1			Nursing Home, Workplace, Residential Institution	Primate Houses, Workplaces, Residential	
Donegal	1	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		1	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source: Outbreak sources - CIDR, Incidence rate -based on daily cumulative case data published on GeoHive to 17 November 2020.

This data is published daily. Note: Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11

*Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

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**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per 100k	Population	20-Sep	22-Sep	23-Sep	24-Sep	U.) (dac-07				-1	01-Oct	02-Oct	03-Oct	04-Oct	05-Oct	06-Oct		100 00			10-Oct	11-0ct	12-Oct	6 06		1			17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	- 0	4	1	4	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	voN-90	VoN-70	08-Nov	VoN-60	10-Nov	No.			13-NOV	14-Nov	15-Nov	16-Nov	17-Nov	Cha Las	st 3
Kerry	147,707	18 1	9 19	19	24	2	2 2	4	25	22	20	21	26	40	46	52	62	64	7	3 9	91 1	106	110	113	14	4 1	53 1	77 1	74 1	197	215	240	246	263	3 26	69 2	57 2	269	291 2	299	279	281	269	271	236	220	199	102	170	10.4	100	177	100	150	120	12	0 4	0 10	20 4	20 4	107	123	122	4400		•
Limerick	194,899	44 3	9 35	36	34	35	5 3	13	33	34	39	37	45	58	69	90	96	107	11	11	19 1	145	160	167	18:	2 18	39 2	07 2	08	231	246	248	277	280	29	90 1	01 :	288	293	306	299	310	306	312	277	260	262	220	227	220	221	210	210	100	20	7 10	3 12	3 12	28 1	28	21	123	-		-1	
Mayo	130,507	26 3	1 30	25	32	3	1 3	2	30	28	26	28	24	26	30	33	32	36	4	2 4	2	54	67	75	80) 9	0 1	07 1	23	131	150	167	185	208	3 22	28 2	43 2	50	246	256	266	259	248	242	261	246	222	210	100	102	104	105	170	400	20	13	8 13	0 13	30 2	211 2	201	222		236	The state of the last	
Meath	195,044	32 3	5 38	37	-44	47	2 4	7	44	47	51	62	67	71	68	85	90	96	111	5 12	9 1	64	183	199	21	3 31	06 3	57 4	03 4	452	490	488	591	629	8 65	57 6	56 6	48	349	661	651	590	558	531	481	450	440	252	214	202	272	240	222	204	20	10	1 19	0 14	*1 1	18	113	110		109	_	96
Sligo	65,535	17 1	5 17	17	17	18	2	4	32	27	27	31	27	38	55	64	75	90	10	7 13	37 1	50	163	175	181	6 21	08 2	41 2	91 3	304	294	325	356	366	3 3	95 4	ne 4	וחם	123	128	420	422	297	250	254	250	222	204	314	202	212	243	232	204	20	1 17.	2 10	4 14	41 1	40 1	33	139	CALCON	134		96
Westmeath	88,770	51 5	2 51	48	50	55	5 6	4	55	47	48	52	62	66	64	68	80	88	91	5 10	00 1	05	115	148	167	7 1	71 2	17	211 2	251	294	324	337	425	43	35 4	53 4	55	160 4	153	461	405	115	440	402	200	222	304	200	203	220	211	183	153	104	15	4 15	4 14	10 1	28	114	104		93	-2.	
Wexford	149,722	33 2	3 23	25	28	28	3 2	7	27	35	33	33	35	40	41	48	57	73	81	8 (5	98	112	130	160	0 17	3 1	88 2	02 2	250	271	272	297	298	3 30	01 3	22	118	313	201	269	257	250	242	102	174	172	304	200	200	223	216	208	184	158	15	1 16	2 13	33 1	50 1	50	113	-	113	-3	No. of Lot, House, etc., in case, the lot, the l
Kilkenny	99,232	26 2	1 22	21	19	24	1 2	6	26	26	26	29	38	40	45	42	43	51	5	1 5	9	61	73	87	98	10	5 10	09 1	23 1	142	146	154	165	165	17	7 1	74 1	00	176	170	172	171	100	150	102	104	172	191	129	126	36	83	83	/4	6/	ь	4	8 4	9 4	19	49	47	45	46	-7	-
Carlow	56,932	37 3	9 40	42	44	42		0	39	39	26	33	35	44	44	44	42	42	40	4	2 !	54	61	74	77	, 8	3 8	84	19	116	149	167	198	204	24	2 2	42 2	70	999 1	200	211	227	227	202	200	270	139	134	136	134	134	141	141	133	128	130	0 12	5 12	26 13	29 1	26	118	116	116	_	96
Clare	118,817	44 4	1 44	40	40	41	1	7 !	50	53	63	76	76	87	96	121	144	158	18	3 19	9 2	46	261	268	30	4 3	10 31	06 3	09 3	222	326	227	322	212	20		111 2	72	001	201	311	240	252	233	233	270	278	249	242	214	213	1//	160	137	126	105	5 9	5 9	18 5	91	88	72	77	81	-9	
Cork	542,868	27 3	2 36	42	47	52	2 6	2 1	66	71	81	88	97	102	105	110	111	119	12	7 14	0 1	55	159	181	199	3 20	19 2	32 2	37 2	256	275	308	322	220	24	10 2	27 2	24 2	17 1	201 4	202	290	203	200	235	229	209	189	186	181	1/3	171	160	139	132	122	2 10	9 10	04 10	04	93	109	111	112	17	-
Galway	258,058	30 3	2 39	39	45	48	5	4 1	82	85	74	81	79	85	89	93	92	97	10	7 11	3 1	37	153	155	165	5 17	3 2	03 2	28 2	262	273	299	214	226	25	E 2	72 2	00 1	77 7	202 1	335	270	331	334	318	305	276	258	242	233	239	216	195	179	158	140	3 11	9 10	08 10	02	89	83	86	82		%
Longford	40,873	37 3	39	34	32	37	3	9	19	59	73	98	120	127	132	147	152	154	165	3 16	3 1	76	208	193	196	15	21 19	93 1	76 2	213	240	254	279	201	20	01 2	00 0	00	201 2	200	201	200	334	391	313	296	282	200	243	211	187	171	144	126	109	108	3 9	7 8	16 8	33	86	80	84	78	-10	
Roscommon	64,544	45 5	57	62	67	64	7	6 1	34	99	102	121	133	143	161	155	155	170	161	3 16	6 1	92	184	200	181	1 18	7 2	01 1	98 2	201	223	232	228	239	26	0 2	71 2	co :	70 2	200	201	200	221	240	203	240	223	193	181	193	166	164	157	152	142	132	2 12	7 11	15 1	15 1	03	103	100	100	-2	-
Offaly	77,961	60 6	2 56	59	56	59	5	6 1	33	62	65	67	74	77	77	99	103	104	110	12	3 1	30	136	140	145	5 14	11 19	51 1	40 1	177	201	195	210	224	100	A	tor an	eta :	224 2	267 4	222	203	201	240	229	203	225	229	218	195	189	1/4	153	152	175	170) 17	5 16	3 16	66 1	69	141	169	161	-5	-
Laois	84,697	44 4	47	40	33	34	3	1 :	32	32	35	43	43	76	76	89	87	96	105	5 12	3 t	24	133	135	139	13	6 1	61 1	69 1	151	174	195	201	214	22	2 2	20 2	20 2	27 2	217	251	251	216	235	191	162	153	130	112	106	100	96	97	99	85	99	3	1 8	7 9	95 1	14	112		122	6	
Waterford	116,176	95 9	7 97	87	88	86	6	7 (7	59	53	44	38	35	34	28	31	32	40	4	6 5	56	64	61	66	7	n 9	22 1	00 1	121	122	142	TEE	100	17	2 4	20 2	20 2	05 2	APE -	201	206	231	235	221	208	204	197	1/9	170	174	175	174	163	157	155	5 14	9 13	16 13	36 1	37	116	107	104	-33	CO I STATE
Tipperary	159,553	18 1	17	16	19	18	2	1	24	24	25	31	32	36	40	48	53	55	58	5	8 6	86	70	71	78		3 7	79 1	28	93	110	112	115	110	12	0 6	0 1	24 4	200 2	100	120	120	228	210	205	201	201	195	194	187	176	163	146	136	128	134	11	4 14	2 1	41 1	56 1	163	163	164	5	-
Kildare	222,504	67 6	69	71	75	76	7	5 1	78	77	85	82	80	97	95	94	87	98	99	10	8 1	25	146	154	165	19	8 19	98 2	na o	00	244	257	270	292	20	U 1	12 2	00	201 2	133	133	200	200	133	139	131	130	130	130	132	130	128	122	117	123	118	11	3 11	7 1	14 1	01 1	105	110	107	5	
Louth	128,884	102 9	107	109	101	95	10	4 5	32	80	76	75	74	79	77	88	90	85	85	8	9 1	16	109	116	115	15	2 16	61 1	81 t	195	198	179	221	261	29	0 0	00 2	72 2	00 0	000	200 4	203	230	202	270	242	231	210	186	177	169	156	143	121	118	103	3 9	8	5 9	13 1	39	88	85	86	-3	-
Cavan	76,176	24 2	22	32	37	37	4	9 !	51	47	56	67	79	84	88	114	134	144	164	20	0 3	03 :	339	386	412	57	71 6	41 7	25 7	000	211	924	910	1012	105	10 10	FO 0	00 0	00 2	100 (311 4	203	236	233	285	231	297	257	219	193	202	189	177	159	155	157	15	6 14	7 1	51 1	51 1	160	157	168	10	-
Leitrim	32,044	41 4	44	44	41	34	3	7 :	17	25	19	25	25	28	31	31	28	34	34	53	3 1	81	97	125	137	14	7 16	2 2	18 2	218	225	240	252	262	27	2 2	70 2	60 °	47 2	101 3	200	200	170	105	640	589	562	4/4	365	295	263	232	206	159	143	133	3 11:	3 11	2 10	02 1	08	98		95	-14	The same of the sa
Monaghan	61,386	39 3	37	54	60	68	9	3 1	16 1	35	134	166	173	189	178	207	226	257	25	7 27	n a	U3 :	319	331	313	36	2 21	50 2	60 2	50	275	200	102	202	- 21	c 4	00 2	09 2	91 2		209	200	1/8	125	122	109	97	84	69	56	31	28	34	37	37	47	5	8	11 8	31 8	37	94		100	13	1000
Donegal	159,192	97 10	122	148	159	178	18	5 1	91 2	04	211	219	233	258	265	273	293	312	319	32	6 3	24	345	355	355	5 35	4 36	67 3	65 3	ES :	244	247	220	220	32	0 1	10 0	24 2	10 3	200 0	203	323	310	305	303	288	269	218	205	171	176	166	142	137	121	122	111	3 117	7 12	4 1	12	114	104	104	-8	
Wicklow	142,425	72 7	77	74	71	69	6	5 6	7	70	73	65	72	74	77	78	78	77	76	71	6 8	80	84	88	91	R	7 8	19 4	91 1	na .	119	120	124	124	12:	100	E 1	45 S	40 1	23	310	313	31/	322	310	320	303	305	286	300	297	290	293	275	285	273	3 28	1 27	71 27	72 2	75 2	69	281	293	6	
Dublin	1,347,359	137 13	140	144	146	148	15	2 1	0 1	54	159	163	168	172	161	166	162	171	165	16:	3 1	73	174	177	180	18	4 19	33 1	7 2	201 1	222	221	238	241	-		7 0	FO 1	40 I	193	190	19/	143	141	130	1117	116	107	104	106	91	88	89	82	77	89	81	8	4 8	5 8	5	82		83	-3	-
National	4,761,865	70 7	74	76	79	80	8	4 8	88	22	92	96	101	108	107	114	110	124	126	10	4 15	E0.	EO	107	100	10	0 00	07 0		201	251	tinise.	1000	1000.0	- 1100		ala	00 2	.00 Z	.00 2	208	200	202	202	237	220	Z28	217	209	200	199	191	185	172	161	151	14	2 13	4 13	9 1	36		118		-18	%

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily; Population: Census 2016, CSO

Summary of Restriction Impact

The below heatmap shows the average daily impact in 14 day incidence rate per 100k for each change in restrictions. Note the absolute number of weekly tests has significantly increased since Wave 1.

	29/02/2020	12/03/2020	15/03/2020	24/03/2020	21/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/0/1/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	02/60/61	21/09/2020	25/09/2020	07/10/2020		tor for	22/10/3030
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Laois + Offaly, Kildare entended	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National		Level 4 Donegal, Cavan, Monaghan	Lo
Carlow	0	0	1	-2	2		1	-2	-1	0	0	2		-4		1		5		17	-7		-14
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-14
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	The second second
Dublin	3	6	11		-2		-3	-1	0	0	0	1		2		4	2			4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14 -10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9						8		7	-9		-12 -7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-/
Laois	1	0	1	. 0	0	-2	0	0	0	0	2	2				1		7		2	-10		-10 -5
Leitrim	1	0	3		0		-1	0	1	-1	0	0		4		-1		12		0	-17		
Limerick	1	1	5	-1	-1		-1	0	0	0	1	1		2		-1		12		7	-5		-13 -11
Longford	1	1	1 3		7		-1	-1	0	0	0	0		2		2		6		5	-8		-11
Louth	1	1	3		0		0	-1	0	0	0	1		1		2				12 12	-2 -3		-13
Mayo	0	1	- 4		-1		-2	0	0	0	0	0		0)	1		/		25.00			-15 -12 -22 -13
Meath	1	2			0		-1	0	0	0	0	C		1		2		24		19		-12	-22
Monaghan	0	0					-2	-3	0	0	0	1		1		7		11		-3		A. The same of the	-10
Offaly	1	1	(16			-12	0	0	0	0	7						6		-3	-9		-0
Roscommon	0	1	1	No.		1		-2	0	0	0	1		0		5		4		4	-10 -14		-11 -17
Sligo	1	0					0	0	2	-2	0	(0		1		17		16	10000		
Tipperary	1	1					0	-1	0	0	0	3		-4		0		6		9			-10
Waterford	1	3		2 -3			0	0	-	0	0	1		1		1		200		100			-19
Westmeath	2	3		7 2		-		-1	0	0	0	()	1	L	1		12		18	-15 -16		
Wexford	0	0		1 -1			0	0	0	0	0	1		(0		13 2		3	100		-9
Wicklow	1	5		5 3	-1	3	-1	0	0	0	-1	1	5	1	le .	1		2		3	-5		-0

Source: Based on dally cumulative case data published on GeoHive to 17 November 2020. Measures the average dally change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend

Cavan profile:

- Cavan has experienced a higher 14 day disease incidence rate per 100k during the second wave than the national average
- Part of Cavan borders with NI where different restrictions are in place

Summary analysis:

- Cavan-Belturbet LEA is the only part of Cavan with a NI border. This LEA is experiencing a higher disease incidence than the national average
- Ballyjamesduff LEA has the highest incidence rate. The timing of the acceleration of growth rate in this LEA appears to correlate with reports of celebrations and 'lock ins' for Crosserlough county final win
- Levels of private house outbreaks rose during September and October
- Travel along the Belturbet by-pass fell 33% during October (Source Til Road Travel data)

Restriction impact:

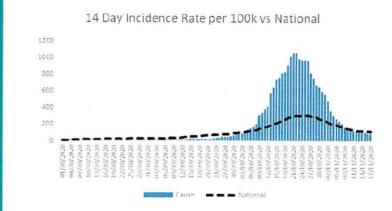
- The timing of the growth of cases appears to correlate with the events listed above and changes to restrictions in wet pubs
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence level in Cavan
- Level 5 restrictions continue to drive incidence level further

Employment Summary:

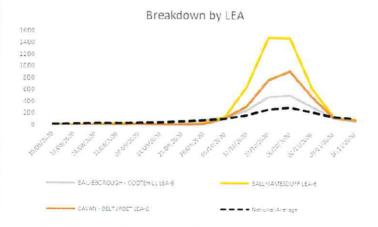
Cavan had c.47% of its workforce on PUP or TWSS (15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP (17 Nov) which is down from 9.7k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration



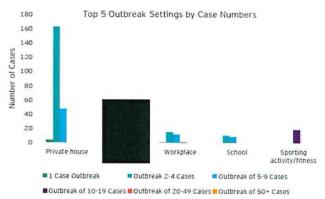
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

CIDR Data: 1st of September to 19th of November 1,272 3.6 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 215 72 Workplace 29 12 School 20 Sporting activity/fitness 19 Notable Outbreaks utbreak Setting No. of Cases Sporting activity/fitness 04/10/2020 19 Community outbreak 07/10/2020 16

Private house



13/10/2020

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 1.9/1.1/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all Case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Dublin borders including a significant commuter population

Summary analysis:

- Ratoath LEA has the highest incidence rate. The timing
 of the acceleration of growth rate appears to correlate
 with reports of celebrations for Ratoath county final
 win (Source: GAA.ie)
- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak of 51 cases
- · One significant community outbreak of 29 cases

Restriction impact:

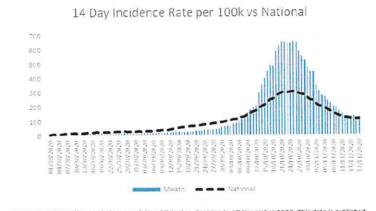
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- Level 5 restrictions continue to drive incidence level down further

Employment summary

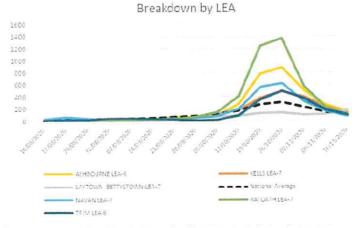
Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

CIDR Data: 1st of September to 19th of November

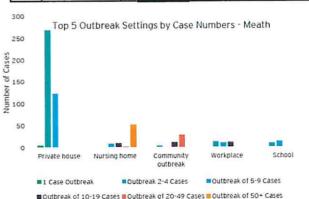
2,46	56
% of Cases Linked to Outbreak	Avg. Cases Per Outbreak
27%	3.3

Top 5 Outbreak Settings

Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	397	121
Nursing home	74	9
Community outbreak	45	4
Workplace	38	18
School	25	10

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Nursing home		51
Community outbreak	10/10/2020	29
Community outbreak	13/10/2020	12
Workplace	19/10/2020	11
Nursing home		10



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one duditional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

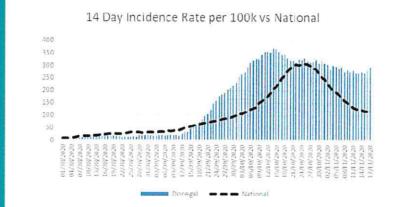
- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in (Source: Donegal Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

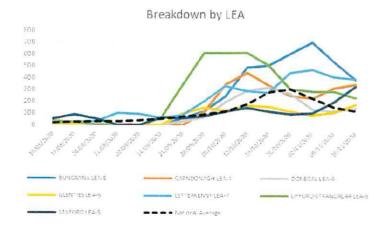
- Disease incidence continued to rise after level 3 Donegal
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have had impact
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal continue to decline at a far lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (based on Facebook survey data)

Employment summary

Donegal had c.49% of its workforce on PUP or TWSS (30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)



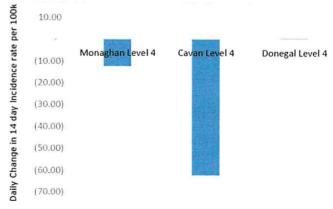
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative, This data is

	Cases	
	2,165	
% of Cases Linked to 0	lutbreak Avg.	Cases Per Outbreak
62%		3.9
Top 5 Outbreak Settin	ngs	
Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	651	235
Workplace	159	28
Hospital	126	5
Extended family	118	19
Nursing home	58	5
Notable Outbreaks		
Outbreak Setting	Date	No. of Cases
Hospital	Name and Address of the Owner, where the Owner, which is the Ow	99
Workplace	23/09/2020	55
Nursing home		49
Social gathering	24/10/2020	20
Hospital		17

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020, This data is published daily. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation cases who are asymptomatic or a cluster/outbreak, with one laboratory confirmed case of COVID-19. and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started on 21/28 Sept for continuing/new students respectively), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

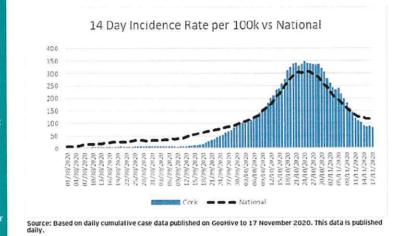
- Cases in Cork city rose as wet pubs reopened (21 Sept).
 Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

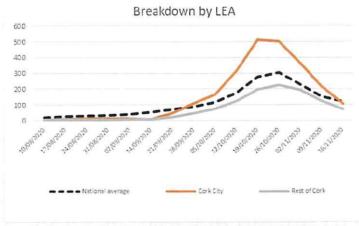
Employment summary:

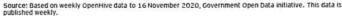
 At peak, c.39% of Cork's workforce were on PUP or TWSS (96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

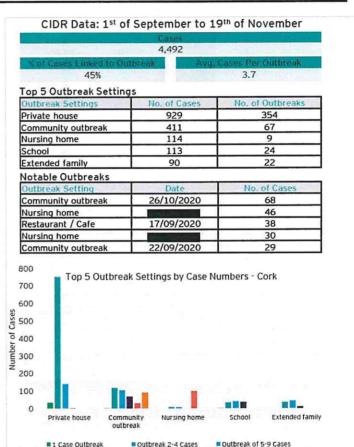
Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration









Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20, it should be noted that there is typically a time lap between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of litness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South, which is the home of the GAA SFC champions, had a confirmed outbreak in mid-October
- Throughout November, private household cases were responsible for 49% of outbreak cases, with the and community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

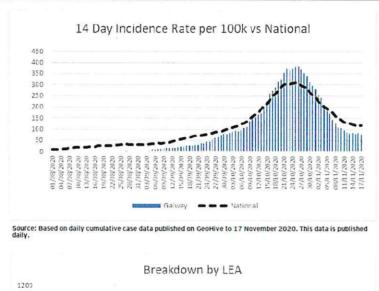
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

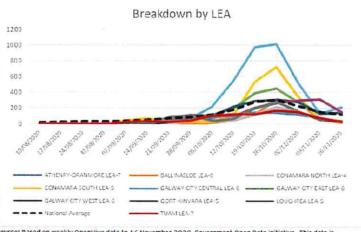
Employment summary

 Galway had c.39% of its workforce on PUP or TWSS (49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

CIDR Data: 1st of September to 19th of November 2,060 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks 723 Private house 293 207 Community outbreak 30 Childcare facility 61 8 School 37 11 Notable Outbreaks Outbreak Setting Date No. of Cases 24/09/2020 114 Community outbreak Social gathering 19/09/2020 20 Community outbreak 25/09/2020 18 700 Top 5 Outbreak Settings by Case Numbers - Galway 600 500 400 300 ž 200 100 Private house Childcare School outbreak facility 1 Case Outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■Outhreak of 10-19 Cases ■ Outhreak of 20-49 Cases ■ Outhreak of 50+ Cases

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (MPSC)

Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

Dublin - local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/2020	31/08/2020	07/09/2020	14/09/2020	21/03/2020	38/01/XX	05/10/2020	12/10/2020	05/05/01/20	26/10/2020	02/11/20	09/11/2020	16/11/2020
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
~	CABRA-GLASNEVIN LEA-7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
Dublin City	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
2	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
g	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	FEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
1.	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
Dun Laoghaire Rathdown	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
n Laoghaire Rathdown	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
the	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
2 %	KILLINEY-SHANKILI LEA-7	3	3	3	13,1	23.6	49.9	65.6	68.3	115.5	120.8	105	107.7	70.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIG GAN LEA-S	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
=	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
正	ONGAR LEA-S	3	3	36.3	67	80.0	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-S	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
c	FIRHOUSE-BOHERNABREENA LEA-5	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
P	LUCAN LEA-5	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublin	PALMERSTOWN-FUNTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386,5	331.3	260.3	226.1	165.6
Ħ	RATHFARNHAM-TEMPLEOGUE LEA-7	3	3	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
S	TALLAGHT CENTRAL LEA-6	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall.

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- . Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- . Significant differences exists within each of the four county council areas of Dublin with Dun Laoghaire-Rathdown seeing lower overall incidence

Summary analysis:

- · Highest incidence rates in areas such as Lucan, Ballymun and Swords, Largest outbreaks also focused in the corresponding CCAs: Dublin North, Dublin North West, Dublin North Central
- . Tallaght South is the only LEA within Dublin where cases have continued to climb in November

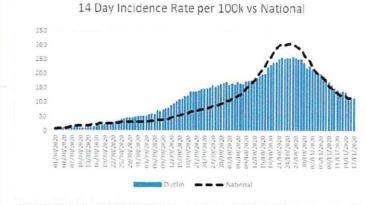
Restriction analysis:

- . Cases in Dublin took longer to decline after Level 3. indicating Level 5 was needed here to control cases
- · Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

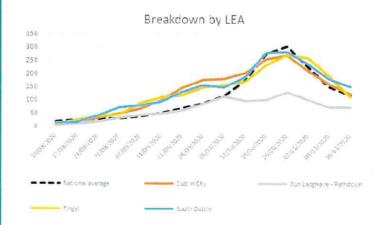
Employment summary:

At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly

CIDR Data: 1st of September to 19th of November

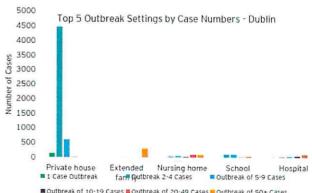
Case	es .
12,6	06
% of Cases Linked to Outbreak	Avg. Cases Per Ontbreak
56%	2.9

Top 5 Outbreak Settings

Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Extended family	24/09/2020	288
Nursing home		75
Hotel	12/09/2020	38
Childcare facility	20/10/2020	38
Residential institution	02/10/2020	30



■Outbreak of 10-19 Cases ■Outbreak of 20-49 Cases ■Outbreak of 50+ Cases

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20, it should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

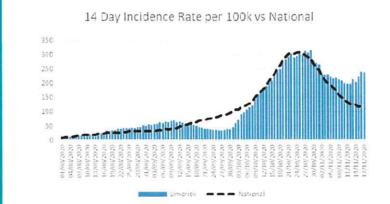
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November. Both are close to Listowel in Kerry, which experienced the highest incidence levels in that county
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Employment summary:

 Limerick had c.43% of its workforce on PUP or TWSS (34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Notes

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Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

CIDR Data: 1st of September to 19th of November

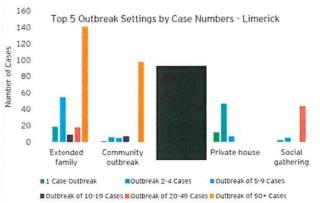
Case	
1,77	71
% of Cases Linked to Outbreak	Avg. Cases Per Outbreak
39%	6.4

Top 5 Outbreak Settings

Outbreak Settings	No. of Cases	No. of Outbreaks	
Extended family	242	19	
Community outbreak	117	8	
Private house	66	34	
Social gathering	51	5	

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Extended family	23/09/2020	141
Community outbreak	08/10/2020	94
of Day		
Residential institution	13/10/2020	31
Social gathering	15/10/2020	25



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20, it should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases

Kerry profile:

 Kerry has experienced a similar 14 day disease incidence rate per 100k during second wave to the national average. However, Listowel LEA has seen a sharp increase in its rate since early October

Summary analysis:

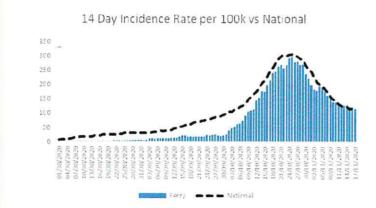
- North Kerry (Listowel) is most severely affected. This
 coincides with outbreaks southern parts of Limerick such
 as Newcastle West and Adare-Rathkeale, as well
 as Limerick city
- Killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- The remainder of county (further south, smaller towns) is generally less affected
- Private homes account for 33.68% of all outbreak cases since Sept 1st
- Listowel's incidence levels were three times higher than the next worst-afflicted LEA. Note the small population of -29,000 people meant 182 cases over a 2-week period prior to 26 Oct created a very high incidence rate

Restriction impact:

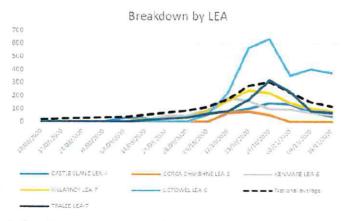
- The number of cases in Kerry started to grow around the time level 3 was introduced - two weeks later, this high growth rate had largely ceased
- Improvements have levelled off somewhat across LEAs such as Tralee, Killarney and Listowel

Employment summary:

 Kerry had c.49% of its workforce on PUP or TWSS (32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

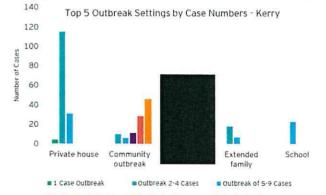


Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is multished weekly

CIDR Data: 1st of September to 19th of November 963 4.1 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 150 53 Community outbreak 101 14 Extended family 23 School Notable Outbreaks Outbreak Setting Date No. of Cases Community outbreak 03/09/2020 43 Community outbreak 23/10/2020 25 Religious/Other ceremony 16/10/2020 11 Restaurant / Cafe 11/09/2020

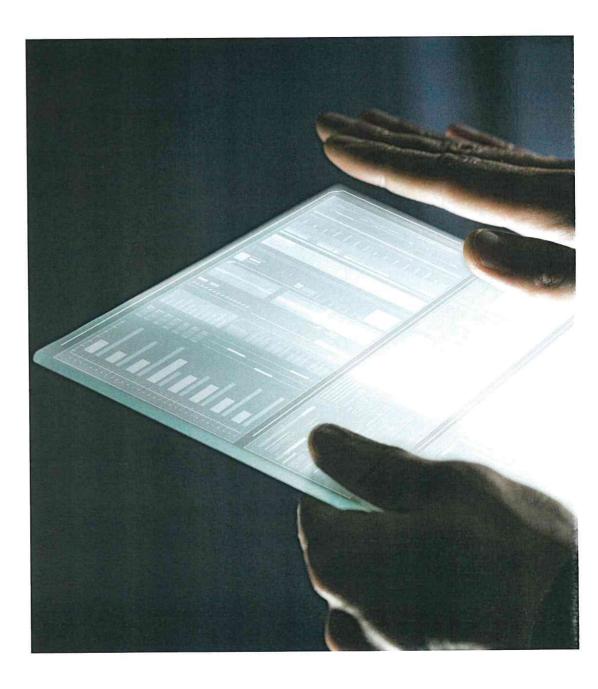


■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

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Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties - highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

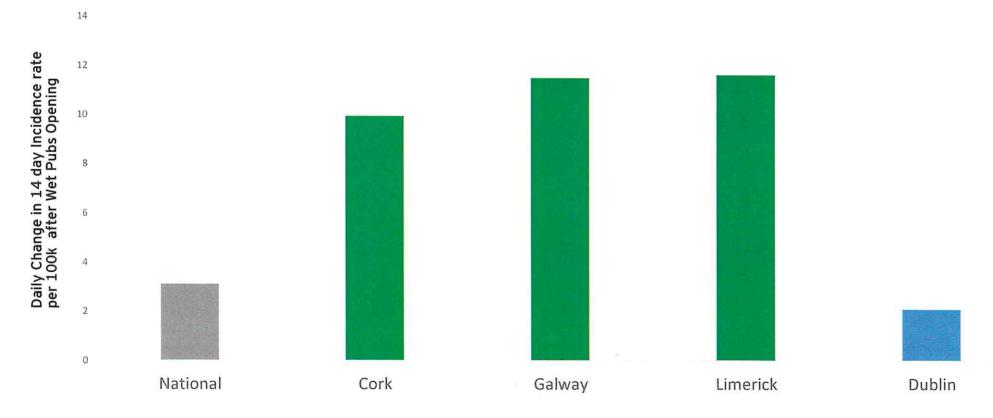
Ireland - restrictions analysis



Data analytics briefing - 23 Nov

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's cases then slowed when compared with other counties

Case growth in Dublin after the Wet Pubs opening in other counties was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Note this coincides with universities opening, which impacts Cork, Galway and Limerick



The three phases of re-opening during late May to early July did not have a significant impact on cases

The reopening of construction, non-essential retail and the wider Phase 3 changes did not appear to have a material impact on the cases nationally or in larger counties

	29/02/2020	12/03/2020	15/03/2020	24/03/3020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	23/00/12020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	26/09/2020	07/10/2020	000000000000000000000000000000000000000	or for for	22/10/2020
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare dosed School Closed	Bars dosed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to Skm	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Laois + Offals, Kildare entended	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Leyel 3 Donogal	Level 3 National		Level 4 Donog al, Cavan, Monaghan	5
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-14
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-28
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-14
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	-15
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	2	. 2		4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14
Kerry	1	5	.3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-7
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		2	-10		-10
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-5
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-11
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-15
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-12
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24	10	19	-34		-22
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		- 11		-3		-12	-13
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9		-8
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-11
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-6
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-10
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-19
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-9
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-6

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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Track and Trace Free Text Analysis

The HSE Track and Trace system captures the information for each citizen being tested for C-19. This includes a contact type field, which explains the contact between citizens that the test resulted from. Contact categories are selected by the contact tracer from a drop down list, including "social", "work", etc.

There is also a free text field where the contact tracer may add further details. For example, if the category was "social" then the free text field may say "attended sports game together".

A selection of the analysis of this free text field is shown in this section. Note it is a relatively small sample of data and should be treated only as directionally informative.

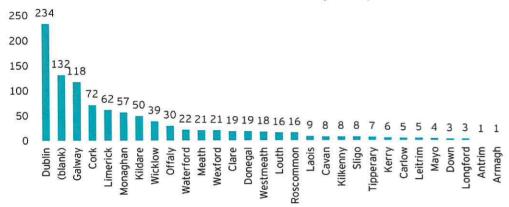


Data analytics briefing - 23 Nov

Alcohol/social gatherings contacts with positive individuals Alcohol and party-related terms mentioned 1,014 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only

Contacts with positive individuals: Alcohol/Social Gathering related terms mentioned in free text (by county)



Key message: Alcohol-related events appear to be a driver in contacts generated, with relatively high numbers given data available.

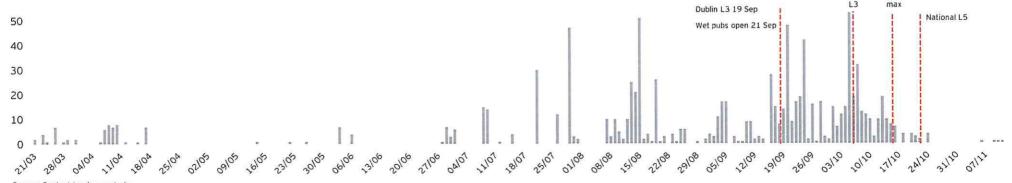
Limerick: 17 contacts from confirmation party in Aug; 33 contacts from communion party in Oct

Galway: has c.50% smaller population than Cork but has c.65% more alcohol related contacts; 22 contacts from one party in Jul; 15 contacts from a kids' party in Sep; 31 contacts from a party in Sep Positivity Rate: Sep-Oct: 4.3% vs. 7.6% nationally. Care required as this is a small sample size

cIDR data shows that 540 positive cases occurred in the same period across 60 outbreaks for categories 'Social Gatherings' and 'Public House' compared to 80 cases in Jul-Aug similar to large increase in contacts shown from late Sep within Track and Trace

National National L3

Contacts with positive individuals: Alcohol/Social Gatherings related terms mentioned in free text (over time)

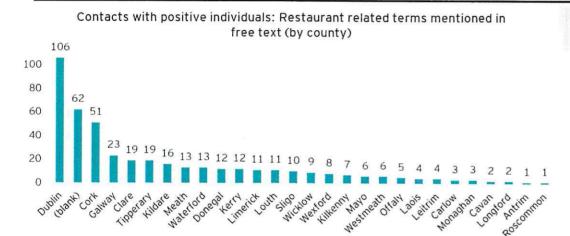


Source: Contact tracing analysis Terms searched: alcohol', 'drink', 'party', 'celebration', 'booze', 'beer', 'wine', 'cans', 'pint' Dates: Dublin L3 (19/09) Wet Pubs Open (21/09) National L3 (07/10) National L3 Max (16/10) National L5 (22/10)

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Contacts with positive individuals generated in restaurants Restaurants mentioned 439 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only



Key message: Restaurants generated contacts, however absolute levels remain relatively low given data available.

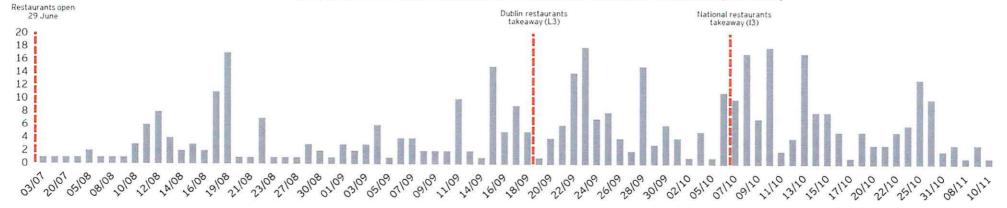
Dublin: 18 contacts relating to a coffee chain over three days in August; 5 contacts relating to Dublin restaurant over 2 days in Sep

Cork: 5 contacts relating to a restaurant chain in one day in Sep; 4 contacts relating to a fast food chain over two days in Nov

Positivity Rate: Sep-Oct 1.8% vs. 7.6% nationally. Care required as this is a small sample size

CIDR: Shows 221 positive cases across 35 outbreaks during Sep-Oct compared to 44 positive cases in Jul-Aug largely consistent with the increase in contacts shown from mid Sep in Track and Trace

Contacts with positive individuals: Restaurant related terms mentioned in free text (over time)



Source: Contact tracing analysis
Terms searched: Restaurant, eating out, out for a meal, and a list of all national chains in Ireland
Dates: Restaurants open (29/06) Dublin Takeaway (19/09) National Takeaway (07/10)

Note - there were 18 mentions before 1 July 2020

Retail contacts with positive individuals Retail and related terms mentioned 651 times between Mar - 12th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only



Retail store cases appear to be driving smaller number of contacts rather than large clusters

Dublin: No large clusters, largest number of contacts on a single day was 5; 5 contacts in specific supermarket on a day in May

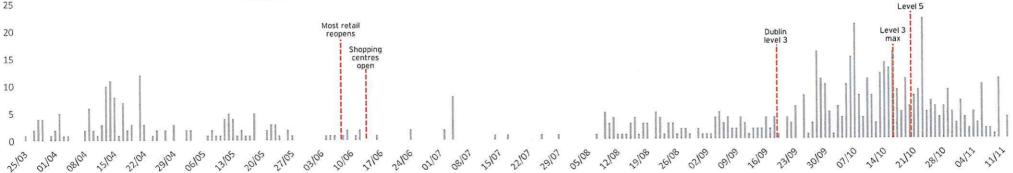
Kildare: No large clusters, largest number of contacts on a single day was 3

Cork: No large clusters largest number of contacts on a single day was 5; 5 contacts in a chain supermarket on a day in Nov

Positivity Rates: Sep-Oct 1.3%

cidentification of trace and trace contact and trace contact data

Contacts with positive individuals: Retail and related terms mentioned in free text (over time)

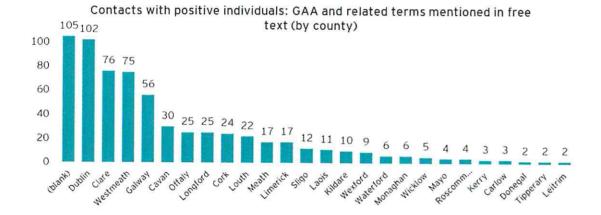


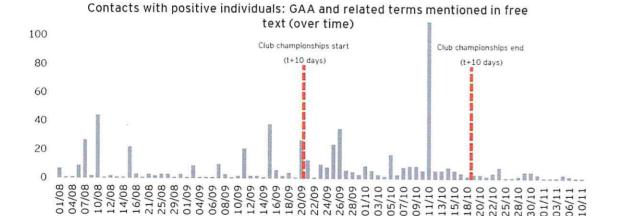
Source: Contact tracing analysis
Terms searched: shop, SuperValu,Lidl,Tesco,Aldi,Dunnes Stores,Eurospar,Iceland,Marks & Spencer, Donnybrook Fair, Joyces,Fresh,
Spar,Centra,Londis,Mace,Gala,Daybreak,Costcutter,Applegreen, Newsagent

Dates: Most Retail Opens (08/06) Shopping Centres Open (15/06) Dublin L3 (19/09) National L3 Max (16/10) Level 5 (22/10) Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

GAA-related events contacts with positive individuals GAA-related terms mentioned 653 times between Mar - 10th Nov

Note: Analysis completed using the small available sample of track and trace free text data. Treat as directionally informative only





Key message: GAA events and celebrations appear to have generated incidences of high numbers of contacts with positive individuals. However, overall levels appear low.

Clare: 24 contacts on day in Aug for GAA Training; 33 contacts on day in Aug for GAA; End of Jul start for club games in Clare as master fixtures committee recommended new

Westmeath: 52 GAA contacts on single day in Oct; (Senior football finals occurred on 27th Sep)

Galway: 34 contacts on day in Sep mentioning a specific GAA team

Dublin: 17 contacts on day in Aug mentioning a specific GAA camp; Camps took place between 22nd Jul - 23rd Aug Positivity Rate: 490 contacts made between Sep-Oct resulting in 11 positive tests (c.2.2%)

CIDR: 159 cases across 24 outbreaks between Sep-Oct in the category 'Sporting activity/fitness'. No cases are shown for this category in Jul-Aug. This shows largely the same trend as track and trace with majority of contacts occurring from Sep onwards

Source: Contact tracing analysis
Terms searched: terms 'GAA', 'Gaelic', 'County Final', 'County Championship', Hurling' and 'Football'
Dates: Football and hurling championships took place between 13 Sep and 9 Oct 2020

Note - there were 16 mentions before 1 Aug 2020

International Desktop Research

Please see the associated magazine.

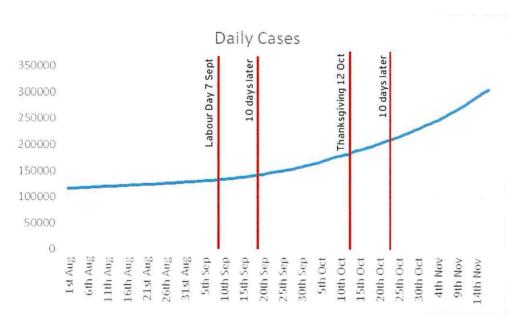
Additional examples are also shown here.



Canadian Thanksgiving: Test & Trace data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb; 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Track & Trace records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the rate of transmission after Thanksgiving." The percentage increase in cases dramatically changed after Thanksgiving, with a 14% increase in positive cases between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28
 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

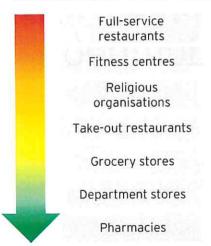
US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.).

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

Key findings

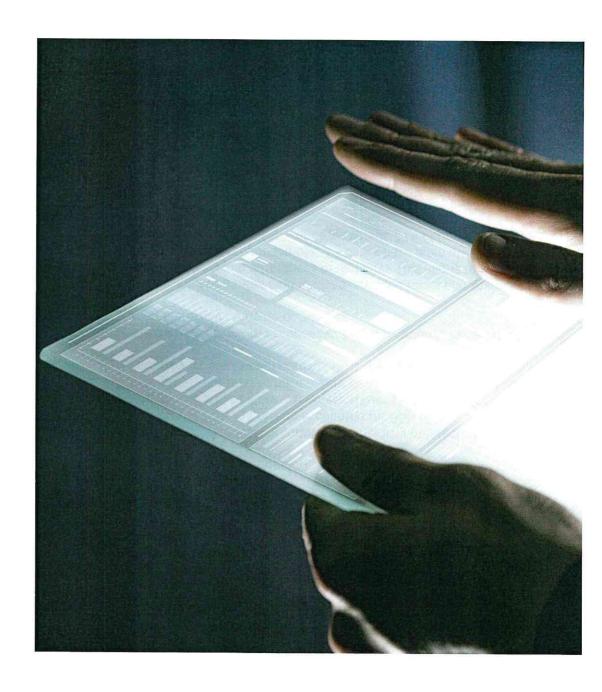
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

http://hirr.hartsem.edu/research/fastfacts/fast_facts.html

Note: Calculation of positivity rate using cases generated as a proportion of visits generated

Roadmap for next six weeks



Approach to Christmas monitoring We will combine a variety of data sources to monitor activity over the Christmas period

			by NPHET Incidence)		Provided by isations (act			insi	enerated ghts ompliance)	Approach overview
Setting	Description	HSE	CIDR	TII/NTA	Survey	cso	Gardaí	Mobile data	Payments data	 Leverage existing health data
Events	Indoor and outdoor (e.g. concerts, sports events, weddings, funerals)	~	~	$\frac{1}{2}$			TBC	~		from NPHET, curate data from Government agencies and
Social/family gatherings	Levels of gatherings in private households	~	~				1	~		create new insights from additional data sources
Retail and services	Levels of activity in retail and other services (e.g. hairdressers)	4	~	相談	No.	~		~	~	 Support comprehensive data
Workplaces	Attendance at physical workplaces	~	~					~		analysis to monitor and provide insights on the
Domestic transport and travel	Levels of movement around the country	~	~	~		~				effectiveness and impact of restrictions and behaviours
Education	Schools, childcare, adult and higher education	~	~							over Christmas
Bars/restaurants	Activity levels in bars and restaurants	~	~						~	 Leverage insights to inform restriction measures for future
Care homes	Residential facilities, assist living and nursing homes	4	4							planning as well as provide "stories" to help bring to life
Sentiment/compliance	Indicators around compliance to restrictions			~	~		TBC	~		for the public
International travel	International travel levels and related disease spread	~	~			~	MI	~		 Aggregated and anonymised data only. No personal
Leisure/recreation	Gyms, pools, leisure centres	~	~					~		identifiable data
Accommodation services	Stays in hotels, guesthouses and B&Bs	~	~				Min.	~	~	

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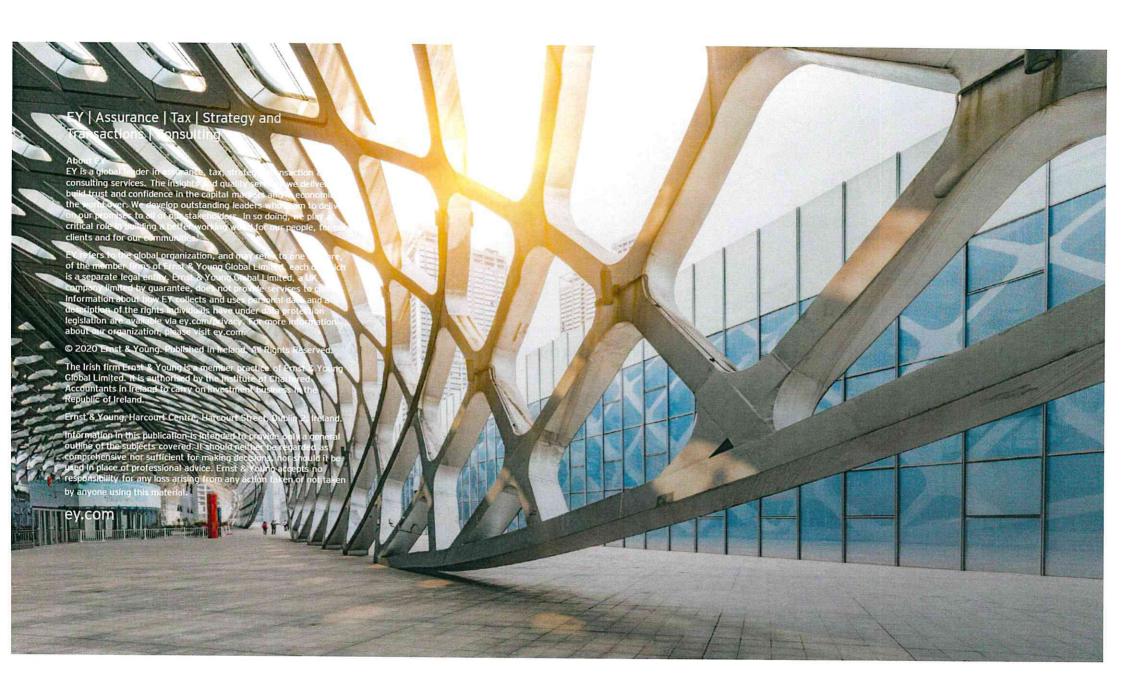
What will the next six weeks look like?

Data is anonymised and aggregated to LEA or country and by industry type. No personal identifiable information

This week W/c 16 Nov	Week 2 W/c 23/11	Week 3 W/c 30/11	Week 4 W/c 7/12	Week 5 W/c 14/12	Week 6 W/c 21/12
		Proposed brief	ing frequency		
Weekly/ ad-hoc	Weekly / ad-hoc	Weekly / ad-hoc	Daily / ad-hoc	Daily / ad-hoc	Daily / ad-hoc
		Insights o	delivered		
County dashboard	County dashboard	County dashboard	County dashboard	County dashboard	County dashboard
Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers
Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact
Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysi
	Transport	Transport	Transport	Transport	Transport
	Facebook survey	Facebook survey	Facebook survey	Facebook survey	Facebook survey
ase monitoring	Spending data	Spending data	Spending data	Spending data	Spending data
rictions		Stay at home index	Stay at home index	Stay at home index	Stay at home index
STATICO.		Data analytics briefing - 23 Nover	nber 2020 - DRAFT - Not for circulation	Social distance index	Social distance index

Disclaimer

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information



County Analysis Summary

County	Border County	Major Incidence	Dublin and Surrounding Area	Following National Restrictions Trend	Wave One Outbreak Sources	Wave Two Outbreak Sources	Change in 14 day incidence rate (14/11-17/11)	Wave 2 Incidence rate
Cavan	/	/		/	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	-0.14	
Louth	1	✓		✓	Nursing Home, Private House, Hospita	Private Houses, Hospitals, Residential Instutions	0.1	
Donegal	1	1			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	0.06	
Monaghan	1				Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential Insitutions	-0.08	
Leitrim*					Nursing Home, Private House, Travel	Private Houses, Extended Family,	0.13	
Meath		1	/	1	Related Nursing Home, Private Houses, Workplace	Religious/Other Ceremony Private Houses, Nursing Homes, Community Outbreak	0.01	
Dublin		_	-		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	-0.18	
Kildare**		~	1		Nursing Home, Private Houses, Residential Institution	Priate House, Workplace, Nursing Homes	-0.03	
Cork		1		1	Workplace, Private Houses, Nursing	Private House, Community Outbreak, Nursing	-0.08	
Galway		1		1	Homes Hospital, Nursing Home, Private	Private House, Community Outbreak, Nursing	-0.1	
Kerry					Private Houses, Residential	Private House, Community Outbreak, Nursing	-0.11	
Limerick					Insitutions Hospital Nursing Home, Private Houses,	Extended Family, Community Outbreak,	0.15	
					Residential Institution Hospital, Nursing Home, Private	Private House Private House, Workplace, Hospital	-0.09	
Carlow*					Houses Nursing Home, Private Houses,	Private House, Extended Family, Community	0.17	
Clare		· ·			Extended Family Workplace, Hospital, Community	Outbreaks	THE RESERVE THE PARTY OF THE PA	
Laois*		✓			Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	-0.32	
Longford*		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	-0.02	
Offaly*		1			Workplace, Hospital, Community Hospital/Long-Stay Unit	Private House, Workplace, Nursing Home	0.06	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	-0.05	
Tipperary		✓			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	0.05	
Waterford		1			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	0.05	
Kilkenny*		·			Hospital, Private House, Community	Drivate House Workelase Hospital	-0.09	
Wicklow**			-		Hospital/Long-Stay Unit Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	-0.03	
Mayo				/	Nursing Home, Hospital, Community	Private House, Nursing Hame, School,	-0.04	
Sligo*					Hospital/Long-Stay Unit Nursing Home, Private House, Travel	Workplace Private House, Extended Family,	-0.23	
Westmeath*	1				Related Workplace, Nursing Home, Hospital	Religious/Other Ceremony Private House, Nursing Homes, Workplace	-0.33	
Wexford					Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing	-0.07	

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Wave 1: 03/03-25/07 Wave 2: 26/07-20/11

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Summary of 14 day incidence rate per 100k

UPDATE FOR NEW DATA

The below heatmap shows the county incident rate per capital over the last two months. The overall reduction in cases has levelled in the week with some counties now increasing.

Two Weekly Incidence Rate Per 100k	17-Sop	18-Sep	18-0eb	24 Sep	22.Sep	23.50	200	74-0ep		26-Sep	27-Sep	28-Sep	29-Sep	30.5	0.00	1-O	02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	07-Oct	DR-Oct	Og.Oct	3 0 0	10-0	11-0ct	12-Oct	13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	1 6	25 05	5 6	74-0ct	28.0ct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	O1-Nov	02-Nov	03-Nov	04-Nov	05-Nov	70N-90	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	Change Last 3 Days
Offaly	62	60	64	60	62	6	59	56	59	56	63	6	2 8	5 1	67	74	77	77	93	100	104	f 11	0 1	3 1	30 1	136	140	145	141	151	140	177	201	195	5 211	0 22	4 2	22 2	24 :	14 2	24	217 2	22 2	27 2	18 23	6 1	91 16	2 15	3 13	0 11	101	100	91	3 9	7 9	85	99	94	87	95	114	112	1/7	19%
Leitrim	78	72	75	41	44	14	14	41	34	37	37	2	5 1	9 7	25	25	28	31	31	1 28	34	1 3	4 :	3	81	97	125	137	147	162	218	218	225	240	25:	3 26	2 2	72 2	78 2	59 2	47 2	22 2	09 2	08 17	78 13	5 12	2 10	9 9	7 8	6	51	3	1 21	3 3	4 3	37	47	56	81	81	87	91	94	13%
Waterford	34	85	89	95	97	7	37	88	86	67	67	5	9 5	3	44	38	35	34	23	3	1 32	4	0	6 !	56	64	61	86	70	83	109	13	132	143	3 5!	5 16	0 1	73 1	76	94 2	:05	215 2	26 2	25 22	28 2	10 20	5 20	01 20	01 19	19	18	776	16:	3 14	6 13	123	124	114	142	141	156	163	163	13%
Limerick	53	49	45	44	39 :	9	36	34	35	33	35	3	1 1	9	37	45	58	69	91	56	107	7 11	4 1	19 1	45 1	160	167	132	189	207	208	23	243	248	27	7 28	0 2	90 :	331 2	38 2	93 3	06 2	99 3	10 30	06 3	2 27	7 26	9 26	2 22	22	2 250	35	216	21	0 2	207	190	105	105	244	201	222		11%
Clare	35	38	42	44	41	4	10	40	41	47	50	5	3 6	3	76	76	97	96	121	144	158	3 18	3 19	19 2	16 2	261	268	304	310	306	309	322	329	327	32	2 31	3 30	04	311 2	72 2	64	281 2	52 2	48 25	3 25	B 23	5 22	9 20	9 18	19	13	177	17	1 161	0 12	122	122	na	10.4	104	01	103	220	756
Louth	34	96	102 1	102	98 1	7 1	19	101	95	104	92	8	0 7	6	75	74	79	77	83	50	35	5 8	5 8	9 1	16 1	103	16	115	152	161	18	1 185	183	178	3 22	1 26	1 25	13 2	83 2	72 2	286 2	99	311 2	83 25			5 29	7 29	7 25	21	19	202	189	17	7 15	155	157	156	147	151		L. Warrie	157	496
Donegal	64	73	84	97 1	06 ti	2 1	18	59	178	185	191	20	1 2	11 2	19	233	258	265	273	253	312	31	9 32	6 3	24 3	345	355	355	354	367	365	356	344	347	325		100		7	1000	22 3	29 3	318 3	13 3	7 37	2 31	n 32	n 30	9 30	28	300	297	291	29	2 27	295	272	901	271	272		263	231	3%
Galway	29	27	28	30	32	39	39	45	46	54	62	6	5 7	4	81	79	85	89	93	52	97	, 10	7 1	13 13	37 1	153	155	165	173	203	228	262	273	288				100		S8 3	73 3	82 3	84 3	70 35	4 2	11 31	3 20	6 29	2 25	24	2 21	1 197	17	1 14	4 12	100	100	07	00	83			A POST	296
Roscommon	31	33	33	45	54 !	7	52	67	64	76	84	9	3 10	2 1	121	133	143	161	155	155	170	16	6 16	6 1	92 1	184	200	181	187	201	198	20	223	232	221	3 23	9 21	30 :	71 2	SD 2	76 2	63 2	63 21	59 2	11 21	0 22	9 20	2 22	E 22	21	105	-00	17	15	2 15	175	170	75	100	100	100	03	100	296
Wicklew	70	70	70	72	70	7	74	71	69	65	67	7	0 7	3 6	65	72	74	77	73	78	77	, 7	6 7	6 1	30	84	88	91	87	89	91	1 10:	119	120	1 24	1 12	4 12	99 1	45 1	15 1	149 1	149 1	45 1	47 14	19 1	11 12	0 11	7 11	6 10	100	100	0.	1 00	9 00	0 0	77	110	1/0	163	100	100	141	169	196
Tipperary	19	19	19	18	16	7	16	19	18	21	24	2	4 2	5	31	32	36	40	43	53	55	5 5	8 5	8 (86	70	71	78	83	79	88	91	117	113	119	5 11	8 1	20 1	26 1	24 1	134 1	139 1	33 1	29 14	15 17	2 12	9 10	1 12	0 10	10	100	* 200	1 120	121	3 6	****	83	86	84	80	80	82	66	-4%
Kerry	19	18	19	18	19	9	19	24	22	24	25	2	2 2	0	21	26	40	48	52	62	64	7	3	91 10	36	110	113	144	153	177	174	197	215	240	246	36	3 21	9 2	F7 2	29 2	291 2	99 2	79 2	01 26	9 7	71 12	G 22	0 10	0 10	170	100	700	120	120	2 11	123	118	113	117	1114	101	105	110	
Mayo	26	27	26	26	31	0	29	32	31	32	30	2	3 2	6 2	28	24	26	30	33	32	36	4	2 4	2 !	-4	67	75	RO	90	107	123	13	157	167	101	5 20	9 20	× 2	42 2	50 2	46 3	50 Z	ee 21	E9 2	10 21	2 20	9 24	0 13	0 10	100	101	- 30	100	10.	2 10	133	133	29	128	128	127	123	122	-5%
Wexford	35	36	34	33	23	3	25	28	28	27	27	3	5 3	3 :	33	35	40	41	49	57	7:		0 6	5 (10	112	100	120	172	100	202	250	274	272	201	7 29	8 3	01 0	10 6	10 2	313	301 2	00 20	57 25	0 21	2 19	A 49	0 23	2 21	13	10.	84	183	1/1	5 16	197	101	45	141	118	113	113	made0	-7%
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Longford	49	49	46	37	39 :	9	34	32	37	39	45	5	9 7	3 9	98	120	127	132	147	152	154	16	9 16	9 17	76 2	009	197	136	191	192	170	212	240	254	276	9 20	1 2	0- 0	60 3	90 I	201 2	100 1	18 1	00 00	10 17	0 13	4 K	H 13	9 13	130	189	134	14	1 14	1 13	123	130	25	126	129	126	113	116	-11%
Dublin	121	123	36 1	37 1	36 14	0 1	14	46	148	152	160	15	4 15	9 1	63	168	172	161	166	162	17	1 16	5 16	3 17	73 1	174	177	120	194	192	197	200	222	231	200	20	1 26	0 0	to 2	30 s	201 2	.03 Z	50 05	U6 21	19 23	9 20	3 24	5 22	3 19	18	1 19.	166	164	15	7 15	142	132	27	115	115	103	103	100	-15%
Cavan	22	21	24	24	22 2	2	32	37	37	49	5	4	7 5	6 6	67	79	84	88	111	114	15.4	16	4 20	0 30	13 3	29	366	412	571	C41	726	700	011	014	010	21	2 405	0 10	er 2	22 4	00 2	00 2	08 20	09 20	2 27	2 23		0 22	6 21	20:	200	199	19	1 18	5 17	161	151	'42	134	139	136	113	118	-18%
Carlow	33	35	35	37	39	0	12	44	42	40	35	3	1 2	6 1	33	35	44	44	41	47	45	4	0 4	2 5		61	74	77	92	04	110	110	140	107	310	2 20	1 2	10 0	10 0	70 0	00 0	00 1	04 8	75	2 60	8 E4	5 38	3 56	2 47	36:	28	263	232	2 200	6 15	143	133	119	112	102	108	93	67	-18%
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Laois	46		44	44	46	7	10	33	24	31	32	3	, ,	5	42	12	76	76	03	67	50	10	E 11	2 4	10 1	154	125	130	102	200	400	350	373	360	402	38	3 41	PC 4	15 3	34 3	75 3	49 3	63 32	23 3	n 31	5 10	3 28	8 26	9 21	20:	17	176	168	142	2 13	121	122	116	117	124	112	114	104	-19%
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County view - Roscommon (20/11)

ACTION Add national average and make title consistent Total Confirmed Cases

Trend vs. National

925

ACTION Add trend vs national

Roscommon profile:

 Roscommon experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Roscommon rising above the national rate in mid-November

Summary analysis:

- The main driver of outbreaks within the county since the start of November are those seeded in nursing homes – representing 64%. Private house outbreaks make up a significant portion of remaining outbreaks, at 33% of new outbreaks
- An earlier increase was seen in Athlone LEA-6 in the week following the football final held 20 September. The winning team was located in this LEA. However other events coincided with this date including the reopening of wet pubs

Restrictions impact:

- Level 3 (max) restrictions put in place as of 16 October can be seen to align with a reduction in incidence rate ten days later
- In some instances, this reduction can be seen to accelerate again with the introduction of level 5 restrictions on 22 October (Athlone LEA-5, Roscommon LEA-6, Boyle LEA-6)

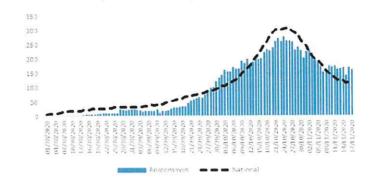
Employment summary

Roscommon had c.37% of its workforce on PUP or TWSS (11k) at the peak in early May (EY 2019 employment estimates). There are currently 3k on PUP (17 Nov) which is down from 7k in May (CSO, DSP)

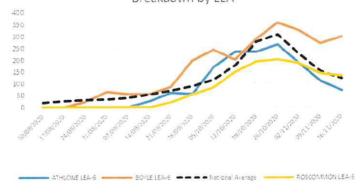
Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

14 Day Incidence Rate per 100k vs National



Breakdown by LEA



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is made available publicly

Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

Since the 1st of September

557 cases, with 68% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	194	78
Nursing home	82	5
Extended family	30	5
Workplace	14	8
Notable events	Date	No. of cases
Nursing home		66
	30.0-317-1-47	let-
Extended family	09/10/2020	18
Nursing home		12
Private house	14/10/2020	7

ACTION
Replace with Eve
employment /
econometric stuff

Trend vs. National

6,248



County View - Laois, Offaly and Kildare (17/11)

Laois, Offaly and Kildare profile:

TBC using updated graph

Summary analysis:

- · Increasing case number trend emerges in July
- Outbreaks concentrated in food and meat processing plants
- Highest numbers in Offaly in Edenderry (93 of 103 cases) in two weeks preceding 17 August, with Kildare largely focused in Athy/Kildare (129/151 of 437)

Restrictions impact:

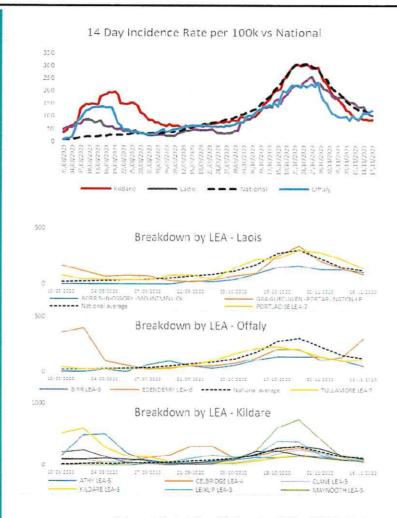
- County lockdowns for Laois, Offaly and Kildare from 8 August
- Offaly and Laois leave lockdown on 21 August and the following week cases begin to rise in Laois with minimal decrease in Offaly - note Laois had relatively few cases prior to lockdown
- Kildare lockdown extended for an additional 10 days
- Case numbers fall, however prevalence appears to shift from the south and middle of the county (Athy. Kildare Town and Newbridge) to the north of the county (Naas, Maynooth and Celbridge)
- As cases increase in North Kildare from October, a similar trajectory of case growth appears in Dublin West

Employment summary

 These counties had c.40% of their combined workforce on PUP or TWSS (c.73k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain significantly lower than peak (24k versus 44k) (CSO, DSP).

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or



Since the 1st of September

2,859 cases, with 57% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	870	342
Nursing home	216	13
Hospital	162	16
School	84	23
Extended family	81	13

Notable events	Date	No. of cases
Nursing home	Blow Server	52
Hospital		49
Nursing home	EX November	46
Nursing home	nile d'Aussi	38
Nursing home	No.	38

ACTION
Replace with Eve
employment /
econometric stuff

Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

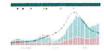
County view - Waterford (20/11

ACTION Add national Source?

Total Confirmed Cases

Trend vs. National

975



Waterford profile:

Waterford experienced a lower 14 day disease incidence rate per 100k during second wave than the national average. However, this changed in recent days with Waterford rising above the national rate in mid-November

Summary analysis:

- Cases rose in early September in Waterford City East, South and Tramore-Waterford City West. There was a meat factory outbreak around this time resulting in 50 cases
- Workplace outbreaks have been prominent in Waterford, making up 30% of outbreak-related cases in November, with the largest resulting in 24 cases
- Private households make up another 63% of outbreakrelated cases during this period
- Outbreaks in September and October were both driven by cases occurring in Waterford city. Unlike other counties, these do not seem to spread throughout Waterford to the same degree, with LEAs outside Waterford City maintaining lower cases compared to national levels

Restrictions impact:

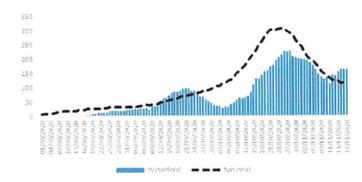
- Cases stabilised in the ten days after Level 3 restrictions came into effect
- While falling steadily throughout November, cases hegan to rise again towards the middle of the month

ACTION Move top right Trend vs National ave here

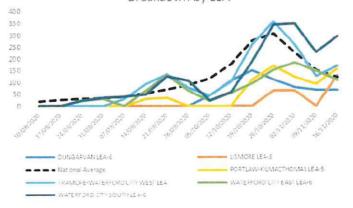
JP or urrently 8k on av (CSO,

Notes
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration

14 Day Incidence Rate per 100k vs National



Breakdown by LEA



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is made

Data analytics briefing - 23 November 2020 - DRAFT - Not for circulation

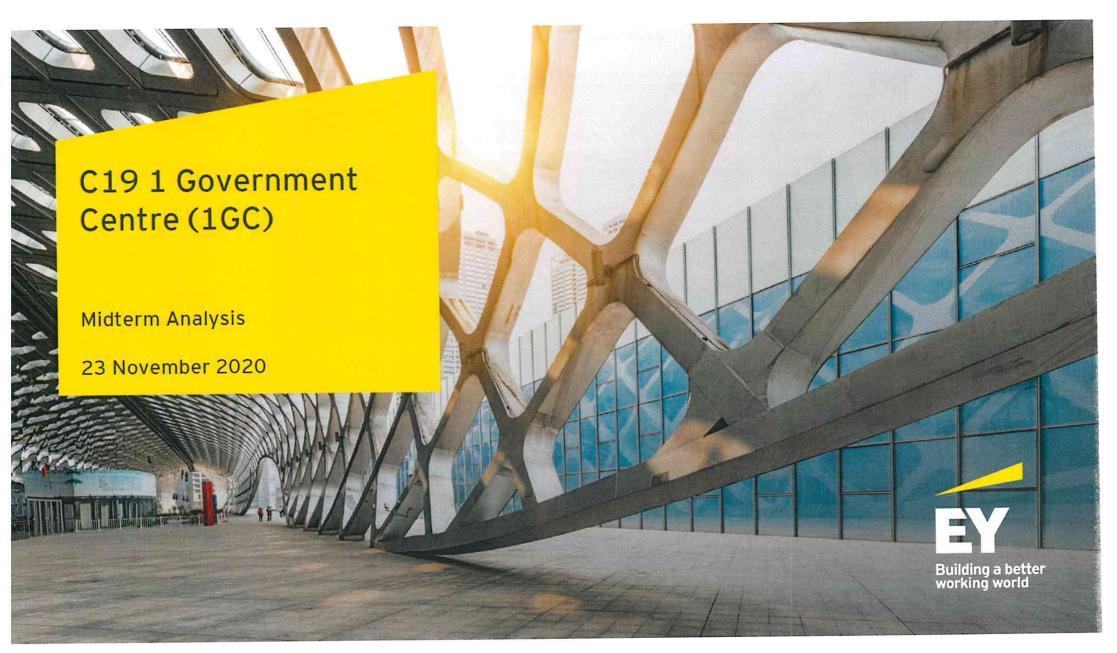
Since the 1st of September

777 cases, with 63% linked to outbreaks

Top 5 Settings	No. of Cases	No. of Outbreaks
Private house	329	135
Workplace	84	8
Community outbreak	20	2
Other	12	2
Extended family	11	3

Notable events	Date	No. of cases
Workplace	04/09/2020	49
Workplace	03/11/2020	21
Community outbreak	02/10/2020	16
Private house	09/09/2020	10
Other	28/10/2020	9

ACTION Replace with Eve employment / econometric stuff



Restrictions Impact Overview

The below heatmap shows the average daily impact in 14 day incidence rate per 100k for each change in restrictions. Schools went on midterm break on 26/10/2020, which is just 4 days after the start of Level 5 on 22/10/2020. It is therefore difficult to differentiate between the impact of Level 5 and any impact schools closing for midterm had. The reopening of schools on 02/11/2020 is included in the below restrictions impact analysis where the time period of schools reopening coincides with a reduction in the decrease in 14 day incidence rates across most counties.

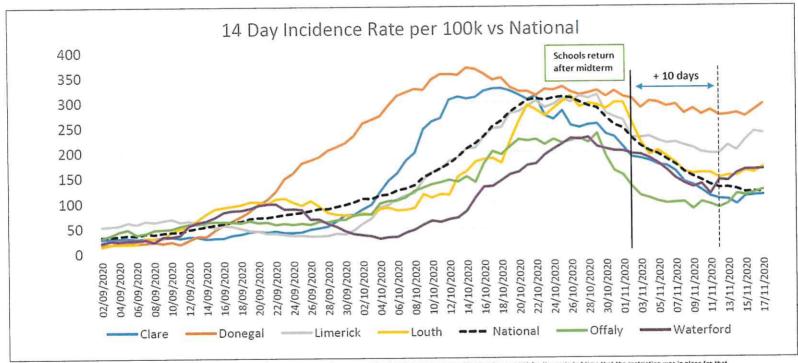
The drivers behind this trend is explored further in the following slides.

	29/02/2020	12/03/2020	15/03/2020	2403/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/08/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	26/09/2020	07/10/2020		16/10/2020	22/10/2020	02/11/2020
verage daily change in the 14 day incidence rate per 100k		Childcare closed, School Closed		Retail, restaurants etc.closed	Stay at home order (2km)	Stay at home increased to Skm	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Laois + Offaly	Schools + childcare opened	evel 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan,	Level 5 National	1 5
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Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that

14 Day Incidence Rate Overview

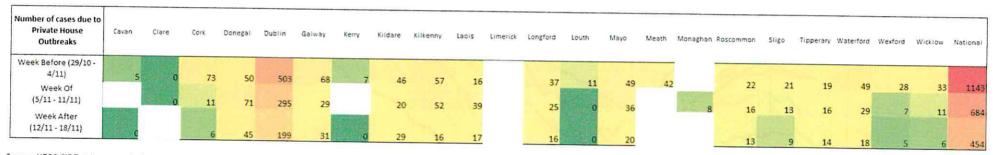
The graph below shows the 14 day incidence rate for the counties highlighted in the previous slide as showing an increase in the 14 day incidence rate since the reopening of schools after the midterm break. While the above counties show some upward trend in the days following 12/11/2020 (10 days after the reopening of schools), there is no definitive link to schools being the main driver. This is further illustrated by select counties in the subsequent slides.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Private House Outbreak Analysis

The below diagram shows the number of cases due to private house outbreaks resulting from the week before, during and after midterm. (Please see below details of the dates applied). The week of midterm didn't see an increase in private house outbreaks. Donegal saw a small increase in cases due to private house outbreaks over the midterm break but private house outbreaks don't appear to explain the upward trend.



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Note that:

- The week of midterm occurred from 26/10/2020 to 1/11/2020
- The number of days it takes to impact on private household activity is assumed to be 10
- ▶ The impact of the week of midterm is therefore from 5/11/2020 to 11/11/2020
- ▶ The impact of the week before midterm is from 29/10/2020 to 4/11/2020
- The impact of the week after midterm is from 12/11/2020 to 18/11/2020

Limerick: Large hospital and community outbreak drive the increase in incidence rate

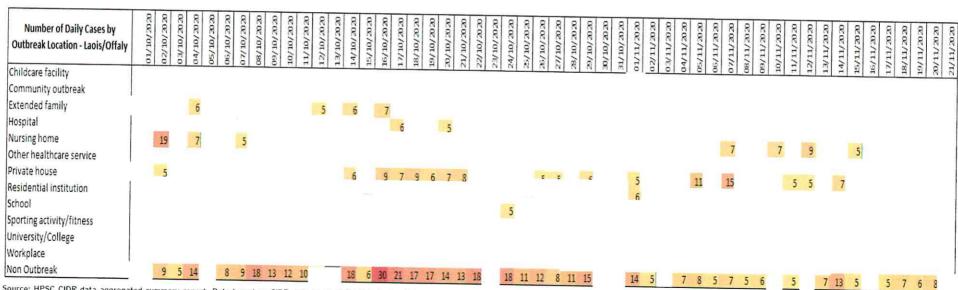
- Of all cases since 19th October, 271 cases had non-missing outbreak locations. This means, in Limerick's case, data on approximately one quarter of all cases can be used to triangulate the cause of recent trends. Note the increase since 10th Nov
- Of 271 cases where outbreak location was recorded, 82 of these were recorded as happening in hospital. Note there was a major hospital outbreak of 117 outbreaks which spilled over to neighboring counties. All of these outbreak related cases occurred in November
- Of 271 cases where outbreak location was recorded, 80 were instances of community outbreak. This remained generally steady throughout November with a slight decrease up to the 18th
- Overall, this does not point towards schools being a major driver following midterm

Number of Daily Cases by Outbreak Location - Limerick	01/10/2020	03/10/2020	04/10/2020	05/10/2020	06/10/2020	07/10/2020	05/01/60	02/01/01	12/10/2020	13/10/2020	14/10/2020	15/10/2020	02/01/71	02/02/201/81	0202/01/61	21/10/2020	22/10/2020	23/10/2020	24/10/2020	0000/01/90 7	27/	100	29/10/2020	31/10/3020	01/11/2020	02/11/2020	03/11/2020	04/11/2020	05/11/2020	07/11/20	08/11/2020	09/11/2020	10/11/2020	11/11/2020	13/11/2020	14/11/2020	15/11/2020	16/11/2020	0202/11//1	19/11/2020	20/11/2020
Community outbreak							West		19212		1.6	20	7		6	(2		8	1	9																				
Extended family		14 1	32	5	7		15	9	11		8	5	1		13	,	0		0								7			6				11			18	8			
Hospital																											1000										Section 1				
Hotel																											5														
Other																																									
Private house																														6											
Religious/Other ceremony													750																		d.										
Residential institution													11					5																							
Restaurant / Cafe																																									
School																																									
Social gathering	5	8										1	1																												
Sporting activity/fitness																																									
Workplace											CHICAGO CO.		-	- 1110	and a	77(16, 32)	and the same				- litera	-	20		4 20		14	20	20	0 21	1 16	11	21	10	20 2	6 1F	47	27	18	2 12	2 20
Non Outbreak	9	7	11	8	10	10	9 33	19 1	16 22	2 16	27	9 4	8 29	30	40	19 2	7 28	19	29	28 1	6 37	25	32		31 28	-	14		111111111111111111111111111111111111111	-	-								reak		

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Offaly: Private house outbreaks and nursing homes driving incidence rates. A number of school outbreaks but spread across the time period

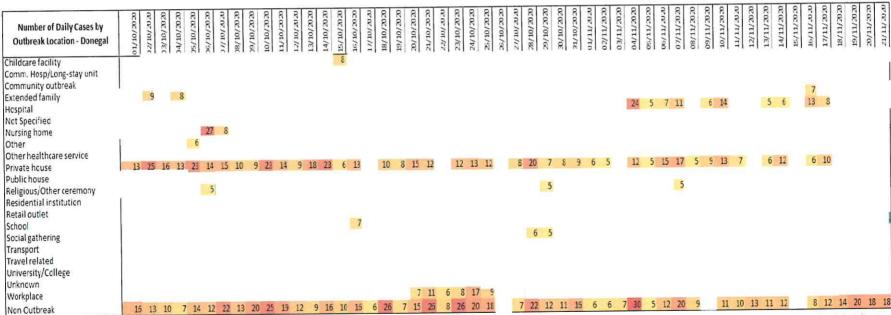
- ▶ Offaly and Laois are both reported together in CIDR, so cannot identify from this data which county the outbreak is in
- Non-outbreak sources leveled off from 6th Nov, 11 days after mid term, similar to what was observed on a national level
- Private home outbreak cases increased slightly in the timeline linked to midterm, with daily outbreak cases increasing from 1-5 to a number of days where 10+ cases were detected
- Nursing home cases increased due to a single major outbreak, rather than a large number of smaller outbreaks
- Outbreak cases associated with schools are generally spaced out, arguably peaking during the first two weeks of level three and then largely dropping off moving into level five with one further case detected in early November



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Donegal: Rise in November primarily driven by a major hospital outbreak

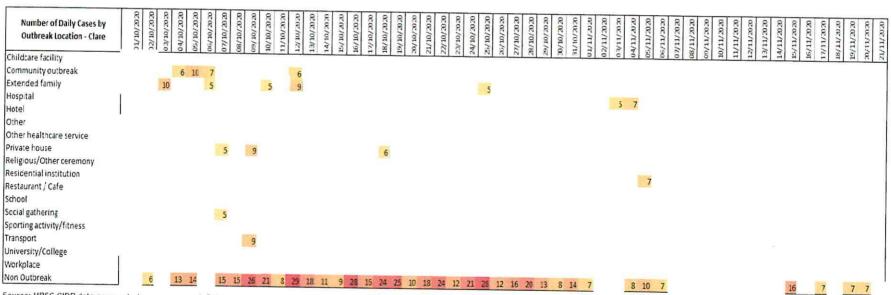
- Despite cases rising again in mid-November, cases related to outbreaks remained low compared to earlier in the month
- Private house outbreaks were the main source of cases in Donegal throughout October, making up 54% of all outbreak-related cases. By November, this number had fallen to 39% of all outbreak-related cases, with considerably fewer private house cases/day occurring in this month
- From early November, hospitals became the dominant source of outbreak cases, moving from just 1% of total outbreak cases in October to 34% in November. One 98 case outbreak made up the vast majority of these instances, and thus a considerable proportion of the total number of cases in Donegal for this month



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Clare: Two hospital outbreaks the primary reason behind increased incidence rate

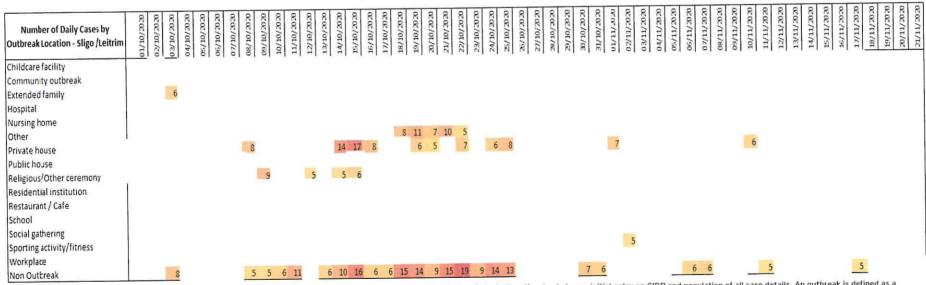
- ► Cases in Clare fell at a similar rate to the national average, but on 15/11, cases rose somewhat, before stabilizing
- ▶ Private house outbreaks were the main source of outbreak-related cases throughout October, making up over 60% of all outbreak-related cases
- However, from early November, hospitals became the dominant source of outbreak cases, moving from just 1% of total outbreak cases in October to 70% in November. This was driven by 2 major outbreaks (17 cases and 9 cases total)
- ▶ It must be noted that the relatively small number of outbreak cases seen in Clare, both in October and November, likely contributed to the large swing in which outbreak types resulted in the most cases each month



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as confirmed cases of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Leitrim: A rise in cases primarily driven by private household outbreaks

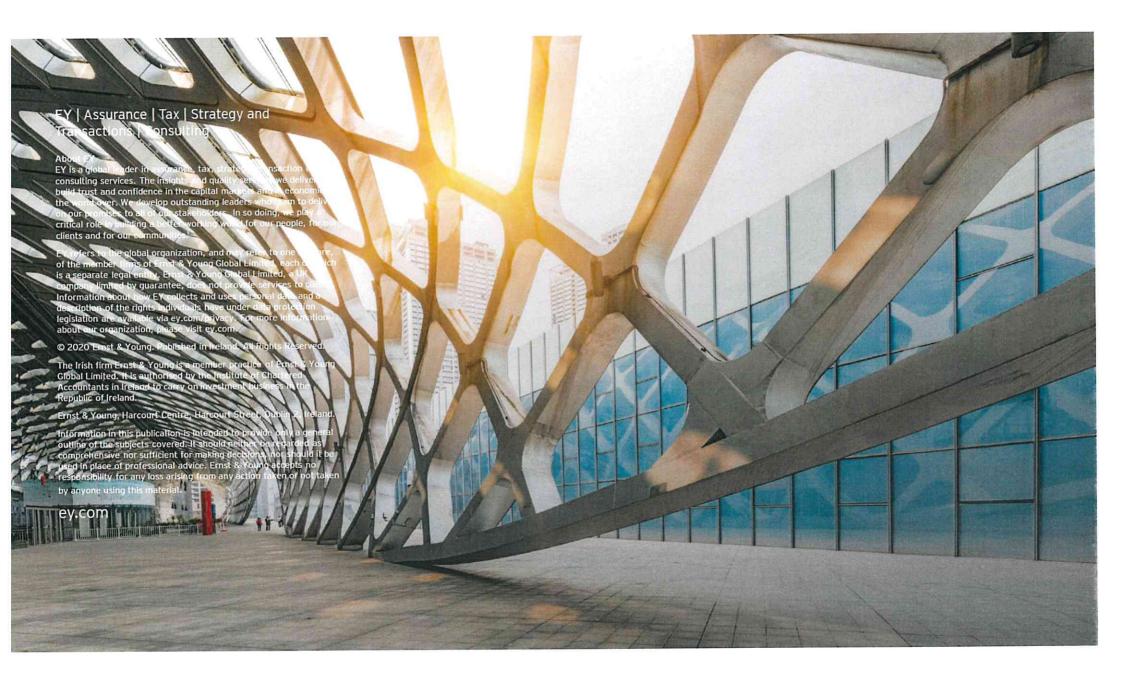
- ▶ In CIDR, Leitrim is paired with Sligo, which did not experience a rise at this time
- ▶ CIDR data shows a decline in outbreak-related cases in late October, well before the impact of mid-term could be seen
- ▶ Cases in Leitrim, which had been falling in early November, began to rise again from 11/11 (10 days after the mid-term break ended).
- Private households remain a prominent source of outbreak-related cases throughout both October and November (change in % mainly came from major drop-off in outbreaks classified as "other")
- Note: Combined with Sligo in CIDR

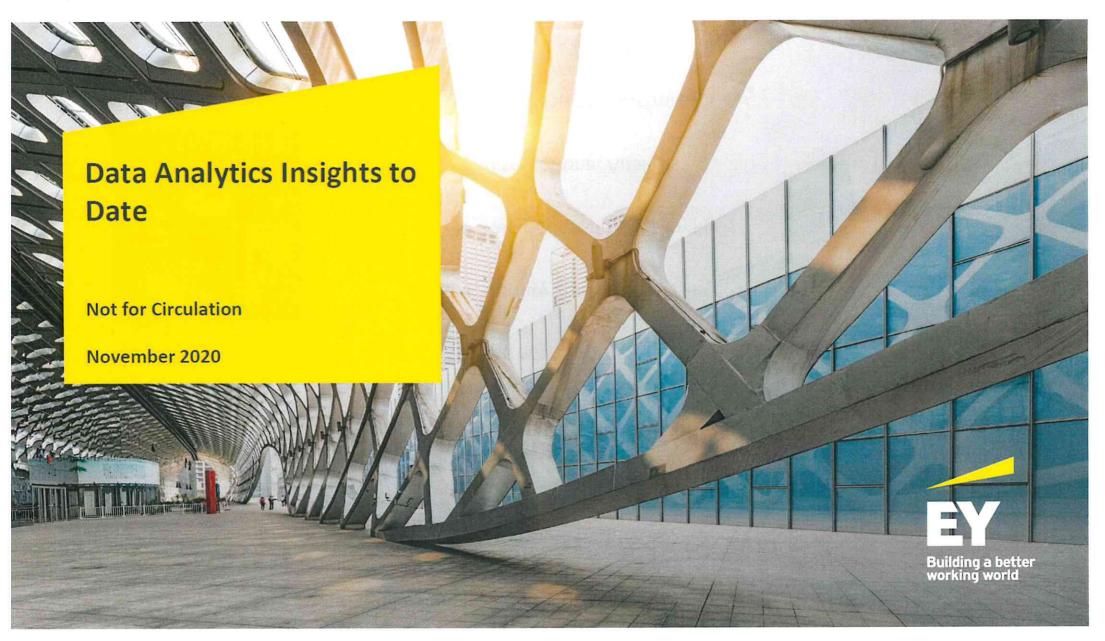


Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Disclaimer

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda



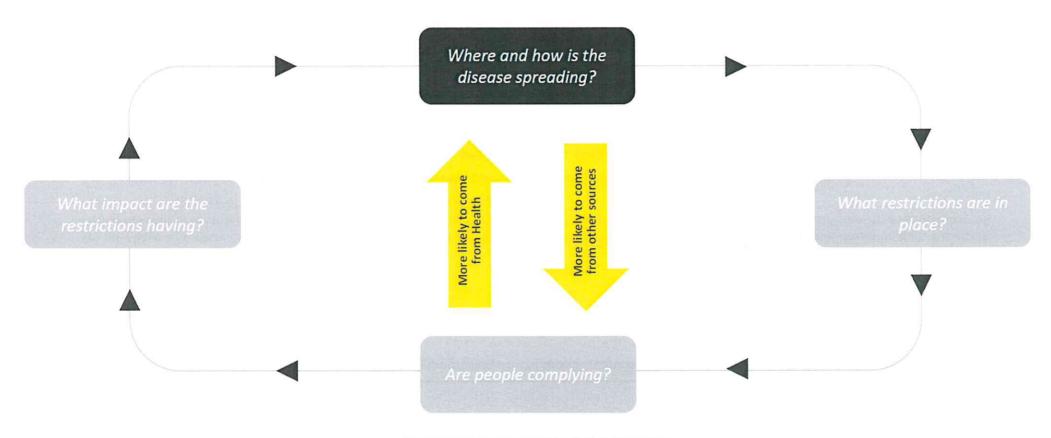


- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis
- Roadmap to Christmas

Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation

Answering four key questions to support government decision making

Helping improve visibility and decision making by combining and analysing data across government

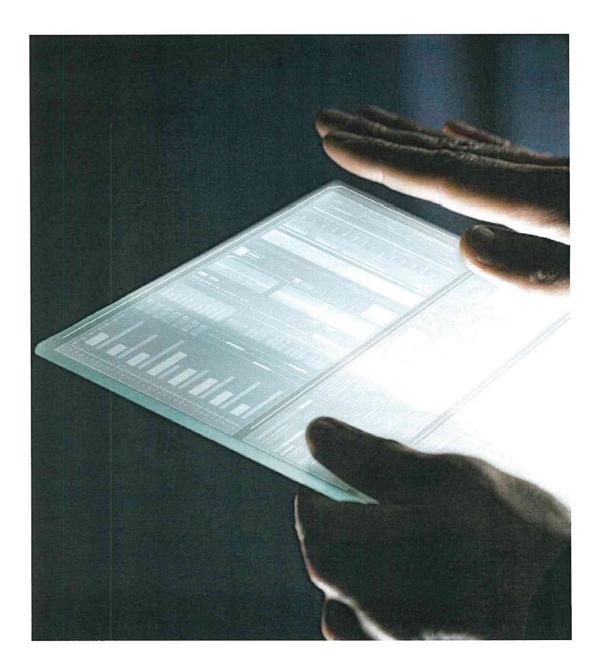


Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation

Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - 2. Proximity to the border
 - Following the national profile
 - Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- · Social gatherings, citizen congregations, alcohol and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet pubs opened in all counties except Dublin in late September. The 14 day disease incidence rate per 100k started to increase ten days later in most counties. This increase was not seen to the same extent in Dublin. Note this also coincided with universities opening for some counties
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county
 when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that
 universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties. The introduction of Level 4 in Donegal coincided with a reduction in mask wearing (Facebook survey data), which goes against national trends
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		1		1	Nursing Home, Private Houses, Residential	Home Extended Family, Community Outbreak, Private	
Mayo				1	Institution Nursing Home, Hospital, Community	House Private House, Nursing Home, School,	
Meath		1	1	1	Hospital/Long-Stay Unit Nursing Home, Private Houses, Workplace	Workplace Private Houses, Nursing Homes, Community	
Sligo*				7	Nursing Home, Private House, Travel Related	Outbreak Private House, Extended Family, Religious/Other Ceremony	
Westmeath*				✓	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Kilkenny*		✓			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		✓			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		1			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		1		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	
Roscommon		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	~~~~
Offaly*		1			Workplace, Hospital, Community Hospital/Long- Stav Unit	Private House, Workplace, Nursing Home	
Laois*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Mursing Home	
Waterford		1			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		1			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential Institution	Priate House, Workplace, Nursing Homes	
Louth	✓	1		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	1		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	1	1			Nursing Home, Workplace, Residential Institution	production of the production o	
Donegal	1	1			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		✓	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources – CIDR, Incidence rate –based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. Note Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

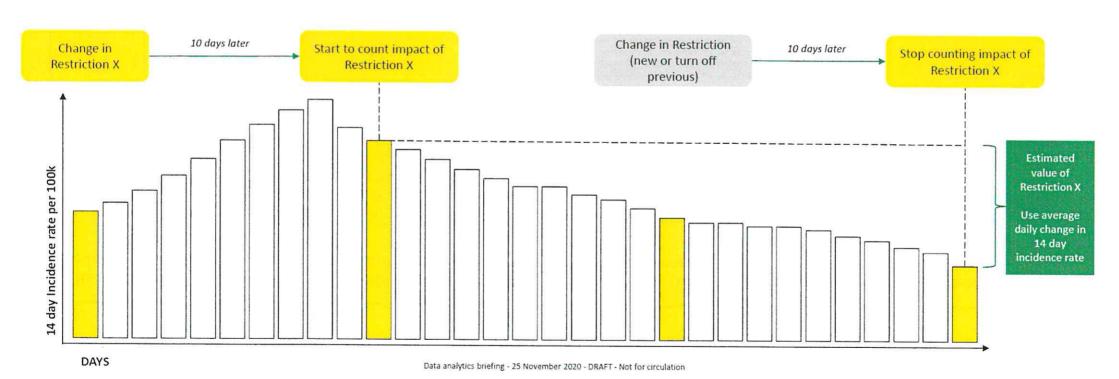
Two Weekly Incidence Rate Per 100k	Population	20-Sep 21-Sep	22-Sep	23-Sep		25-Sep	27-Sep		29-Sep	S-C	1-0ct		04-Oct	08-Oct	07-Oct	8	09-Oct	1-0-1	1	13-Oct	-	15-Oct		18-Oct	19-Oct	1 .	N	23-Oct	24-Oct	26-Oct		28-Oct	30-Oct	31-Oct	02-Nov	03-Nov	05-Nov	06-Nov	00-Nov	09-Nov	10-Nov	11-Nov	13-Nov	_		17-V	Days
Kerry	147,707	18 19	19	19	24	22 2	4 25	22	20	21	26 4	46	52	62 64	73	91	106	110 11:	3 144	153	177	174 19	37 215	240	246 26	63 26	9 257	269	291 29	9 279	281 2	269 27	1 236	220 1	183	178 1	34 190	177 1	162 1	53 139	139	129 1	28 121	THE STATE OF	123 12	10 1000	-11%
Limerick	194,899	44 39	39	36	34	35	33 33	34	39	37	45 5	8 69	90	96 107	7 114	119	145 1	60 16	7 182	189	207 :	208 2	31 24	6 248	277 28	80 29	301	288	293 30	6 299	310	306 31	2 277	269 2	52 228	227 2	29 221	216 2	218 2	11 207	198	195 1	95 21	1 201	222 23	4.00	15%
Mayo	130,507	26 3	30	29	32	31 3	32 30	28	26	28	24 2	30	33	32 36	42	42	54	67 7	5 80	90	107	123 1	31 150	167	185 20	08 22	8 243	250	246 25	6 266	259 2	248 24	2 261	246 2	32 216	198 1	83 184	185 1	176 1	62 147	151	145 1	41 118	3 113	1000	10 109	-4%
Meath	195,044	32 35	38	37	44	42 4	17 44	47	51	62	67 7	1 68	85	90 96	115	129	164 1	183 19	9 213	306	357	403 4	52 49	0 488	591 6	29 65	7 656	648	649 6	651	590 5	558 53	1 481	450 4	48 352	314 2	82 272	249 2	232 2	04 201	172	154 1	41 140	0 133	139 12	28 134	196
Sligo	65,535	17 15	17	17	17	18	24 32	2 27	27	31	27 3	8 55	64	75 90	107	137	150 1	163 17	5 186	208	241	291 31	04 29	4 325	356 3	66 39	5 406	409	423 43	8 438	423	397 35	9 354	356 3	33 304	285 2	59 220	211 1	189 1	59 154	154	154 1	40 121	8 114	104 9	5 93	-23%
Westmeath	88,770	51 5	51	48	50	55	54 55	47	48	52	62 6	6 64	68	80 81	3 96	100	105	115 14	8 167	171	217	211 2	51 29	4 324	337 4	25 43	5 453	455	460 45	3 461	465	415 44	0 402	369 3	72 354	266 2	55 229	216 2	208 1	84 158	151	162 1	33 15	0 150	113 11	17 113	-33%
Wexford	149,722	33 2	23	25	28	28	27 27	7 35	33	33	35 4	0 41	48	57 73	3 80	85	98	112 13	0 160	173	188	202 2	50 27	1 272	297 2	98 30	1 322	318	313 3	01 268	257	258 24	2 192	174 1	72 141	124 1	26 96	89	83	74 67	67	48	49 49	3 49	47 4	5 46	-7%
Kilkenny	99,232	26 2	22	21	19	24	26 26	26	26	29	38 4	0 45	42	43 5	51	59	61	73 8	7 98	105	109	123 14	42 148	6 154	165 16	65 17	7 174	180	175 17	6 173	171	168 15	0 133	131 1	39 134	136 1	34 134	141	141 1	33 128	130	125 1	26 12	9 126	118 11	16 116	-9%
Carlow	56,932	37 3	40	42	44	42	10 35	39	26	33	35 4	4 44	44	42 4	2 40	42	54	61 7	4. 77	83	84	119 1	16 14:	9 167	198 2	04 24	2 242	270	292 30	6 311	327	327 29	3 299	270 2	78 249	242	14 213	177	160 1	37 126	105	95	98 9	1 88	72 7	77 81	-9%
Clare	113,817	44 4	44	40	40	41 -	47 50	53	63	76	76 8	7 96	121	44 15	8 183	199	246	261 26	8 30	310	306	309 3	22 32	6 327	322 3	13 30	4 311	272	264 2	81 252	248	253 25	5 235	229 2	09 189	186	81 173	171	160 1	39 132	122	109 1	04 10	4 93	109 1	11 112	17%
Cork	542,868	27 3	36	42	47	52	62 66	6 71	81	88	97 10	2 105	110	111 112	9 127	140	155	159 18	1 195	209	232	237 2	56 27	5 308	322 3	36 34	0 327	334	347 3	335	333	331 33	4 318	305 2	76 259	242 2	33 239	216	195 1	79 158	143	119 1	108 10	2 89	83 8	36 82	-8%
Galway	258,058	30 3	39	39	45	46	54 62	2 65	74	81	79 8	5 89	93	92 9	7 107	113	137	153 15	5 165	173	203	228 2	62 27	3 288	314 3	26 35	5 372	368	373 3	32 384	370	354 34	11 313	296 2	82 255	243	211 187	171	144 1	26 109	108	97	86 83	3 86	80 8	34 78	-10%
Longford	40,873	37 3	39	34	32	37	39 49	9 59	73	98	120 12	7 132	147	52 15	4 169	169	176	208 19	3 196	181	193	176 2	13 24	0 254	279 2	291 28	1 308	296	281 21	39 291	306	279 29	4 259	245 2	23 193	181	93 166	164	157 1	52 142	132	127	115 12	5 103	103 10	00 100	-2%
Roscommon	64,544	45 5	57	62	67	64	76 84	4 99	102	121	133 14	3 161	155	55 17	0 166	166	192	184 20	00 18	187	201	198 2	201 22	3 232	228 2	39 26	0 271	260	276 2	3 263	259	231 24	0 229	203 2	25 229	218	95 189	174	153 1	52 175	170	175 1	163 16	6 169	141 16	69 161	-5%
Offaly	77,951	60 6	56	59	56	59	56 63	3 62	65	67	74 7	7 77	99	103 10	4 110	123	130	136 14	0 145	5 141	151	140 1	77 20	1 195	210 2	24 22	2 224	214	224 2	17 222	227	218 23	6 191	162 1	53 130	112	06 100	96	97	99 85	99	94	87 9	5 114	112 11	17 122	6%
Laois	84,697	44 4	47	40	33	34	31 32	2 32	35	43	43 7	6 76	89	87 9	6 105	123	124	133 13	5 13	136	161	169 1	151 17	4 185	201 2	214 22	2 220	220	233 2	12 251	256	231 23	5 227	208 2	04 197	179	70 174	175	174 1	163 157	155	149 1	136 13	6 137	116 10	07 104	-32%
Waterford	116,176	95 9	97	87	88	86	67 67	7 59	53	44	38 3	5 34	28	31 3	2 40	46	56	64 6	1 66	70	83	109 1	131 13:	2 143	155 1	60 17	3 176	194	205 2	15 226	225	228 21	0 205	201 2	01 195	194	87 176	163	146 1	36 128	3 134	114 1	142 14	1 156	163 16	63 164	5%
Tipperary	159,553	18 1	17	16	19	18	21 24	4 24	25	31	32 3	6 40	48	53 5	5 58	58	66	70 7	1 78	83	79	88 5	93 111	0 113	115 1	118 12	0 126	124	134 13	39 133	139	145 13	3 139	131 1	30 130	130	32 130	128	122 1	117 123	3 118	113	117 11	4 101	105 11	10 107	5%
Kildare	222,504	67 6	7 69	71	75	76	75 78	8 77	85	82	80 9	7 95	94	87 9	8 99	108	125	146 15	161	188	198	204 2	08 24	4 257	278 2	93 30	5 303	298	301 3	06 298	289	290 29	2 270	242 2	31 210	186	77 169	156	143	121 118	103	94	85 9	3 89	88 8	85 86	-3%
Louth	128,884	102 9	107	109	101	95 1	04 92	2 80	76	75	74 7	9 77	88	90 8	5 85	89	116	109 11	115	152	161	181 1	85 18	8 178	221 2	261 29	3 283	272	286 2	99 311	289	296 29	3 285	297 2	97 257	219	93 202	189	177 1	159 155	157	156	147 15	151	160 15	57 168	20.0
Cavan	76,176	24 2	2 22	32	37	37	49 5	1 47	56	67	79 8	4 88	114	134 14	4 164	200	303	339 31	86 41	2 571	641	735 7	60 81	1 824	910 1	012 105	8 1058	983	966 9	67 964	810	752 66	8 645	589 5	62 474	365	95 263	232	206 1	159 143	3 133	119	112 10	2 108	98 8	87 95	-14%
Leitrim	32,044	41 4	44	44	41	34	37 3	7 25	19	25	25 2	8 31	31	28 3	4 34	53	81	97 12	25 13	7 147	162	218 2	218 22	5 240	253 2	62 27	2 278	259	247 2	22 209	200	178 12	5 122	109	97 84	69	56 31	28	34	37 37	47	56	81 8	1 87	94 9	34 100	2010
Monaghan	61,386	39 3	7 37	54	60	68	93 11	6 135	134	166	173 1	178	207	226 25	7 257	270	303	319 3	31 31	3 362	350	368 3	50 37	5 365	402 3	89 40	6 409	384	375 3	49 363	323	310 30	05 303	288 2	69 218	205	171 176	166	142 1	137 121	1 122	116	117 12	4 112	114 10	04 104	370
Donegal	159,192	97 10	6 122	148	159	178	185 19	1 204	4 211	219	233 2	58 265	273	293 31	2 319	326	324	345 3	55 35	5 354	367	365 3	356 34	4 347	329 3	320 32	0 312	324	322 3	29 318	313	317 32	22 310	320 3	09 305	286	00 297	7 290	293 2	275 28	5 273	281	271 27	2 275	269 2	281 293	0,70
Wicklow	142,425	72 7	77	74	71	69	65 6	7 70	73	65	72 7	4 77	78	78 7	7 76	76	80	84 8	8 9	1 87	89	91 1	103 11	9 120	124 1	124 12	9 145	145	149 1	19 145	147	149 1	130	117	116 107	104	06 91	88	89	82 77	89	86	84 8	5 85	82 8	86 83	
Dublin	1,347,359	137 13	6 140	144	146	148	152 16	0 154	159	163	168 1	2 161	166	162 17	1 165	163	173	174 17	77 18	0 184	193	197 2	201 22	23 231	238 2	241 25	2 257	253	255 2	55 258	255	252 26	52 237	220 2	26 217	209	200 199	191	185	172 16	1 151	142	134 13	136		118 115	
National	4,761,865	70 7	1 74	76	79	80	84 8	8 88	92	96	101 1	08 107	114	116 12	4 128	134	150	158 16	37 17	7 190	207	217 2	231 25	51 261	279 2	290 30	2 305	302	307 3	09 307	7 238	291 2	6 268	253 2	47 228	211	201 195	184	173	159 150	0 142	133	127 12	8 124	117 1	118 117	-6%

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k for the time period that each change in restriction was in place. The impact is calculated using the approach described in Slide 8. Note the absolute number of weekly tests has significantly increased since Wave 1.

	29/02/2020	12/03/2020	15/03/2020	24/03/2020	21/03/2020	01/05/2020	15/05/2020	28/02/2020	08/09/2020	29/06/2020	13/07/2020	21/07/2020	08/08/3030	19/08/2020	21/08/2020	31/08/3030	05/60/61	21/09/2020	35/09/2020	07/10/2020		MAN VOI VAI	22/10/20:00
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare dosed, School Closed	Bars dosed	Retail, restaurants etc dosed	Stay at home order (2km)	Stay at home increased to 5km	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green Ust	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Laois + Offaly, Kildare entended	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Doing of	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	5
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-1
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-2 -1
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-1
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-1
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	
Dublin	3	- 6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	2	2		4	-6		-1 -1
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		- 1.1
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10	K.	-1
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9	i i	-1
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	.1		0		0		6		3	-7		
Laois	1	0	1	0	0	-2	0	0	0	0	2	. 2	-2	-2	0	1		7		2	-10		-1
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-1 -1
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	C		2		2		6		5	-8		1 5
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-1 -1 -1 -1
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	C	1	0		1		7		12	-3		
Meath	1	2	3	8	0	-3	-1	0	0	0	0	C	i	1		2		24		19	-34		1-2
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		-11		-3		-12	100
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9		
Roscommon	0	1	1	. 2	6	-14	0	-2	0	0	0	1		0	ř.	5		4		4	-10		-1
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	C)	0	i i	1		17		16	-14		1
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3	1	-4	Š.	0		4		3	(
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		8
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	C)	1		1		12		18	-15		
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1	L	0	l.	0		13		3	-16	15	
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	. 1		1		1		2		3	-5		

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend

Cavan profile:

- Cavan has experienced a higher 14 day disease incidence rate per 100k during the second wave than the national average
- Part of Cavan borders with Ni where different restrictions are in place

Summary analysis:

- Cavan-Belturbet LEA is the only part of Cavan with a Ni border. This LEA is experiencing a higher disease incidence than the national average
- Ballyjamesduff LEA had the highest incidence rate throughout October. The timing of the acceleration of growth rate in this LEA appears to correlate with the GAA county final (winners are in this LEA)
- Levels of private house outbreaks rose during September and October
- Travel along the N03 between Belturbet and George Mitchell Bridge at the NI Border fell 33% during October (Source TII Road Travel data)

Restriction impact:

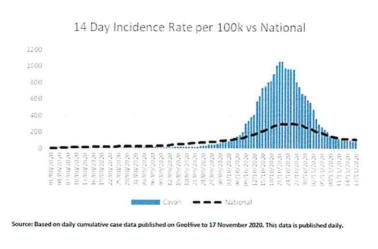
- The timing of the growth of cases appears to correlate with the events listed above and changes to restrictions in wet pubs
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence level in Cavan
- Level 5 restrictions continue to drive incidence level further

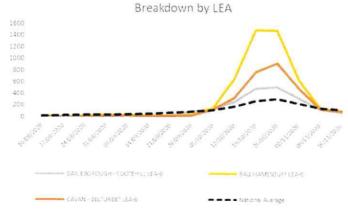
Employment Summary:

 Cavan had c.47% of its workforce on PUP or TWSS (c.15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP (17 Nov) which is down from 9.7k in May (CSO, DSP)

Hotes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

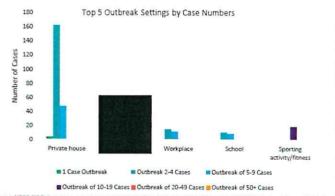




Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 215 72 Workplace 29 12 School 20 Sporting activity/fitness 19 Notable Outbreaks Outbreak Setting Date No. of Cases Sporting activity/fitness 04/10/2020 Community outbreak 07/10/2020 16 Private house 13/10/2020



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a duster/outbreak, with two or more case of laboratory confirmed COVID-19 indection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile: • Meath has experi

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- · Dublin borders including a significant commuter population

Summary analysis:

- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak
 of 51 cases in
- · One significant community outbreak of 29 cases
- Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county final win (Source: GAA.ie)

Restriction impact:

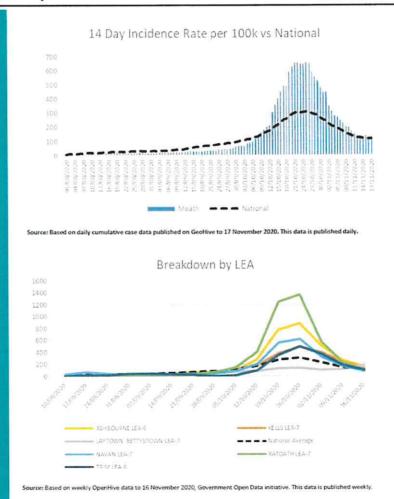
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- . Level 5 restrictions continue to drive incidence level down further

Employment summary:

 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



CIDR Data: 1st of September to 19th of November 2,466 Top 5 Outbreak Settings Outbreak Settings No. of Outbreaks No. of Cases 397 121 Private house Nursing home 74 9 Community outbreak 45 4 38 18 Workplace School 25 10 Notable Outbreaks No. of Cases Outbreak Setting Date Nursing home 51 Community outbreak 10/10/2020 29 Community outbreak 13/10/2020 12 Workplace 19/10/2020 11 Nursing home 300 Top 5 Outbreak Settings by Case Numbers - Meath 250 200 150 100 50 Private house Workplace outbreak Outbreak of 5-9 Cases ■1 Case Outbreak Outbreak 2-4 Cases ■Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a duster/outbreak with two or more cases of absoratory confirmed CO/ID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a duster/outbreak, with one laboratory confirmed case of CO/ID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection [as per the COVID-19 case definition] [HPSC]

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The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with Ni where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in (Source: Donegal Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

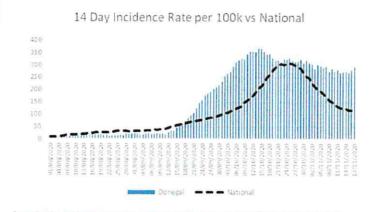
- Disease incidence continued to rise after level 3 Donegal approvincement
- Specific restrictions in Ni (1/10) on bars and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

Employment summary:

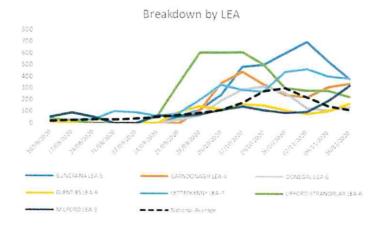
 Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EV 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.





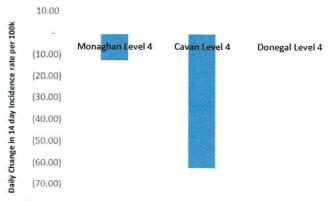


Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDIT DUTIN 1	^t of September to 19	OI MOVELLIBEL
	Cases	
	2,165	
% of Cases Linked to O	utbreak Ave	. Cases Per Outbreak
62%		3.9
Top 5 Outbreak Setting	s	
Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	651	235
Workplace	159	28
Hospital	126	5
Extended family	118	19
Nursing home	58	5
Notable Outbreaks		
Outbreak Setting	Date	No. of Cases
Hospital		99
Workplace	23/09/2020	55
Nursing home	The state of the s	49
Social gathering	24/10/2020	20
Hospital	Tables and	17

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. An outbreak is defined as a duster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 included published).

Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

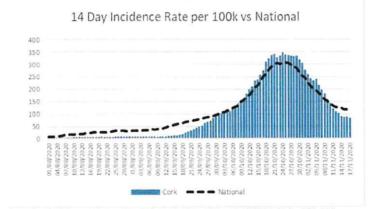
- Cases in Cork city rose as wet pubs reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

Employment summary:

 At peak, c 39% of Cork's workforce were on PUP or TWSS (c 95k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November Top 5 Outbreak Settings Outbreak Settings No. of Case No. of Outbreaks Private house 929 354 Community outbreak 411 67 Nursing home 114 9 113 School 24 Extended family 90 22 Notable Outbreaks Outbreak Setting No. of Cases Date Community outbreak 26/10/2020 68 46 Nursing home Restaurant / Cafe 17/09/2020 38 Nursing home 30 Community outbreak 22/09/2020 800 Top 5 Outbreak Settings by Case Numbers - Cork 700 600 500 400

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Outbreak of 5-9 Cases

Outbreak 2-4 Cases

■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

300 200 100

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LFAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South had a confirmed outbreak in mid-October
- Throughout November, private household cases were responsible for 49% of outbreak cases, with community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

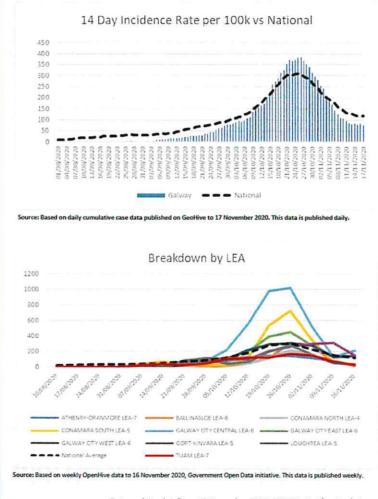
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary:

 Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



CIDR Data: 1st of September to 19th of November 2.060 34 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 723 293 207 Community outbreak 30 Childcare facility 61 School 37 11 Notable Outbreaks Outbreak Setting Date No. of Cases Community outbreak 24/09/2020 114 Social gathering 19/09/2020 20 Community outbreak 25/09/2020 700 Top 5 Outbreak Settings by Case Numbers - Galway 600 500 400 300 ₹ 200 100 Private house Community hildcare facility School outbreak 1 Case Outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report, Data based on CIDR data as at 19/11/20, it should be noted that there is typically a time lag between initial entry on GDR and population of all case details. An outbeak is defined as a duster/foutbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom satus. This includes cases with symptoms and cases who are asymptomatic OR a cluster/foutbreak, with one laboratory

confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19

infection (as per the COVID-19 case definition) (HPSC)

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Dublin – local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24,087,20,20	31/08/3030	07/09/2020	14/09/2020	ZI/08/20	28/09/2020	05/10/2020	12/10/2020	19/10/2020	36/10/2020	02/11/20	09/11/2020	16/11/2020
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134,7	146.6	191	252.3	264.3	185.8	160.3	138.1
G.	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
⊑	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	85
Dublin	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-S	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
'ure	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
n Laoghaire Rathdown	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
the as	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
Dunl	KILLINEY-SHANKILL LEA-7	3	3	3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	/0.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
=	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.0
Œ	ONGAR LEA-5	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-S	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
	FIRHOUSE-BOHERNABREENA LEA-5	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
ig.	LUCAN LEA-S	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublin	PALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
=	RATHFARNHAM-TEMPLEOGUE LEA-7	3	3	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
S	TALLAGHT CENTRAL LEA-6	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council areas of Dublin with Dun Laoghaire—Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

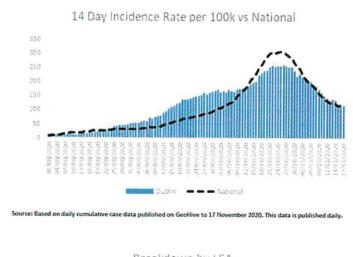
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural assects into consideration.





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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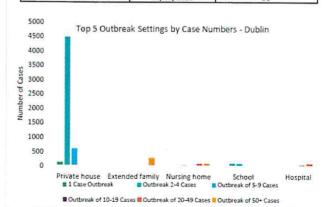
CIDR Data: 1st of September to 19th of November Cases 12,606 of Cases Linked to Outbreak Avg. Cases Per Outbreak

Top 5 Outbreak Settings

Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Extended family	24/09/2020	288
Nursing home	Klorke	75
Hotel	12/09/2020	38
Childcare facility	20/10/2020	38
Residential institution	02/10/2020	30



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a distset/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSCI)

Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

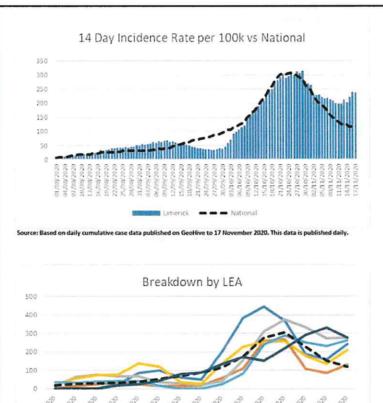
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November.
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Employment summary:

 Limerick had c.43% of its workforce on PUP or TWSS (c.34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Hotes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration.

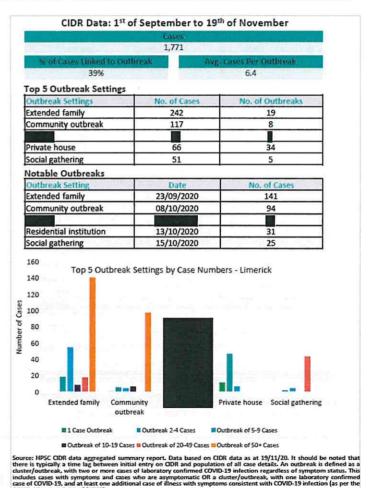


ADARE-RATHKEALE LEA-6

- LIMERICK CITY EAST LEA-7

- LIMERICK CITY WEST LEAD

NEWCASTLE WEST LEA-6



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Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

CAPPAMORE-KILMALLOCK LEA-7

- LIMERICK CITY NORTH LEA-7

--- National average

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases

Kerry profile:

Kerry has experienced a similar 14 day disease incidence rate per 100k during second wave to the national average. However, Listowel LEA has seen a sharp increase in its rate since early October

Summary analysis:

- North Kerry (Listowel) is most severely affected. This coincides with outbreaks southern parts of Limerick such as Newcastle West and Adare-Rathkeale, as well as Limerick city
- Killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- The remainder of the county (further south, smaller towns) is generally less affected
- Private homes account for 33.68% of all outbreak cases since Sept
- Listowel's incidence levels were three times higher than the next worst-afflicted LEA. Note the small population of ~29,000 people meant 182 cases over a 2-week period prior to 26 Oct created a very

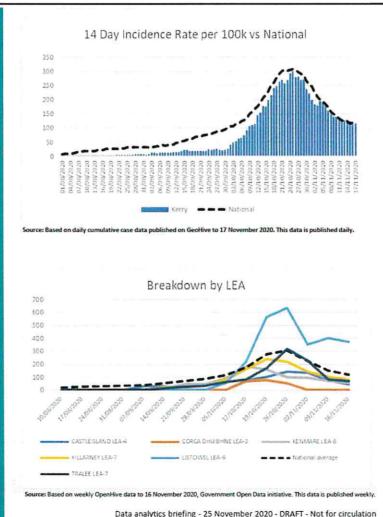
Restriction impact:

- The number of cases in Kerry started to grow around the time level 3 was introduced - two weeks later, this high growth rate had largely ceased
- Improvements have levelled off somewhat across LEAs such as Tralee, Killarney and Listowel

Employment summary:

Kerry had c.49% of its workforce on PUP or TWSS (c.32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

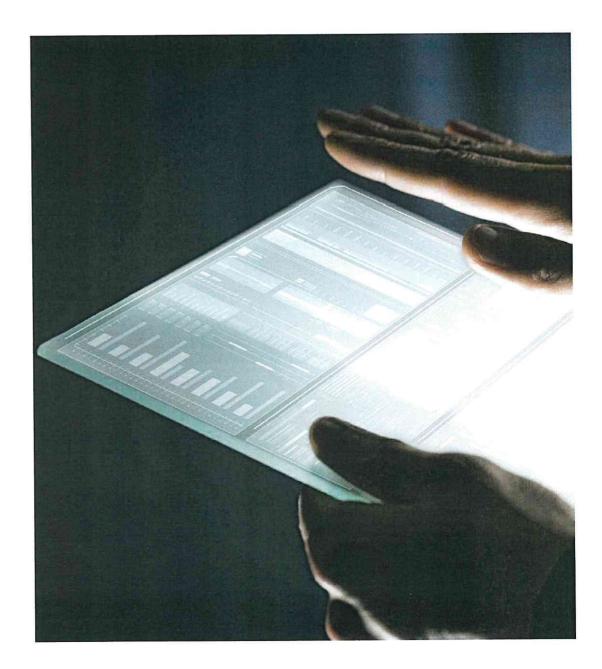
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take



CIDR Data: 1st of September to 19th of November 4.1 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 150 53 Community outbreak 101 14 Extended family 25 School 23 4 Notable Outbreaks Outbreak Setting No. of Case Community outbreak 03/09/2020 43 Community outbreak 23/10/2020 25 Religious/Other ceremony 16/10/2020 11 Restaurant / Cafe 11/09/2020 11 140 Top 5 Outbreak Settings by Case Numbers - Kerry 120 100 80 60 20 Private house Community Nursing home Extended family outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases 1 Case Outbreak ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20, it should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This

includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

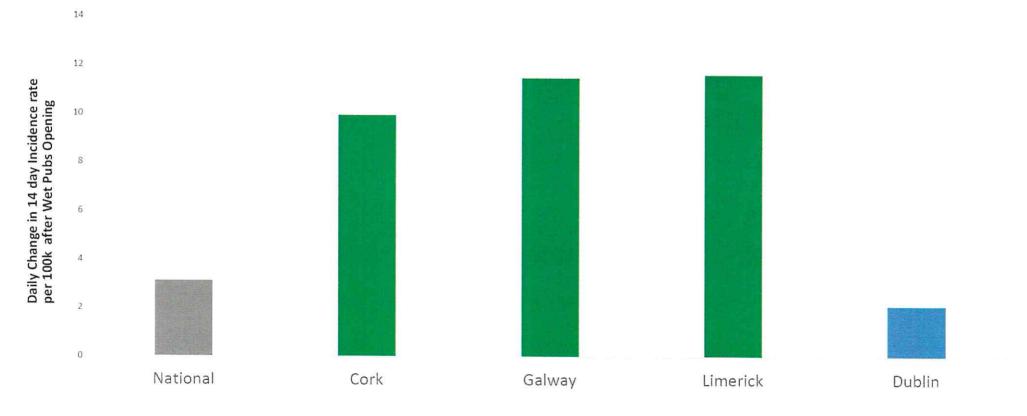
Ireland – restrictions analysis



Data analytics briefing - 25 November

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate then slowed when compared with other counties

The incidence rate growth in Dublin after the Wet Pubs opening in other counties was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Note this coincides with universities opening, which impacts Cork, Galway and Limerick



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The incidence rate did not materially increase after the three phases of re-opening during late May to early July

The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

	2/03/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/02/2020	29/05/2020	13/07/2020	21/0//2020	08/03/2020	02/08/3020	21/08/2020	31/03/3020	0200/10/61	21/03/2020	35/09/2020	0.7713/2020	OC OCCUPANTA	lof tof Acto	22/11/2020
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcale closed Schod Closed	Bars closed	Retail restaurants etc closed	Stay at burne order (2km)	Stay at home increased to Slaw	Construction Opened	Wandatory PUF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green Ust	Lockdown Laois, Offalv Kildare	Face masks in shops	Lockdown Ifted Laois + Offaly, Kilcare entended	Schools+ childcare opened	Level 3 Dublin	We. Bars Opened except Dublin	Level 3 Donegar	Level 3 National	Level 3 Mass National	Level 4 Doningal Cavan, Moraghan	Level 5 National
Carlow	0	0	- 1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-14
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-28
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-14
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	-15
Dublin	3	5	- 11	1	-2	-4	-3	-1	0	0	0	1		2		4	2	2		4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-7
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		2	-10		-10
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-5
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-11
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-15
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-12
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-22
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	-13
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9		-8
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-11
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-6
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-10
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-19
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-9
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-6

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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Select International Desktop Research

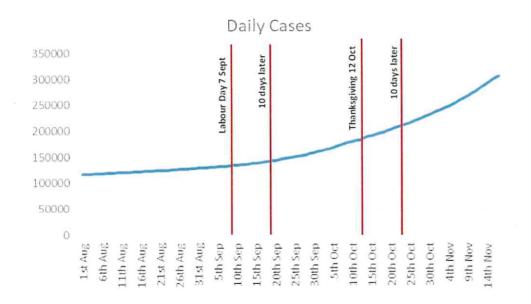


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Canadian Thanksgiving: Testing & Tracing data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 dramatically changed after Thanksgiving, with a 14% increase in positive cases
 between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

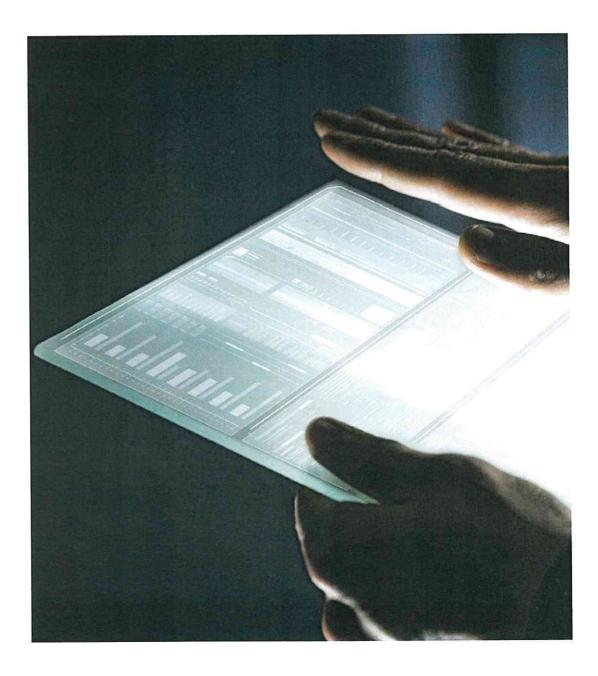
- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

Kev findings

- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of
 cases in the US cities studied. However, it is important to note that the
 median church in the U.S. has 75 regular participants in worship on Sunday
 mornings. All but five states have congregations with more than 2,000 people
 in attendance on a Sunday morning. As of 2012, there were roughly 1,600
 Protestant churches in the United States with a weekly attendance of 2,000
 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/
http://hirr.hortsem.edu/research/fastfacts/fast_facts.html

Roadmap for next six weeks



Approach to Christmas monitoring
We will combine a variety of data sources to monitor activity over the Christmas period

			by NPHET Incidence)	Provid	led by public (activity/c	sector organ ompliance)	isations	Newly go insignation in the contract of the co	hts	Approach overview
Setting	Description	HSE	CIDR	TII/NTA	Survey	cso	Gardaí	Mobility F	ayments data	Leverage existing health data
Events	Indoor and outdoor (e.g. concerts, sports events, weddings, funerals)	~	~				ТВС	~		from NPHET, curate data from Government agencies and create
Social/family gatherings	Levels of gatherings in private households	~	~					~		new insights from additional data sources
Retail and services	Levels of activity in retail and other services (e.g. hairdressers)	~	~			~		~	~	Support comprehensive data
Workplaces	Attendance at physical workplaces	~	~					~		analysis to monitor and provide insights on the effectiveness and
Domestic transport and travel	Levels of movement around the country	~	~	~		~				impact of restrictions and behaviours over Christmas
Education	Schools, childcare, adult and higher education	~	~							Leverage insights to inform
Bars/restaurants	Activity levels in bars and restaurants	~	~						~	restriction measures for future planning as well as provide
Care homes	Residential facilities, assist living and nursing homes	4	~							"stories" to help bring to life for the public
Sentiment/compliance	Indicators around compliance to restrictions			~	~		ТВС	~		Aggregated and anonymised data
International travel	International travel levels and related disease spread	~	~			~		~		only. No personal identifiable data
Leisure/recreation	Gyms, pools, leisure centres	~	~					~		
Accommodation services	Stays in hotels, guesthouses and B&Bs	~	~					~	~	

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What will the next six weeks look like?

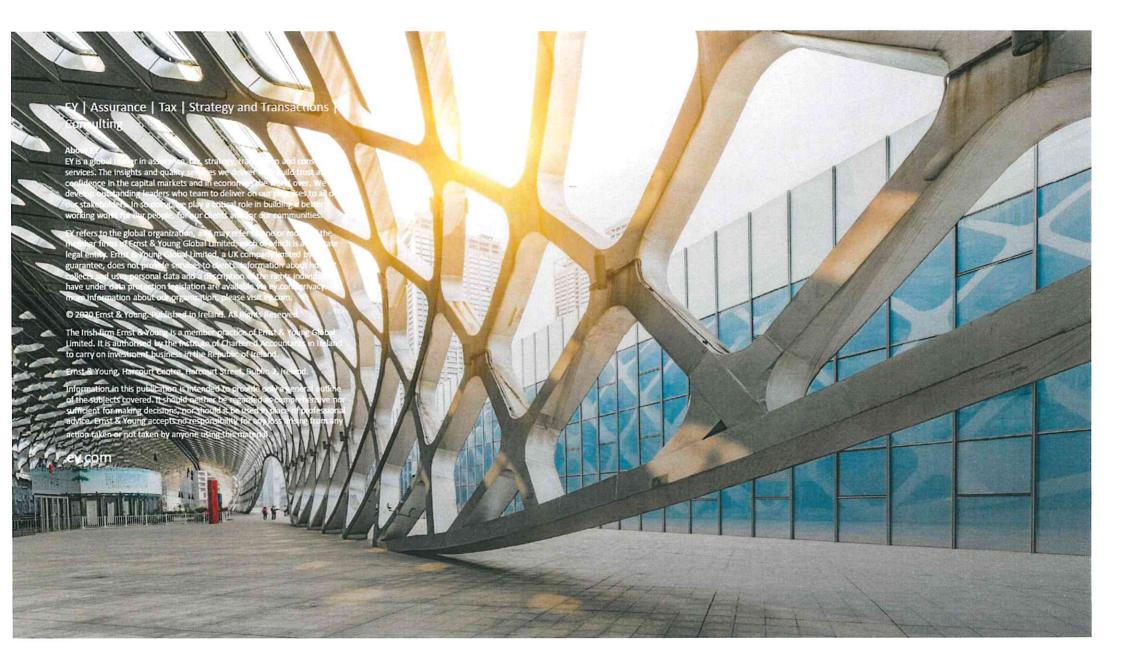
Data is anonymised and aggregated to LEA or country and by industry type.

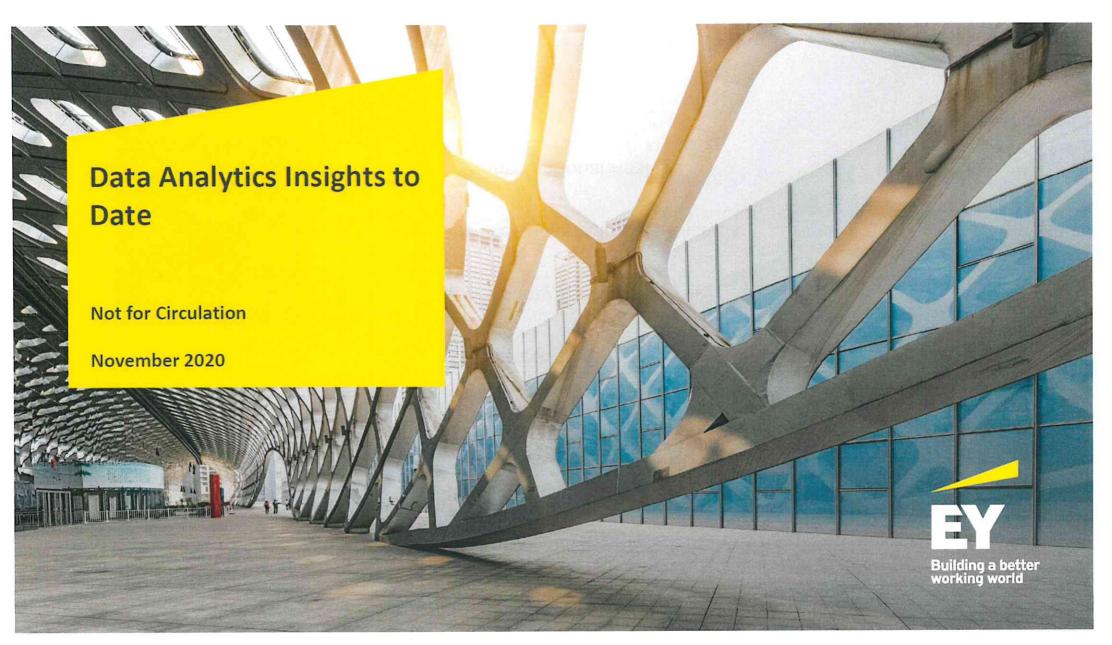
No personal identifiable information

This week W/c 16 Nov	Week 2 W/c 23/11	Week 3 W/c 30/11	Week 4 W/c 7/12	Week 5 W/c 14/12	Week 6 W/c 21/12
		Proposed briefi	ing frequency		
Weekly/ ad-hoc	Weekly / ad-hoc	Weekly / ad-hoc	Daily / ad-hoc	Daily / ad-hoc	Daily / ad-hoc
County dashboard	County dashboard	County dashboard	County dashboard	County dashboard	County dashboard
Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak drivers	Outbreak driver
Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact	Restrictions impact
Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis	Ad-hoc analysis
	Transport	Transport	Transport	Transport	Transport
	Facebook survey	Facebook survey	Facebook survey	Facebook survey	Facebook surve
se monitoring	Spending data	Spending data	Spending data	Spending data	Spending data
ictions		Stay at home index	Stay at home index	Stay at home index	Stay at home index
liance		Data analytics briefing - 25 November	2020 - DRAFT - Not for circulation	Social distance index	Social distance

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda



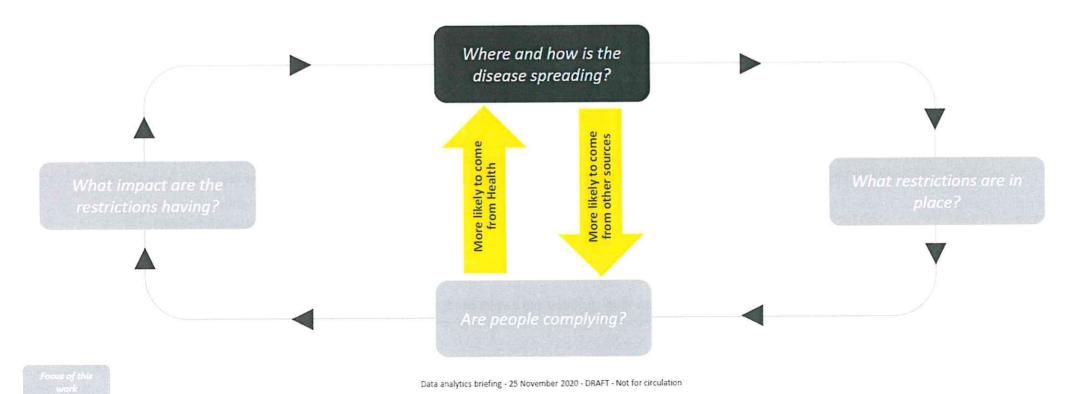


- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis

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Providing data analysis to support Government decision making

EY Data Analytics team was engaged to analyse certain aggregated data available to the State as part of the State's Covid 19 management strategy. EY's role was to analyse the available data and to present it back to Government officials to consider as part of its on-going deliberations and decision making with regard to Covid 19 restrictions. The focus is situating disease incidence rates in the context of other data (e.g. restriction changes) to produce insights, rather than performing epidemiology.



Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - Proximity to the border
 - Following the national profile
 - Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- Social gatherings, citizen congregations and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet pubs opened in all counties except Dublin in late September. This also coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in ??? number ??? counties. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county
 when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that
 universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		1		1	Nursing Home, Private Houses, Residential	Extended Family, Community Outbreak, Private	
Mayo				1	Institution Nursing Home, Hospital, Community	Private House, Nursing Home, School,	
Meath		1	1	1	Hospital/Long-Stay Unit Nursing Home, Private Houses, Workplace	Workplace Private Houses, Nursing Homes, Community	
Sligo*					The second control of	Outbreak Private House, Extended Family, Religious/Other	
Westmeath*				-	Nursing Home, Private House, Travel Related	Ceremony	
Wexford					Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Kilkenny*				✓	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
		✓			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		✓			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		✓		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		✓		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing	
Longford*		1			Workplace, Nursing Homes, Hospital	Home Private House, Nursing Home, Workplace	
Roscommon		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		1			Workplace, Hospital, Community Hospital/Long-	Private House, Workplace, Nursing Home	
Laois*		1			Stay Unit Workplace, Hospital, Community Hospital/Long-		
Waterford		/			Stay Unit	Private House, Workplace, Nursing Home Private House, Workplace, Community	
Tipperary		/			Workplace, Private House, Nursing Home	Outbreaks	
Kildare**		1	/		Workplace, Private Houses, Nursing Homes Mursing Home, Private Houses, Residential	Private House, Workplace, Nursing Home	
Louth			V		Institution	Priate House, Workplace, Nursing Homes	
Cavan	1			✓	Mursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
		✓		✓	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
_eitrim*	· ·				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
-lonaghan -	-	1			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	-	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Vicklow**			~	✓	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		✓	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources - CIDR, Incidence rate -based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. Note 'Wave one defined as 03/03-25/07; 'Wave 2 is 26/07-20/11

**Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

^{**}Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per 100k	Population	20-Sep	22-Sep	23-Sen		- 1			28-Sep	29-Sep	30-Sep	01-Oct	02-Oct	03-Oct	7	7	1		50 60		5 5		13-0ct	4	15-Oct		17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	1	24-Oct	1	26-Oct		28-Oct	ÕĈ		01-Nov		03-Nov	04-Nov	06-Nov	07-Nov	08-Nov	70N-60	10-Nov	11-Nov	12-Nov	13-Nov	15-Nov	16-Nov	Z.	Change Last 3 Days
Kerry	147,707	18	19 15	9 1	9 2	1 22	2 24	1 25	5 22	20	21	26	40	46	52	62	64	73	91 1	106	110 1	113 1	44 15	53 17	7 174	197	215	240	246	263	269 2	257 2	69 29	1 299	279	281	69 2	71 23	6 220	198	183	178	194 19	0 17	162	153	139	139	129 1	128 1	28 12	7 123	122	115	-11%
Limerick	194,899	44	39 3	9 3	6 3	1 35	3	3 33	3 34	35	37	45	58	69	90	96 1	107	114	119 1	145 1	160	67 1	32 18	39 20	7 208	3 231	246	248	277	280	290	301 2	88 29	3 306	299	310	306 3	12 27	7 269	262	228	227 2	29 22	1 21	218	211	207	198	195 1	195 2	211 20	1 222	238	236	15%
Mayo	130,507	26	31 31	0 2	9 3	2 3	3	2 30	28	26	28	24	26	30	33	32	36	42	42	54	67	75 1	30 9	10	7 123	131	150	167	185	208	228 2	243 2	50 24	6 256	266	259	248 2	42 26	1 246	232	216	198	183 18	4 18	176	162	147	151	145	141 1	118 11	3 110	110	109	-4%
Meath	195,044	32	35 3	8 3	7 4	4 42	4	7 44	47	51	62	67	71	88	85	90	96	115 1	129 1	164 1	183 1	99 2	13 30	06 35	57 403	3 452	490	488	591	629	557 6	56 6	48 64	9 661	651	590 !	558 5	31 48	1 450	448	352	314	282 27	2 24	232	204	201	172	154	141 1	40 13	3 139	128	134	1%
Sligo	65,535	17	15 17	7 1	7 17	7 18	2	32	2 27	27	7 31	27	38	55	64	75	90 1	107 1	137 1	150 1	163 1	75 1	86 20	08 24	1 29	1 304	294	325	356	366	395 4	106 4	09 42	3 438	438	423	397 3	59 35	4 356	333	304	285	59 22	0 21	189	159	154	154	154	140 1	28 11	4 104	95	93	-23%
Westmeath	88,770	51	52 5	1 4	8 5	0 5	5 5	55	5 47	48	52	62	66	64	68	80	88	96 1	100	105	115 1	48 1	67 17	71 21	7 211	251	294	324	337	425	435 4	153 4	55 46	0 453	461	465	415 4	40 40	2 365	372	354	266	255 22	9 21	208	184	158	151	162	133 1	50 15	0 113	117	113	+33%
Wexford	149,722	33	23 2	3 2	5 2	8 26	2	7 27	7 35	33	3 33	35	40	41	48	57	73	80	85	98	112 1	30 1	60 17	73 18	8 202	2 250	271	272	297	298	301 3	22 3	118 31	3 301	268	257	258 2	42 19	2 174	172	141	124	26 9	89	83	74	67	67	48	49	49 4	9 47	45	46	-7%
Kilkenny	99,232	26	21 2	2 2	1 1	24	2	8 26	5 26	26	29	38	40	45	42	43	51	51	59	61	73	87	38 10	05 10	19 123	142	146	154	165	165	177	74 1	80 17	5 176	173	171	168	50 13	3 131	139	134	136	134 13	4 14	141	133	128	130	125	126 1	29 12	6 118	116	116	-9%
Carlow	56,932	37	39 4	0 4	2 4	4 42	2 41	35	3 39	26	33	35	44	44	44	42	42	40	42	54	61	74	77 8	3 8	4 119	116	149	167	198	204	242	242 2	70 29	2 306	311	327	327 2	93 25	9 270	278	249	242	214 21	3 17	160	137	126	105	95	98	91 8	8 72	77	81	-9%
Clare	118,817	44	41 4	4 4	0 4	0 4	4	7 50	53	63	76	76	87	96	121	144	158	183 1	199 2	246	261 2	68 3	04 3	10 30	06 305	9 322	326	327	322	313	304	311 2	72 26	4 281	252	248	253 2	55 23	5 229	209	189	186	181 17	3 17	160	139	132	122	109	104 1	04 9	3 109	111	112	17%
Cork	542,868	27	32 3	6 4	2 4	7 5	2 6	2 66	6 71	8	1 88	97	102	105	110	111	119	127	140 1	155	159	181 1	99 20	09 23	32 23	7 256	275	308	322	336	340	327	34 34	7 337	335	333	331 3	34 31	8 305	276	258	242	233 23	9 21	195	179	158	143	119	108 1	02 8	9 83	86	82	-8%
Galway	258,058	30	32 3	9 3	9 4	5 46	5	4 62	2 65	74	1 81	79	85	89	93	92	97	107	113 1	137	153 1	155 1	65 17	73 20	03 221	8 262	2 273	288	314	326	355	372 3	68 37	3 382	384	370	354 3	41 31	3 296	282	255	243	211 18	7 17	144	126	103	108	97	86	83 8	6 80	84	78	-10%
Longford	40,873	37	39 3	9 3	4 3	2 3	7 3	9 45	9 59	73	3 98	120	127	132	147	152	154	169	169 1	176 2	208 1	193 1	96 18	81 19	3 176	213	240	254	279	291	281	308 2	96 28	31 289	291	306	279 2	94 25	9 245	223	193	181	193 16	6 16	157	152	142	132	127	115	115 10	3 103	100	100	-2%
Roscommon	64,544	45	54 5	7 6	2 6	7 64	1 7	6 84	4 99	10:	2 121	133	143	161	155	155	170	166	166 1	192	184 2	200 1	81 18	37 21	01 198	201	223	232	228	239	260	271 2	60 27	6 263	263	259	231 2	40 22	9 200	225	229	218	195 18	9 17	153	152	175	170	175	163 1	166 16	9 141	169	161	-5%
Offaly	77,961	60	62 5	6 5	9 5	6 5	5 5	6 63	3 62	65	5 67	74	77	77	99	103	104	110	123 1	130	136 1	140 1	45 14	41 15	51 140	177	201	195	210	224	222	224	214 22	4 217	222	227	218 2	36 19	1 162	153	130	112	106 10	0 96	97	39	85	99	94	87	95 11	4 112	117	122	6%
Laois	84,697	44	46 4	7 4	0 3	3 3	3	1 32	2 32	35	5 43	43	76	76	89	87	96	105	123	124	133 1	135 1	39 13	36 16	169	151	174	185	201	214	222	220 2	20 23	3 242	251	256	231 2	35 22	7 208	204	197	179	170 17	4 17	174	163	157	155	149	136 1	136 13	7 116	107	104	-32%
Waterford	116,176	95	97 9	7 8	7 8	8 8	6	7 67	7 59	5	3 44	38	35	34	28	31	32	40	46	56	64	61	66 7	70 8	3 109	131	132	143	155	160	173	176 1	94 20	5 215	226	225	228 2	10 20	5 201	201	195	194	187 17	6 16:	146	136	128	134	114	142	141 15	6 163	163	164	5%
Tipperary	159,553	18	16 1	7 1	6 1	9 18	3 2	1 24	4 24	25	5 31	32	36	40	48	53	55	58	58	66	70	71	78 8	33 7	9 88	93	110	113	115	118	120	126 1	24 13	4 139	133	139	145 1	33 13	9 131	130	130	130	132 13	0 12	122	117	123	118	113	117	114 10	1 105	110	107	5%
Kildare	222,504	67	67 6	9 7	1 7	5 7	5 7	5 78	8 77	7 85	5 82	80	97	95	94	87	98	99	108	125	146 1	154 1	68 18	88 19	8 20-	4 208	244	257	278	293	305	303 2	98 30	306	298	289	290 2	92 27	0 242	231	210	186	177 16	9 15	143	121	118	103	94	85	93 8	9 88	85	88	-3%
Louth	128,884	102	98 10	7 10	9 10	11 9!	5 10	4 92	2 80	76	6 75	74	79	77	88	90	85	85	89	116	109	116	15 15	52 16	61 181	1 185	188	178	221	261	293	283 2	72 28	6 299	311	289	296 2	93 28	5 297	297	257	219	193 20	2 18	177	159	155	157	156	147	151 15	160	157	168	10%
Cavan	76,176	24	22 2	2 3	2 3	7 3	7 4	9 5	1 47	5	6 67	79	84	88	114	134	144	164 2	200 3	303	339 3	386 4	12 5	71 6	41 731	5 760	811	824	910	1012 1	058 1	058 9	83 96	6 967	964	810	752 6	68 64	5 589	562	474	365	295 26	3 23	2 206	159	143	133	119	112 1	102 10	8 98	87	95	-14%
Leitrim	32,044	41	44 4	4 4	4 4	1 3	1 3	7 37	7 25	5 15	25	25	28	31	31	28	34	34	53	81	97 1	125 1	37 14	47 16	2 216	3 218	225	240	253	262	272	278 2	59 24	7 222	209	200	178 1	25 12	2 109	97	84	69	56 3	1 21	34	37	37	47	56	81	81 8	7 94	94	100	13%
Monaghan	61,386	39	37 3	7 5	4 6	0 6	9	3 116	6 135	5 13	4 166	173	189	178	207	226	257	257 2	270 3	303	319 :	331	13 31	62 35	50 36	8 350	375	365	402	389	406	109	84 37	5 349	363	323	310 3	05 30	3 288	269	218	205	171 17	6 16	142	137	121	122	116	117 1	124 11	2 114	104	104	-8%
Donegal	159,192	97	106 12	2 14	8 15	9 17	8 18	5 19	1 20-	4 21	1 219	233	258	265	273	293	312	319	326	324	345	355 3	55 3	54 36	57 36	5 356	6 344	347	329	320	320	312 3	24 32	2 329	318	313	317 3	22 3	0 320	309	305	286	300 29	7 29	293	275	285	273	281	271 2	272 27	5 265	281	293	6%
Wicklow	142,425	72	70 7	7 7	4 7	1 6	9 6	5 67	7 70	7:	3 65	72	74	77	78	78	77	76	76	80	84	88	91 8	37 8	9 91	103	119	120	124	124	129	145	45 14	9 149	145	147	149 1	41 13	0 117	116	107	104	106 9	1 81	89	82	77	89	86	84	85 8	5 82	86	83	-3%
Dublin	1,347,359	137	136 14	0 14	14 14	6 14	8 15	2 16	0 154	4 15	9 163	168	172	161	166	162	171	165	163	173	174 1	177 1	80 18	84 19	93 197	7 201	1 223	3 231	238	241	252	257 2	53 25	55 255	258	255	252 2	52 23	7 220	226	217	209	200 19	9 19	1 185	172	161	151	142	134 1	139 13	6 119	118	115	-18%
National	4,761,865	70	71 7	4 7	6 7	9 8	0 8	4 81	8 88	3 9	2 96	101	108	107	114	116	124	128	134	150	158	167 1	77 19	90 20	07 217	7 231	1 251	1 261	279	290	302	305	02 30	7 305	307	298	291 2	86 28	8 25	247	226	211	201 19	5 18	173	159	150	142	133	127 1	128 12	4 117	118	117	-6%

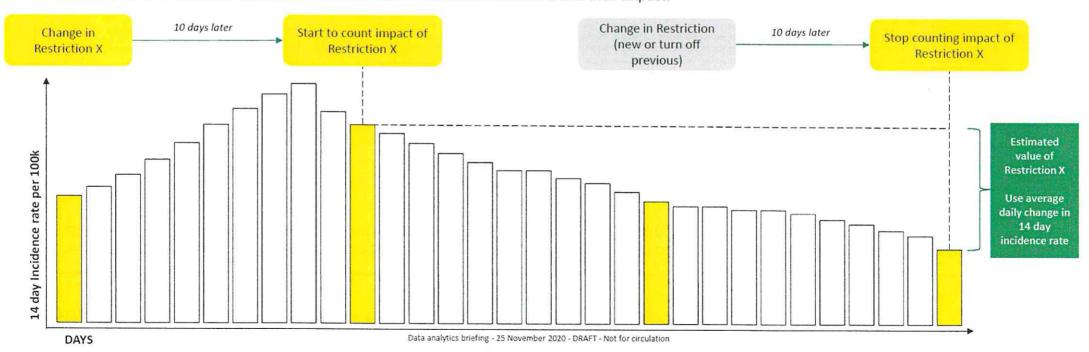
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k for the time period that each change in restriction was in place. The impact is calculated using the approach described in Slide 8. Note that:

- 1. The absolute number of weekly tests has significantly increased since Wave 1
- 2. The more recent restriction changes (Level 3, Level 3 Max and Level 5) happened within a 15 day period.

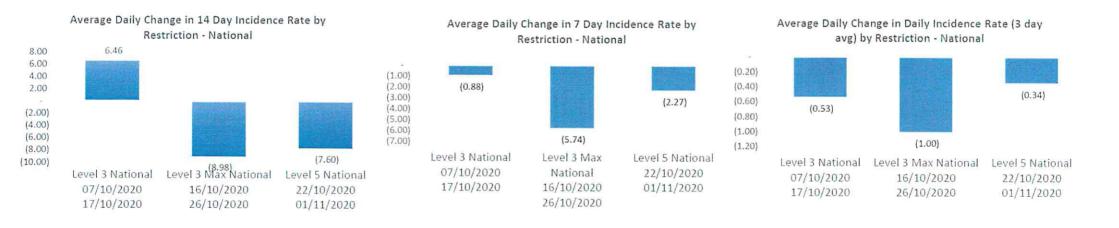
	29/02/2020	12/03/2020	15/03/2020	24/03/2020	21/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/0/1/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	02/06/12	25/09/2020	07/10/2020	W. 140 140 140 14	or for for	22/10/20
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare dosed, School Closed	Bars dosed	Retall, restaurants etc dosed	Stay at home order (2km)	Stay at home increased to Skm	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Laois + Offaly, Kildare entended	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	ਤੁ
Carlow	0	0	1		2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-14 -28
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-28
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-14 -15 -11 -14 -10 -12 -7
Donegal	0	0	5		-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	-15
Dublin	3	6	11	. 1	-2	-4	-3	-1	0	0	0	1		2		4	2			4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14
Kerry	1	5	3		-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	- 4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		
Laois	1	0	1	. 0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		2	-10		-10
Leitrim	1	0	3		0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-5
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0	i.	2		2		6		5	-8		-11
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-13 -11 -15 -12 -22 -13
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-12
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0	6	1		2		24		19	-34		-22
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9		-8
Roscommon	0	1	1	. 2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-11
Sligo	1	0	3		0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1		-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-6
Waterford	1	3	- 2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-10
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0	ì	1		1		12		18	-15		-19
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-9
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-6

The introduction of Level 3 Max and Level 5 both coincide with a reduction incidence rates

The 14 day incidence rate per 100k did not reduce for ??? Number ??? counties with the introduction of Level 3. However, it did start to reduce with the introduction of further household restrictions (Level 3 Max) and then Level 5.

These three restriction changes happened within a 15 day period, with Level 3 Max was only active for 15 days.

For completeness, this analysis has also been repeated for a 7 day and a daily incidence rate average over three days. All three are shown below and follow similar, albeit reduced, patterns.



Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend

Cavan profile: Cavan has experienced a higher 14 day disease incidence rate per 100k during the second wave than the national average Part of Cavan borders with NI where different restrictions are in Summary analysis: Cavan-Belturbet LEA is the only part of Cavan with a NI border. This LEA is experiencing a higher disease incidence than the national Ballyjamesduff LEA had the highest incidence rate throughout October. The timing of the acceleration of growth rate in this LEA appears to correlate with the GAA county final (winners are in this Levels of private house outbreaks rose during September and October Travel along the N03 between Belturbet and George Mitchell Bridge at the NI Border fell 33% during October (Source TII Road Travel Restriction impact: The timing of the growth of cases appears to correlate with the events listed above and changes to restrictions in wet pubs

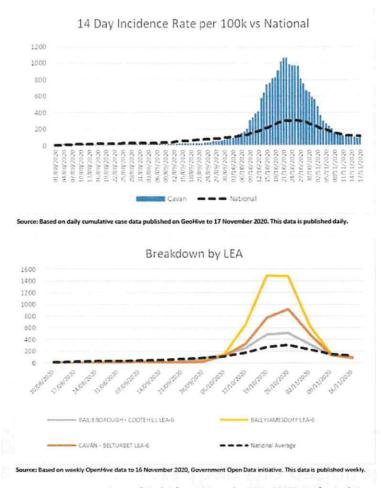
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence level in Cavan
- Level 5 restrictions continue to drive incidence level further

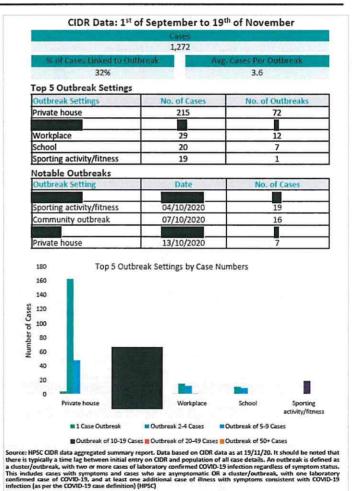
Employment Summary:

 Cavan had c.47% of its workforce on PUP or TWSS (c.15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP (17 Nov) which is down from 9.7k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.

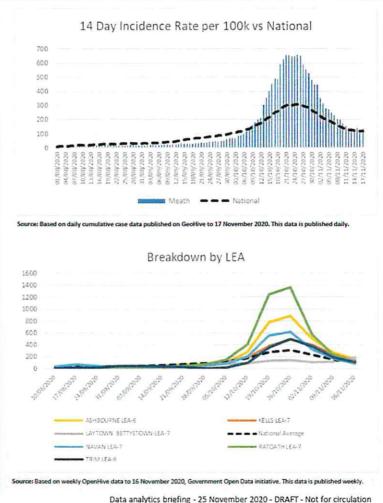


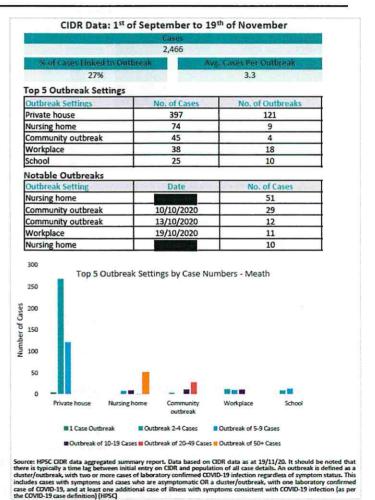


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Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile: Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average · Dublin borders including a significant commuter population Summary analysis: Level of private house outbreaks during September and October · Continued outbreaks in nursing homes, one significant outbreak of 51 cases One significant community outbreak of 29 cases · Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county, final win (Source: GAA.ie) Restriction impact: · The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs Incidence level continued to rise post initial Level 3 restrictions Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels Level 5 restrictions continue to drive incidence level down further **Employment summary:** . Meath had c 42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP) The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the Ni border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

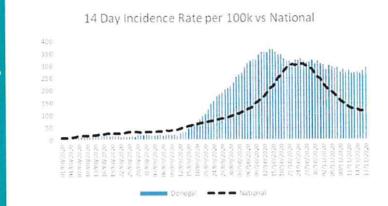
- Disease incidence continued to rise after level 3 Donegal approximement
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

Employment summary:

 Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



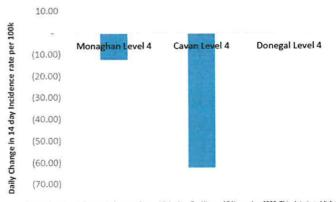
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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	Cases	
	2,165	
% of Cases Linked to O	utbreak Avg	Cases Per Outbreak
62%		3.9
op 5 Outbreak Setting	s	
Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	651	235
Workplace	159	28
Hospital	126	5
Extended family	118	19
Nursing home	58	5
Notable Outbreaks		
Outbreak Setting	Date	No. of Cases
Hospital	India at	99
Workplace	23/09/2020	55
Nursing home		49
Social gathering	24/10/2020	20
Hospital		17



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of filhess with symptoms consistent with COVID-19 infection (as per the COVID-19 assed definition) (HPSC)

Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

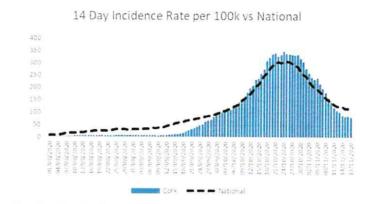
- Cases in Cork city rose as wet pubs reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

Employment summary:

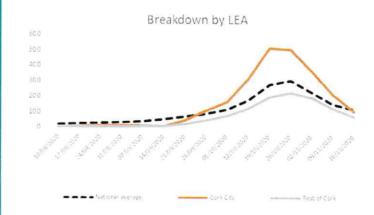
 At peak, c 39% of Cork's workforce were on PUP or TWSS (c 96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



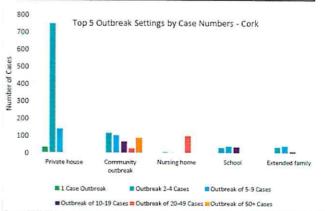
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November 4,492 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 929 354 Community outbreak 411 67 Nursing home 114 9 School 113 24 Extended family 90 22 Notable Outbreaks Outbreak Setting No. of Cases Community outbreak 26/10/2020 Nursing home 46 Restaurant / Cafe 17/09/2020 38 Nursing home 30 Community outbreak 22/09/2020 29



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) [HPSC]

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South had a confirmed outbreak in mid-October.
- Throughout November, private household cases were responsible for 49% of outbreak cases, with and community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

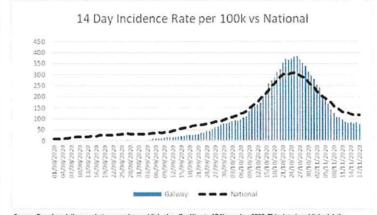
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary:

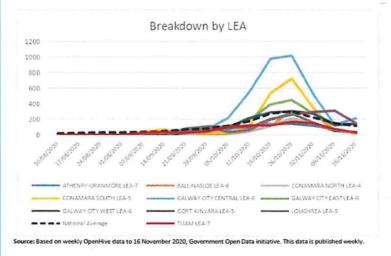
 Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP)

Notes

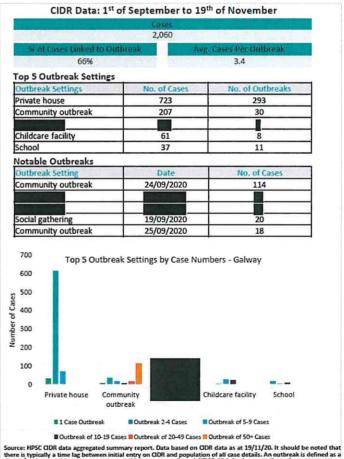
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration







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Source: HPSC CDN data aggregated summary report. Data based on CDN data as at 19/11/2.ii it should be noted that there is typically a time lag between initial entry on CDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This indudes cases with a rea asymptomatic OR a cluster/outbreak with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Dublin – local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/2020	31/08/2020	02/03/2020	14/09/2020	21/09/2020	02/08/2020	05/10/2020	02/01/21	19/10/2020	26/10/2020	02/11/20	09/11/2020	16/11/2020
_	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
_	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
Dublin City	CLONTARF LEA-5	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
_⊑	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
ğ	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123,5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5		12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
4	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
a E	DUN LAOGHAIRE LEA-7	3	3 63	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
Dun Laoghaire Rathdown	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
the	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
Fa Fa	KILLINEY-SHANKILL LEA-7	3	9	3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	70.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3.1	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-9	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
_	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
证	ONGAR LEA-5	1 2 M	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-S	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
P 1	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
-	FIRHOUSE-BOHERNABREENA LEA-5	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
Q	LUCAN LEA-5	3	100113	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublin	PALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
ŧ	RATHFARNHAM-TEMPLEOGUE LEA-7	3	2003	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
S	TALLAGHT CENTRAL LEA-5	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall.

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council areas of Dublin with Dun Laoghaire—Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

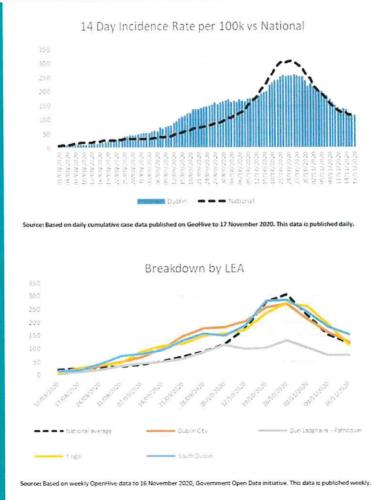
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



CIDR Data: 1st of September to 19th of November 12,606 Top 5 Outbreak Settings Outbreak Settings No. of Outbreaks No. of Cases Private house 5225 2075 291 Extended family Nursing home 266 27 249 66 192 30 Hospital Notable Outbreaks Outbreak Setting Date No. of Cases 24/09/2020 Extended family 288 75 Nursing home 38 12/09/2020 Hotel 38 Childcare facility 20/10/2020 Residential institution 02/10/2020 30 5000 Top 5 Outbreak Settings by Case Numbers - Dublin 4500 4000 3500 3000 2500 2000 1500 1000 500 School Hospital Private house Extended family Nursing home Outbreak of 5-9 Cases # 1 Case Outbreak Outbreak 2-4 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

Source: HPSC CDBI data aggregated summary report. Data based on CDB data as at 15/11/20. It should be noted that there is typically a time lag between initial entry on CDB and population of all case details. An outbreak is defined as a cluster fourtheask, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic CDB a duster fourtheak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

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Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

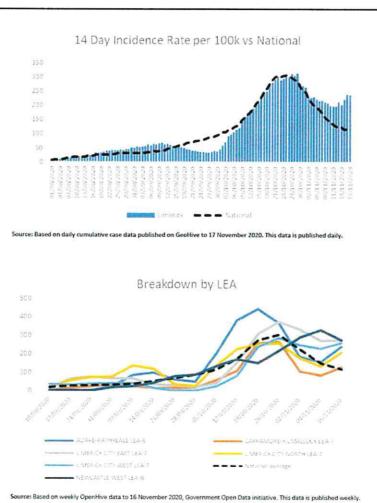
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November.
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Employment summary:

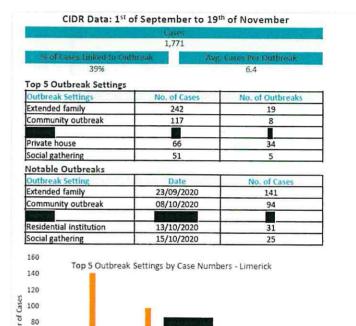
 Limerick had c.43% of its workforce on PUP or TWSS (c.34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Nates

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



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■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a duster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

■ Outbreak 2-4 Cases ■ Outbreak of 5-9 Cases

Private house Social gathering

60

Extended family

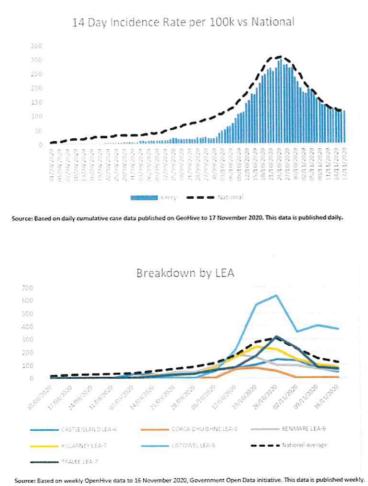
■ 1 Case Outbreak

Community

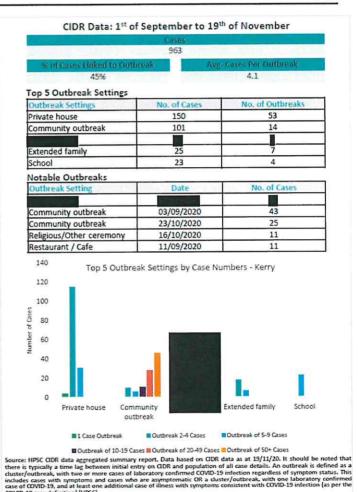
outbreak

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases



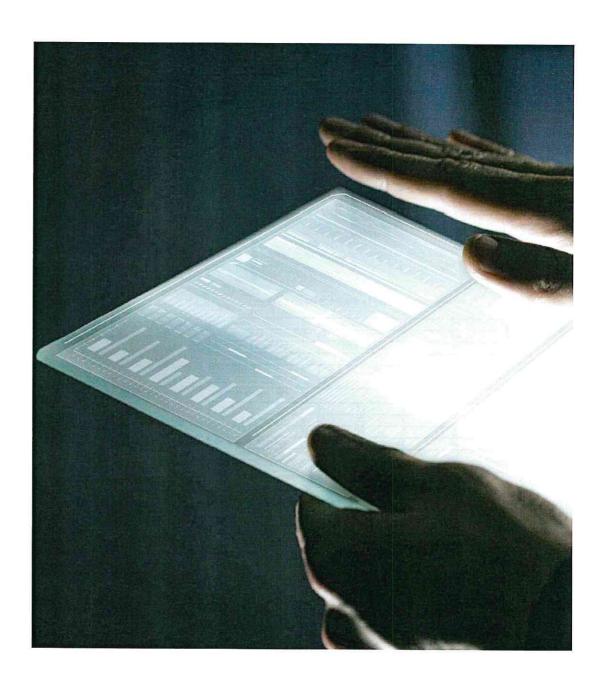


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COVID-19 case definition) (HPSC)

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

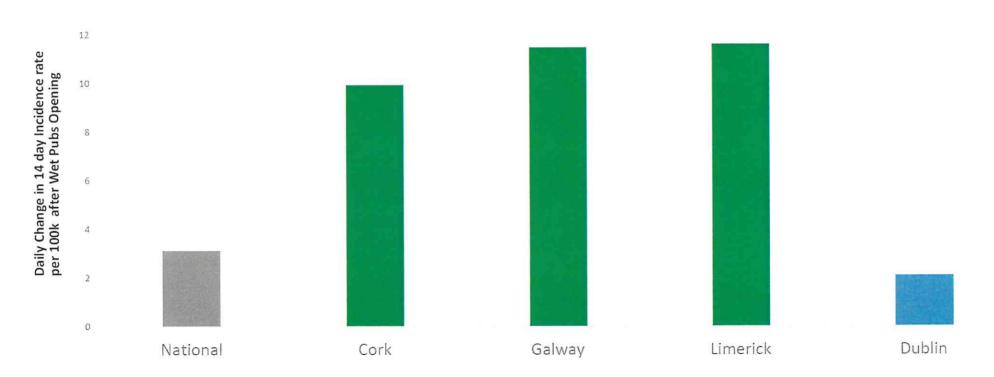
Ireland – restrictions analysis



Data analytics briefing - 25 November

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate was then lower than the national average and for larger counties

Wet pubs opened in all counties except Dublin in late September. This coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in ??? number ??? counties. The subsequent incidence rate growth in Dublin was 33% lower than the national average and 79% to 82% lower than other counties with larger cities.



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The incidence rate did not materially increase after the three phases of re-opening during late May to early July

The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

	2/03/3030	12/03/2020	15/03/20A	24/03/2020	27/03/2020	01/05/2020	15/05/2020	38/05/2020	08/02/20X	23/02/2020	13/07/2020	21/07/2020	08/03/2020	05/03/2020	21/03/2020	31/03/2020	0000/60/61	21/09/2020	25/03/2020	07/13/2020		16/15/A.20	22/10/20
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare closed Schod Closed	Bars closed	Retail, restaurants etc closed	Stay achome order (2km)	Stay at home Increased to 5km	Construction Opened	Wandstor, PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green list	Lockdown Laois Offalv Kildare	Face masts in shops	Lockdown Ifted Loois + Offaly, filicare entended	Schools+ childcare opened	Level 3 Dublin	Wα Bars Opened αcept Dublin	Level 3 Dong al	Level 3 National	terd 3 Max National	Level 4 Donng al, Cavan, Moraehan	Level 5 National
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-14
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-28
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		14
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	4	-2		0	-15
Dublin	3	5	11	1	-2	-4	-3	-1	0	0	0	1		2		4	2	2		4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-7
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		2	-10		-10
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-5
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-11
Louth	1	1	3	-1	0	-3	0	-1	0	0	0	-1		1		2		7		12	-2		-15
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-12
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		74		19	-34		-22
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	-13
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9		-8
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-11
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-6
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-10
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-19
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-9
Wicklow	1	5	5	3	-1	-3	-1	0	- 0	0	-1	1		1		1		2		3	-5		-6

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation

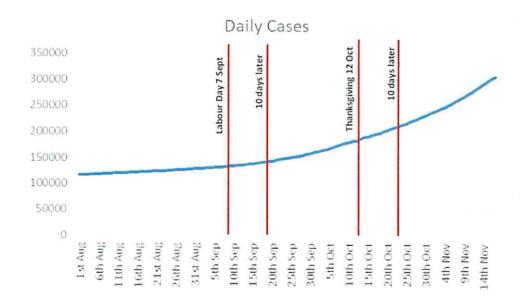
Select International Desktop Research



Canadian Thanksgiving: Testing & Tracing data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 dramatically changed after Thanksgiving, with a 14% increase in positive cases
 between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

Key findings

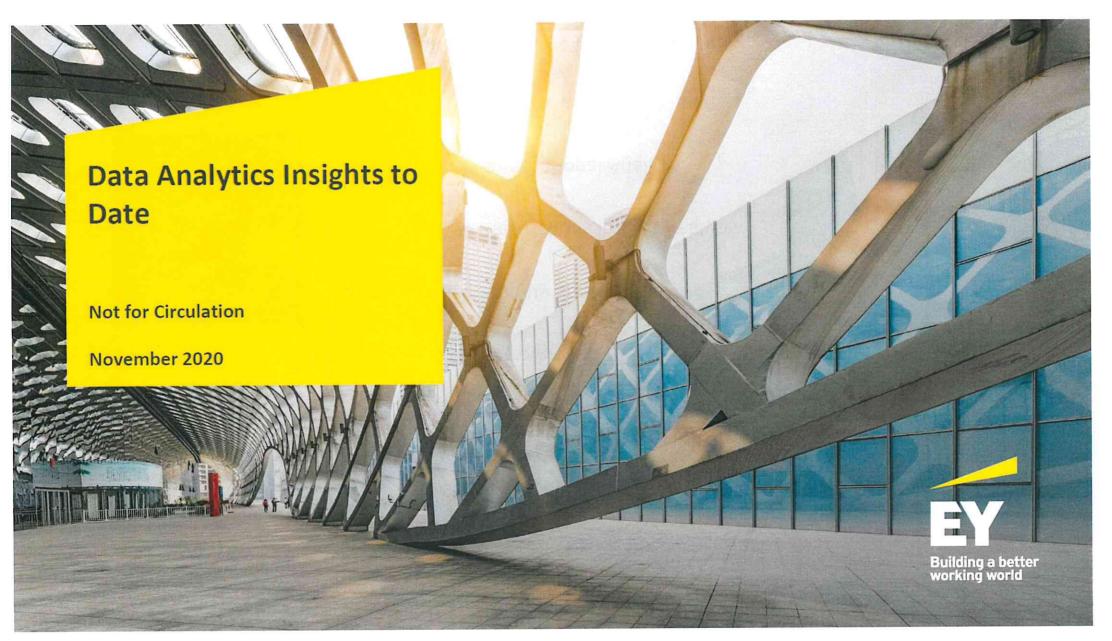
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/
http://hirr.hortsem.edu/research/fastforts/fast_facts.html

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda





- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis

Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation

Providing data analysis to support Government decision making

EY Data Analytics team was engaged to analyse certain aggregated data available to the State as part of the State's Covid 19 management strategy. EY's role was to analyse the available data and to present it back to Government officials to consider as part of its on-going deliberations and decision making with regard to Covid 19 restrictions. The focus is situating disease incidence rates in the context of other data (e.g. restriction changes) to produce insights, rather than performing epidemiology.



Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - Proximity to the border
 - 3. Following the national profile
 - 4. Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- Social gatherings, citizen congregations and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet pubs opened in all counties except Dublin in late September. This also coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in in every counties. Counties. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		✓		1	Nursing Home, Private Houses, Residential	Home Extended Family, Community Outbreak, Private	
Mayo				1	Nursing Home, Hospital, Community Hospital/Long-Stay Unit	House Private House, Nursing Home, School,	
Meath		1	1	1	Nursing Home, Private Houses, Workplace	Workplace	
Sligo*				1	Mursing Home, Private House, Travel Related	Outbresk Private House, Extended Family, Religious/Other Ceremony	
Westmeath*				✓	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Kilkenny*		1			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		✓			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		✓		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		✓		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		✓			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Laois*		✓			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		✓			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		✓			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		✓	✓		Nursing Home, Private Houses, Residential	Priate House, Workplace, Nursing Homes	
Louth	1	✓		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	✓		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	1	~			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	1	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		1	✓		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources – CIDR, Incidence rate –based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. Note: Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11
*Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR
**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per 100k	Population	20-Sep 21-Sep	22-Sep	23-Sep	24-Sep	26-Sen	27-Sep	28-Sep	29-Sep	30-Sep	Ó	03-Oct	1	08-Oct	7	08-Oct	09-Oct	7	2 - 5	Ò	O			1/-Oct	1		21-Oct			-	26-Oct	28-Oct	29-Oct	30-Oct	01-Nov	02-Nov	03-Nov	05-Nov	06-Nov	07-Nov	09-No	10-Nov	11-Nov	12-Nov	14-Nov	15-Nov	16-Nov	Chang Last 3 Days	
Kerry	147,707	18 19	19	19	24 2	2 2	4 25	22	20	21 2	6 40	46	52	62 6	4 73	91	106	110	113 14	14 15	3 177	174	197 2	215 24	246	263	269 2	57 26	69 291	299	279 2	81 269	271	236 2	20 198	183	178 19	94 190	177	162 1	53 13	9 139	129	128 12	8 127	123	122 11	-11%	
Limerick	194,899	44 39	39	36	34 3	35 3	3 33	34	39	37 4	5 58	69	90	96 10	17 114	119	145	160	67 18	2 18:	3 207	208	231 2	246 24	8 277	280	290 3	101 28	88 293	306	299 3	10 306	312	277 2	69 262	228	227 2	29 221	216	218 2	211 20	7 198	195	195 2	11 201	222	238 23	6 15%	
Mayo	130,507	26 3	30	29	32 3	31 3	2 30	28	26	28 2	4 26	30	33	32 3	6 42	42	54	67	75 8	0 90	107	123	131 1	150 16	7 185	208	228 2	43 25	50 246	256	266 2	59 248	242	261 2	46 232	216	198 18	33 184	185	176 1	62 14	7 151	145	141 11	8 113	110	110 10	9 -4%	
Meath	195,044	32 35	38	37	44 4	2 4	7 44	47	51	62 6	7 71	68	85	90 9	6 115	129	164	183	99 2	13 30	6 357	403	452 4	190 48	8 591	629	657 6	56 64	48 649	661	651 5	90 558	531	481 4	50 448	352	314 2	82 272	249	232 2	04 20	1 172	154	141 14	0 133	139	128 13	10000	4
Sligo	65,535	17 15	17	17	17 1	8 2	4 32	27	27	31 2	7 38	55	64	75 9	0 107	137	150	163	75 18	36 20	8 241	291	304 2	294 32	5 356	366	395 4	06 40	09 423	438	438 4	23 397	359	354 3	56 333	304	285 2	59 220	211	189 1	59 15	154	154	140 12	8 114	104	95 9	-23%	4
Westmeath	88,770	51 52	51	48	50 5	55 5	4 55	47	48	52 6	2 68	64	68	80 8	8 96	100	105	115	48 16	7 17	1 217	211	251 2	294 32	4 337	425	435 4	53 45	55 460	453	461 4	65 415	440	402 3	69 37	354	266 2	55 229	216	208 1	84 15	8 151	162	133 15	0 150	113	117 11	-33%	
Wexford	149,722	33 2	23	25	28 2	28 2	7 27	35	33	33 3	5 40	41	48	57 7	3 80	85	98	112	30 16	0 17	3 188	202	250 2	271 27	2 297	298	301 3	22 31	18 313	301	268 2	57 258	242	192 1	74 172	141	124 13	26 96	89	83	74 6	67	48	49 4	9 49	47	45 4	-7%	
Kilkenny	99,232	26 2	22	21	19 2	24 2	6 26	26	26	29 3	8 40	45	42	43 5	51 51	59	61	73	87 5	8 10	5 109	123	142 1	146 15	165	165	177 1	74 18	80 175	176	173 1	71 168	150	133 1	31 139	134	136 K	34 134	141	141 1	33 12	3 130	125	126 12	9 126	118	116 11	-9%	
Carlow	56,932	37 35	40	42	44 4	12 4	0 39	39	26	33 3	35 44	44	44	42 4	2 40	42	54	61	74 7	7 8	3 84	119	116 1	149 16	7 198	204	242 2	42 27	70 292	306	311 3	27 327	293	299 2	70 27	249	242 2	14 213	177	160 1	37 12	6 105	95	98 5	1 88	72	77 8	1 -9%	
Clare	118,817	44 4	44	40	40	41 4	7 50	53	63	76 7	6 87	96	121	144 15	58 183	199	246	261	68 3	04 31	0 306	309	322 3	326 32	7 322	313	304 3	311 27	72 264	281	252 2	48 253	255	235 2	29 20	189	186 1	81 173	171	160 1	39 13	2 122	109	104 10	14 93	109	111 11	1796	
Cork	542,858	27 3	36	42	47 8	52 6	2 66	71	81	88 9	7 102	105	110	111 1	19 127	140	155	159	181 15	9 20	9 232	237	256 2	275 30	8 322	336	340 3	27 33	34 347	7 337	335 3	33 331	334	318 3	05 27	258	242 2	33 239	216	195 1	79 15	8 143	119	108 10	2 89	83	86 8	-8%	
Galway	258,058	30 3	39	39	45 4	16 5	4 62	65	74	81 7	19 85	89	93	92 9	7 107	113	137	153	55 16	55 17	3 203	228	262 2	273 28	8 314	326	355 3	72 38	68 373	3 382	384 3	70 354	341	313 2	96 28	255	243 2	11 187	171	144 1	26 10	3 108	97	86 8	3 86	80	84 7	-10%	
Longford	40,873	37 3	39	34	32 3	37 3	9 49	59	73	98 12	20 12	7 132	147	152 15	54 169	169	176	208	93 1	96 18	1 193	176	213 2	240 25	4 279	291	281 3	08 29	96 281	1 289	291 3	06 279	294	259 2	45 22	193	181 1	93 166	164	157 1	52 14	2 132	127	115 1	15 103	103	100 10	0 -2%	
Roscommon	64,544	45 5	57	62	67 6	54 7	6 84	99	102	121 13	33 143	161	155	155 17	70 166	166	192	184	200 1	81 18	7 201	198	201 2	223 23	2 228	239	260 2	271 26	60 276	263	263 2	59 231	240	229 2	03 22	229	218 1	95 189	174	153 1	52 17	5 170	175	163 16	6 169	141	169 16	1 -5%	
Offaly	77,961	60 6	56	59	56 5	59 5	6 63	62	65	67 7	4 77	77	99	103 10	04 110	123	130	136	140 1	15 14	1 151	140	177 2	201 19	5 210	224	222 2	24 2	14 224	1 217	222 2	27 218	236	191 1	62 153	130	112 10	06 100	96	97	99 8	5 99	94	87 9	5 114	112	117 12	2 6%	
Laois	84,697	44 4	47	40	33	34 3	1 32	32	35	43 4	13 76	76	89	87 9	6 105	123	124	133	135 t	39 13	6 161	169	151 1	174 18	5 201	214	222 2	20 22	20 233	3 242	251 2	56 231	235	227 2	08 20-	197	179 1	70 174	175	174 1	63 15	7 155	149	136 13	6 137	116	107 10	4 -32%	
Waterford	116,176	95 9	97	87	88 8	36 6	7 67	59	53	44 3	38 35	34	28	31 3	2 40	46	56	64	61 6	6 7	0 83	109	131 1	132 14	3 155	160	173 1	76 19	94 205	5 215	226 2	25 228	210	205 2	01 20	1 195	194 1	87 176	163	146 1	36 12	8 134	114	142 1	1 156	163	163 16	4 5%	
Tipperary	159,553	18 16	17	16	19	18 2	1 24	24	25	31 3	32 36	40	48	53 5	5 58	58	86	70	71 7	8 8	3 79	88	93	110 11	115	118	120 1	26 12	24 134	139	133 1	39 145	133	139	31 130	130	130 1	32 130	128	122 1	117 12	3 118	113	117 1	4 101	105	110 10	7 5%	
Kildare	222,504	67 6	69	71	75 7	76 7	5 78	77	85	82 8	30 97	95	94	87 9	8 99	108	125	146	54 1	58 18	8 198	204	208 2	244 25	7 278	293	305 3	03 29	98 301	1 306	298 2	89 290	292	270 2	42 23	210	186 1	77 169	156	143 1	21 11	103	94	85 9	3 89	88	85 8	-3%	
Louth	128,884	102 9	107	109	101 5	95 10	4 92	80	76	75 7	74 75	77	88	90 8	5 85	89	116	109	116 1	15 15	2 161	181	185 1	188 17	8 221	261	293 2	83 27	72 286	299	311 2	89 296	293	285 2	97 29	7 257	219 1	93 202	189	177 1	59 15	5 157	156	147 1	51 151	160	157 16	8 10%	
Cavan	76,176	24 2	22	32	37 3	37 4	9 51	47	56	67 7	79 84	88	114	134 1	14 164	200	303	339	86 4	12 57	1 641	735	760	811 82	4 910	1012 1	058 10	058 98	83 966	967	964 8	10 753	668	645 B	89 56	474	365 2	95 263	232	206 1	59 14	3 133	119	112 10	12 108	98	87 9	-14%	
Leitrim	32,044	41 4	44	44	41 3	34 3	7 37	25	19	25 2	25 28	31	31	28 3	34	53	81	97	25 1	37 14	7 162	218	218 2	225 24	0 253	262	272 2	78 25	59 247	7 222	209 2	00 178	125	122 1	09 97	84	69 5	56 31	28	34	37 3	7 47	56	81 8	31 87	94	94 10	0 13%	
Monaghan	61,386	39 3	37	54	60 6	88 9	3 116	135	134	166 17	73 18	9 178	207	226 2	57 257	7 270	303	319	331 3	13 36	2 350	368	350 3	375 36	5 402	389	406 4	09 38	84 375	5 349	363 3	23 310	305	303 2	88 26	218	205 1	71 176	166	142 1	37 12	1 122	116	117 12	24 112	114	104 10	4 -8%	
Donegal	159,192	97 10	122	148	159 T	78 18	5 191	204	211	219 2	33 25	8 265	273	293 3	12 319	326	324	345	355 3	55 35	4 367	365	356 3	344 34	7 329	320	320 3	312 32	24 322	2 329	318 3	13 317	322	310 3	20 30	305	286 3	00 297	290	293 2	75 28	5 273	281	271 2	72 275	269	281 29	3 6%	
Wicklow	142,425	72 7	77	74	71 8	69 6	5 67	70	73	65 7	72 74	77	78	78 7	7 76	76	80	84	88	91 8	7 89	91	103	119 12	0 124	124	129 1	45 14	45 149	149	145 1	47 149	141	130	17 116	107	104 1	06 91	88	89	82 7	7 89	86	84 8	5 85	82	86 8	3 -3%	
Dublin	1,347,359	137 13	140	144	146 1	48 15	2 160	154	159	163 1	68 17	2 161	166	162 1	71 165	5 163	173	174	177 1	80 18	4 193	197	201 2	223 23	1 238	241	252 2	57 25	53 255	5 255	258 2	55 252	252	237 2	20 22	217	209 2	00 199	191	185 1	72 16	1 151	142	134 13	9 136	119	118 11	-18%	
National	4,761,865	70 7	74	76	79 1	80 8	4 88	88	92	96 1	01 10	8 107	114	116 12	24 126	134	150	158	167 1	77 19	0 207	217	231 2	251 26	1 279	290	302 3	05 30	02 307	7 309	307 2	98 29	286	268 2	53 24	7 226	211 2	01 195	184	173 1	59 15	0 142	133	127 12	28 124	117	118 11	7 -6%	

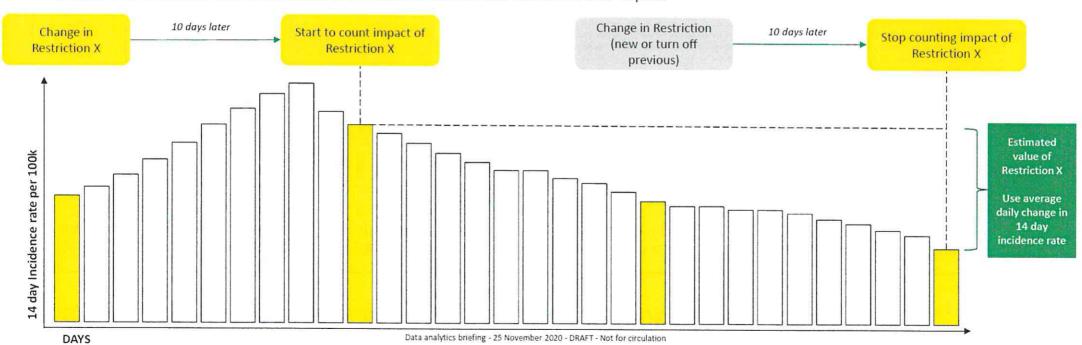
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k for the time period that each change in restriction was in place. The impact is calculated using the approach described in Slide 8. Note that:

- 1. The absolute number of weekly tests has significantly increased since Wave 1
- 2. The more recent restriction changes (Level 3, Level 3 Max and Level 5) happened within a 15 day period.

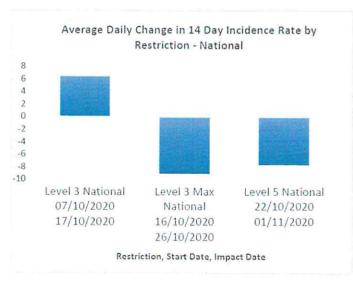
	20/03/20	12/03/2020	15/03/2020	24/03/2020	21/03/2020	01/02/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/70/20	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	02/06/50/50	07/10/20		no m tar	22/10/2020
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childcare dosed, School Closed	Bars closed	Retall, restaurants etc dosed	Stay at home order (2km)	Stay at home increased to 5km	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted Loois + Offoly, Kildare entended	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Loyel 3 Max National	Level 4 Donegal, Cavan, Monaghan	ย้า
Carlow	0	0		-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17			-14
Cavan	0	0		18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5			-10
Cork	2	2	3	3 -3	-1	1	-2	-1	0	0	0	0		0		4		10		7			-14
Donegal	0	0	5	5 5	-2	-1	0	0	0	0	0	1		0		9		12	4	-		0	Name and Address of the Owner, where the Owner, which is the Own
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	2			4	-		-11
Galway	_ 1	1	7	2 -2	0	0	-1	-1	0	0	0	0		1		3		11		12			-14
Kerry	1	5	- 3	3 4	-1	0	0	0	0	0	0	0		1		0		11		9			-10
Kildare	1	2	- 5	5 3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	- 4	1 -3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-7
Laois	1	0	- 1	. 0	0	-2	0	0	0	0	2	2	-2	-2	0			7		2	-10		-10
Leitrim	1	0	1	3 2	0	-1	-1	0	1	-1	0	0	1	4		-1		12		0	-17		-5
Limerick	1	1		-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1		3 4	7	-20	-1	-1	0	0	0	0)	2		2		6		5	-8		-11
Louth	1	1			0	-3	0	-1	0	0	0	1		1		2		7		12			-15
Mayo	0	1	4	700	-1	-2	-2	0	0	0	0	0		0		1		7		12			-12
Meath	1	2			0	-3	-1	0	0	0	0	0)	1		2		24		19			-22
Monaghan	0	0	-	And in case of the last of the	0		-2	-3	0	0	0	1		1		7		11		-3		-12	
Offaly	1	1	. (2		-12	0	0	0	0	7	-9		2	1		6		-3			-8
Roscommon	0	1		1 2	6	1000	0	-2	0	0	0	1		0		5		4		4	-10		-11 -17
Sligo	1	0			0		0	0	2	-2	0	0		0		1		17		16			
Tipperary	1	1			1	-5	0	-1	0	0	0	3	1	-4		0		4		3			-6
Waterford	1	3			-1	0	0	0	0	0	0	1		1		1		6		9			-10
Westmeath	2	3			3	-13	-1	-1	0	0	0	0)	1		1		12		18			-19
Wexford	0	0			0	-1	0	0	0	0	0	1		0		0		13		3	-16		-9
Wicklow	1	5	1.5	5 3	-1	-3	-1	0	0	0	-1	1	<u> </u>	1		1		2		3	-5	į.	-6

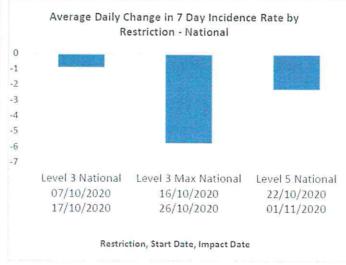
The introduction of Level 3 Max and Level 5 both coincide with a reduction incidence rates

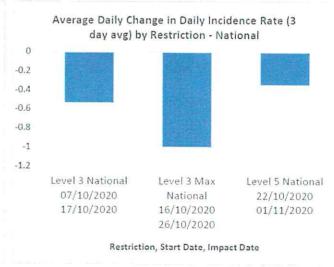
The 14 day incidence rate per 100k did not reduce for all but four counties with the introduction of Level 3. However, it did start to reduce with the introduction of further household restrictions (Level 3 Max) and then Level 5.

These three restriction changes happened within a 15 day period, with Level 3 Max was only active for 15 days.

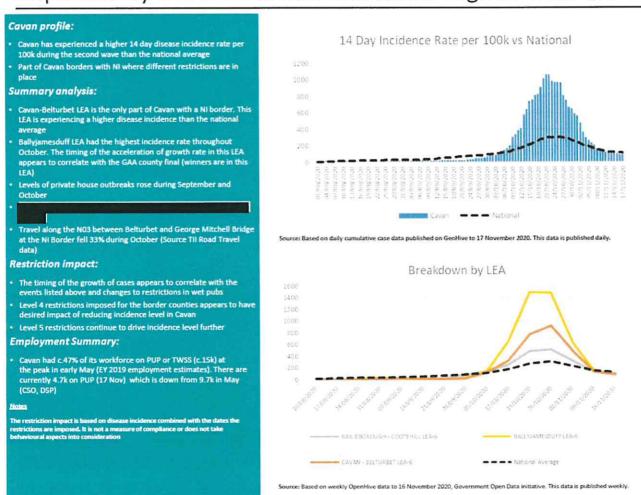
For completeness, this analysis has also been repeated for a 7 day and a daily incidence rate average over three days. All three are shown below and follow similar, albeit reduced, patterns.

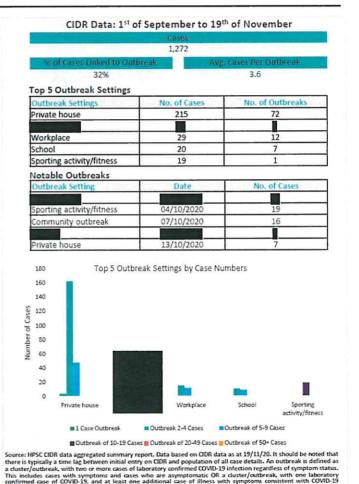






Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend





infection (as per the COVID-19 case definition) (HPSC)

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Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- . Dublin borders including a significant commuter population

Summary analysis:

- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak of 51 cases in
- . One significant community outbreak of 29 cases
- Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county final win (Source: GAA.ie)

Restriction impact:

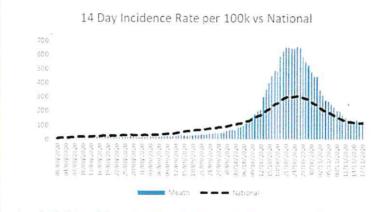
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- . Level 5 restrictions continue to drive incidence level down further

Employment summary:

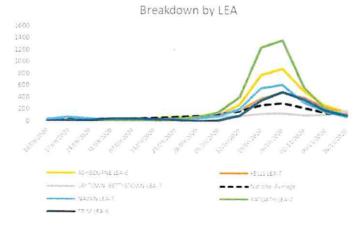
 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



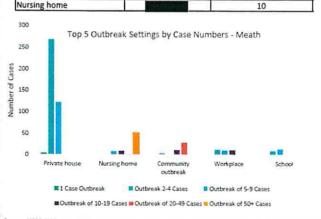
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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CIDR Data: 1st of September to 19th of November 2,466 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 397 121 Nursing home 74 9 Community outbreak 45 4 Workplace 38 18 School 25 10 Notable Outbreaks Outbreak Setting Date No. of Cases Nursing home 51 Community outbreak 10/10/2020 29 Community outbreak 13/10/2020 12 Workplace 19/10/2020 11



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of absoratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) [HPSC]

The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in

Summary analysis:

- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in (Source: Donegai Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

Employment summary:

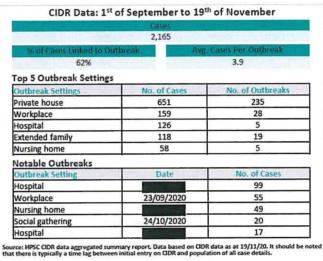
Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

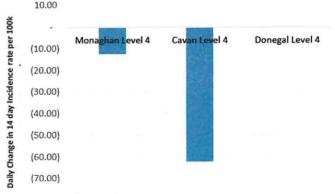
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





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Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 daily. An outbreak is defined as cluster/outbreak, with two or more cases or laboratory continuem unfortunited in regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of CVID-13, and at least one additional case of filmss with symptoms consistent with CVID-19 indection (as per the CVID-19 case definition) (HPSC)

Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases In Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

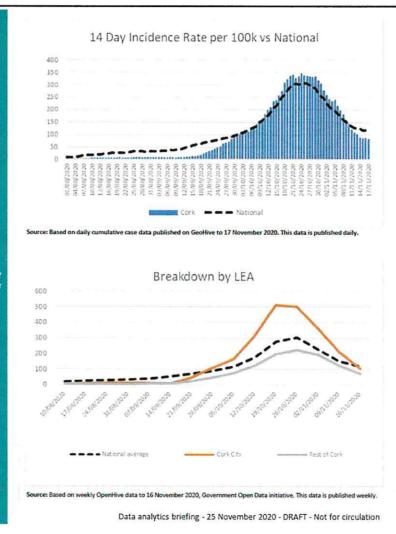
- Cases in Cork city rose as wet pubs reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

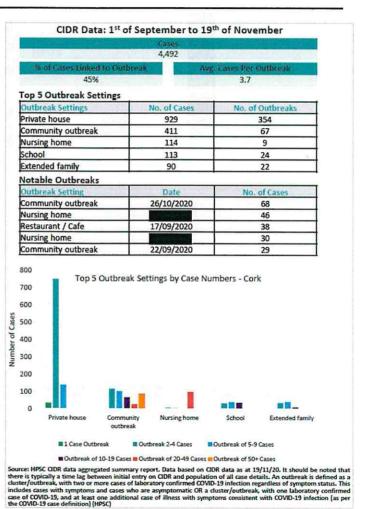
Employment summary:

 At peak, c 39% of Cork's workforce were on PUP or TWSS (c 96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.





Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South had a confirmed outbreak in mid-October.
- Throughout November, private household cases were responsible for 49% of outbreak cases, with community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

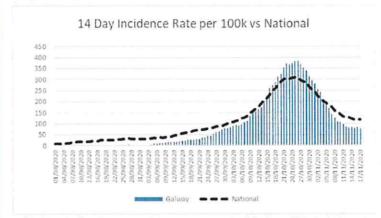
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary:

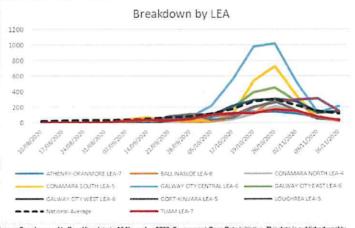
 Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

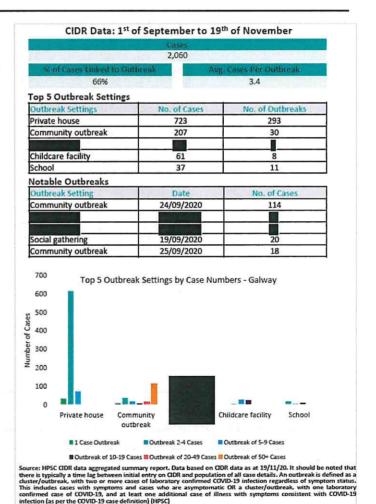


Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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Dublin – local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/2020	31/08/2020	07/09/2020	14/09/2020	21/09/2020	00.00/80	05/10/2020	0.02/01/21	19/10/2020	26/10/2020	02/11/2020	09/11/2020	16/11/2020
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIM NAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
>	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
Dublin City	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
들	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
Ä	KIMMAGE-RATHMINES LEA-5	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
Dun Laoghaire Rathdown	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
n Laoghair Rathdown	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
th 9	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
E 55	KILLINEY-SHANKILL LEA-7			3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	70.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
-	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
Œ	ONGAR LEA-5	3	103	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-5	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
15/07/00	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
c	FIRHOUSE-BOHERNABREENA LEA-S	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
South Dublin	LUCAN LEA-5	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
ď	PALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
itt	RATHFARNHAM-TEMPLEOGUE LEA-7	. 3	3	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
S	TALLAGHT CENTRAL LEA-5	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council areas of Dublin with Dun Laughaire—Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

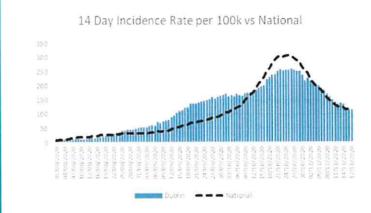
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



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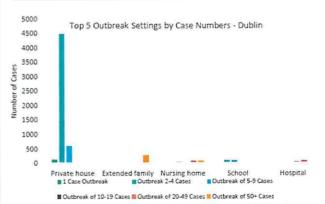
CIDR Data: 1st of September to 19th of November Gases 12,606

Top	5	Outbrea	k Settings
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Outbreak Settings	No. of Cases	No. of Outbreaks
Private house	5225	2075
Extended family	291	3
Nursing home	266	27
School	249	66
Hospital	192	30

Notable Outbreaks

Outbreak Setting	Date	No. of Cases
Extended family	24/09/2020	288
Nursing home		75
Hotel	12/09/2020	38
Childcare facility	20/10/2020	38
Residential institution	02/10/2020	30



Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a duster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a duster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (IMPSC)

Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

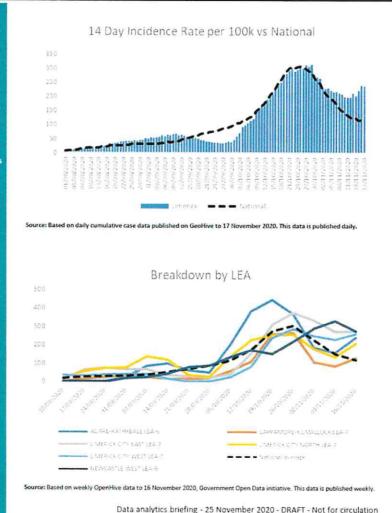
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November.
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

Employment summary:

 Limerick had c 43% of its workforce on PUP or TWSS (c.34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (37 Nov) which is down from 22k in May (CSO, DSP)

Notes

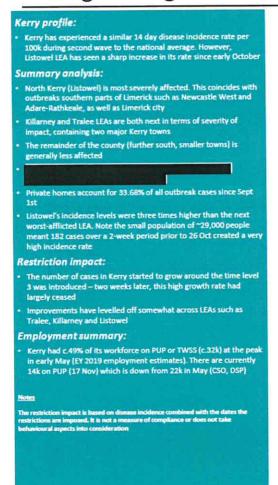
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed, it is not a measure of compliance or does not take behavioural aspects into consideration

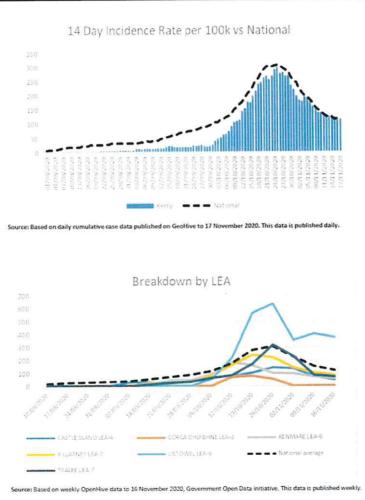




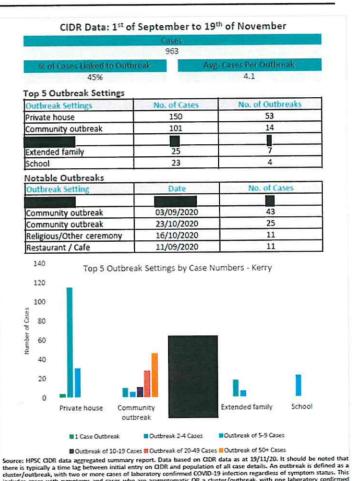
Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases





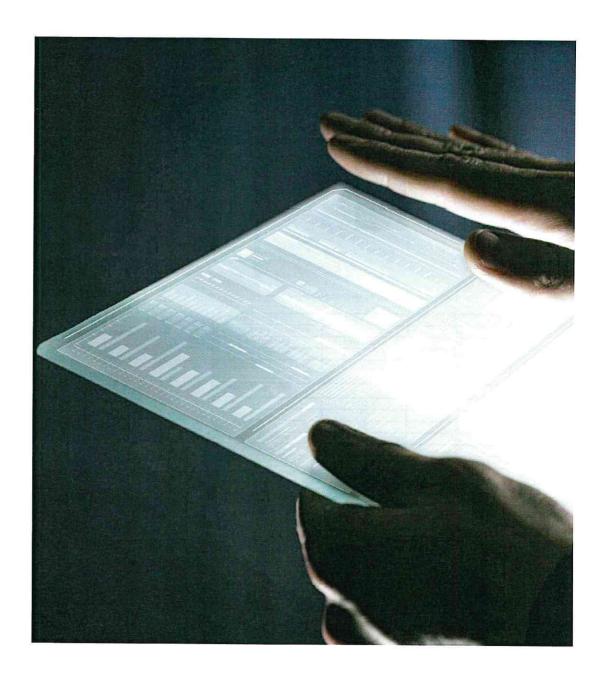
Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation



includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the

COVID-19 case definition) (HPSC)

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

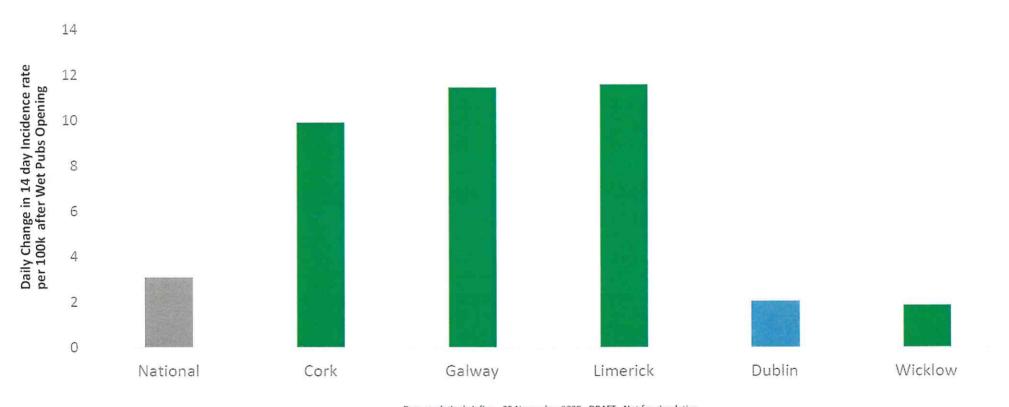
Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

Ireland – restrictions analysis

Data analytics briefing - 25 November

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate was then lower than the national average and for larger counties

Wet pubs opened in all counties except Dublin in late September. This coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in every county. The subsequent incidence rate growth in Dublin was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Wicklow was the only county that performed better than Dublin, with a 10% lower growth rate than Dublin



The incidence rate did not materially increase after the three phases of re-opening during late May to early July

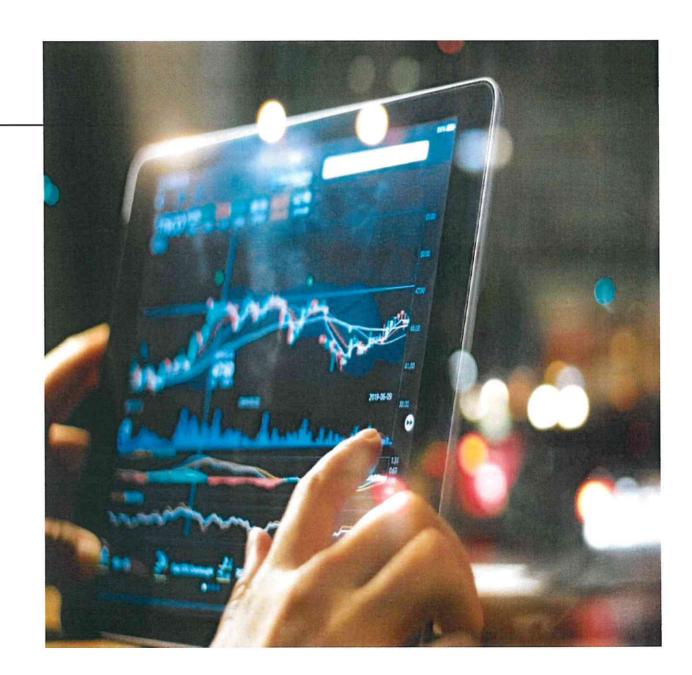
The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

	2/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	0202/50/82	08/02/3030	29/05/2020	13/07/2020	21/01/3030	08/03/2020	0202/80/61	21/03/2020	31/03/2020	0.00./10/22	21/03/2020	A/09/A020	07/13/20		16/10/2/20	22/10/2020
Average daily change in the 14 day incidence rate per 100k	No restrictions	Childrate closed School Closed	Bars closed	Retail, restaurants etc	Stay at home order (2km)	Stay at home increased to Skm	Construction Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	tockdown Liots Offaly Kildare	Face masks in shops	Lockdown Ifted Laois + Offaly, Kilcare entended	Schools+ childcare opened	Level 3 Dublin	We. Bars Opened except Dublin	Lezet a Donegal	Level 3 National	Level 3 Max National	Level 4 Donng al Cavan Morae han	Level 5 National
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1	_	5		17	-7	-	-14
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		62	-28
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-10
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-14
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0	- 1	9		12	4	-2		0	-15
Dublin	3	- 6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	2	2		4	-6		-11
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-14
Kerry	1	- 5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-10
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-12
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0	-	0		6		3	-7		-7
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		2	-10		-10
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4	- 3	-1		12		0	-17		-5
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-13
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-11
Louth	1	1	3	_1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-15
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-12
Meath	1	2	- 3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-22
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3	The state of the s	-12	-13
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		-3	-9	100	-8
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0	-	5		4		4	-10		-11
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		o		4		3	0		-6
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-10
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-19
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		ō		13		3	-16		-9
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-6

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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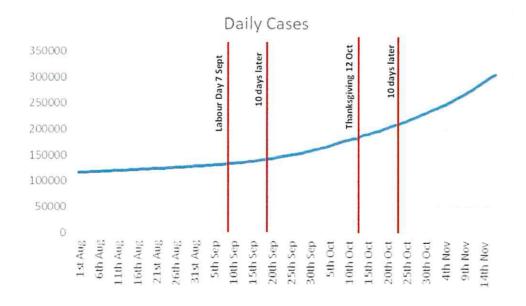
Select International Desktop Research



Canadian Thanksgiving: Testing & Tracing data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 dramatically changed after Thanksgiving, with a 14% increase in positive cases
 between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

Source: https://health-infobase.canada.ca/covid-19/ https://www.thestar.com/news/canada/2020/09/23/wont-be-gathering-forthanksgiving-trudeau-says-covid-19-second-wave-underway.html

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



http://hirr.hartsem.edu/research/fastfacts/fast_facts.html

Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

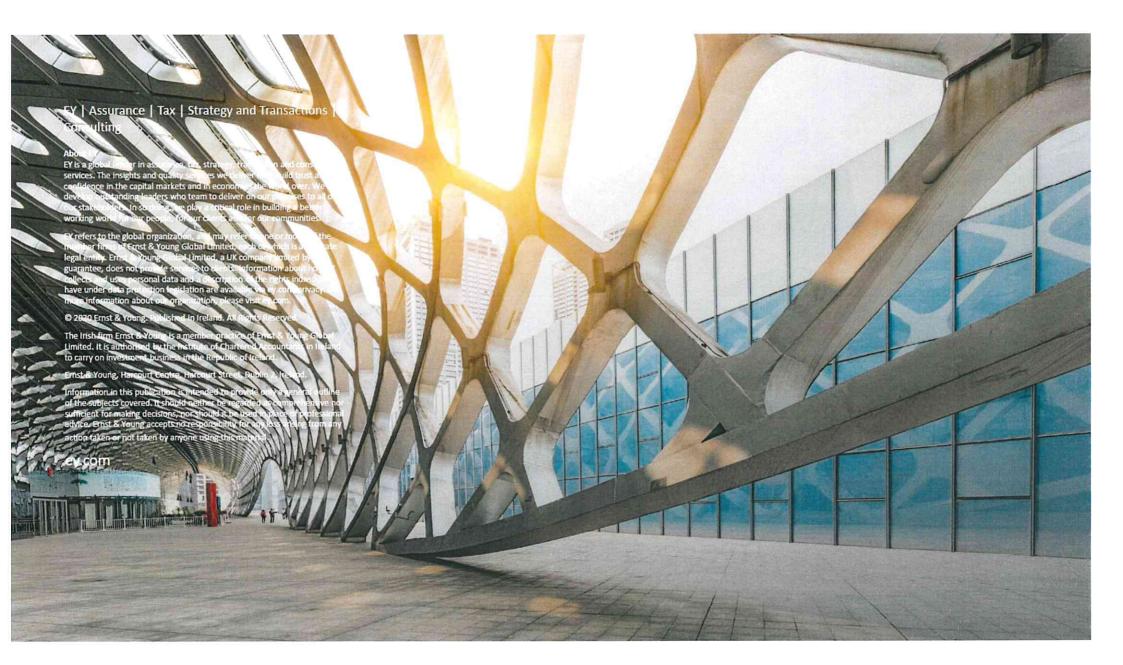
Key findings

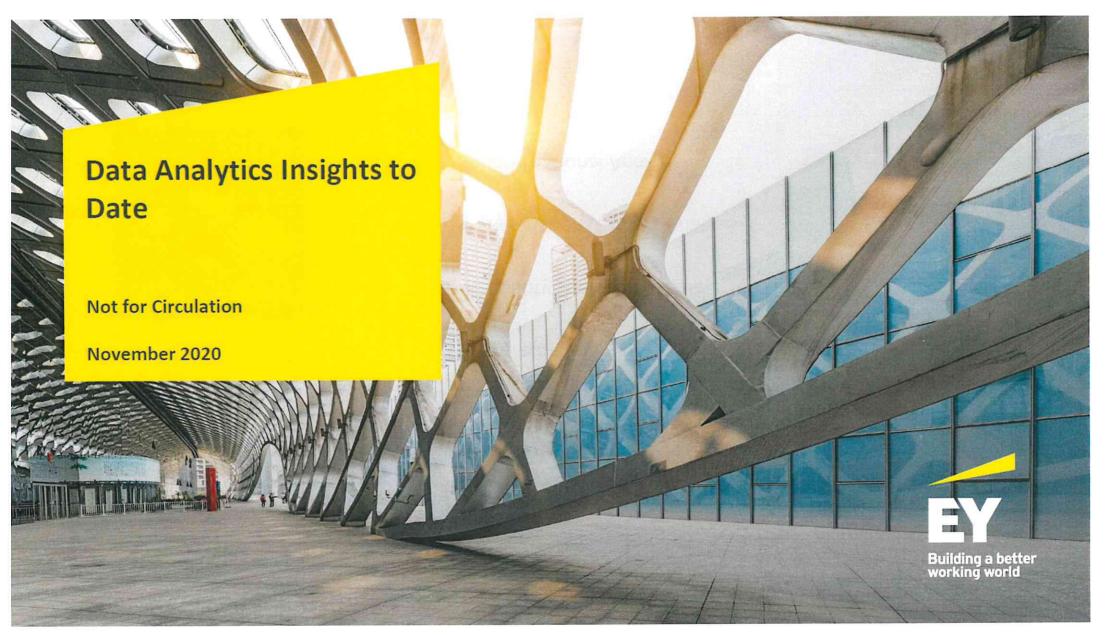
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

Disclaimer

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information
 which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the
 presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda

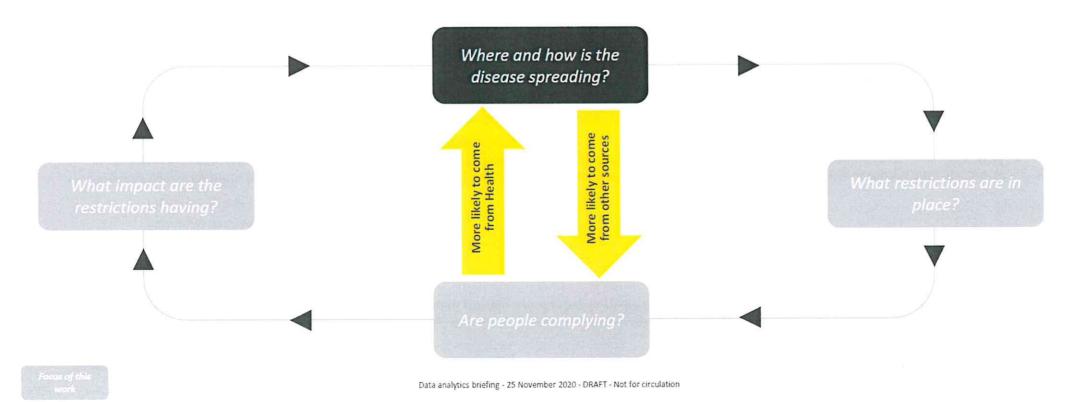




- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis

Providing data analysis to support Government decision making

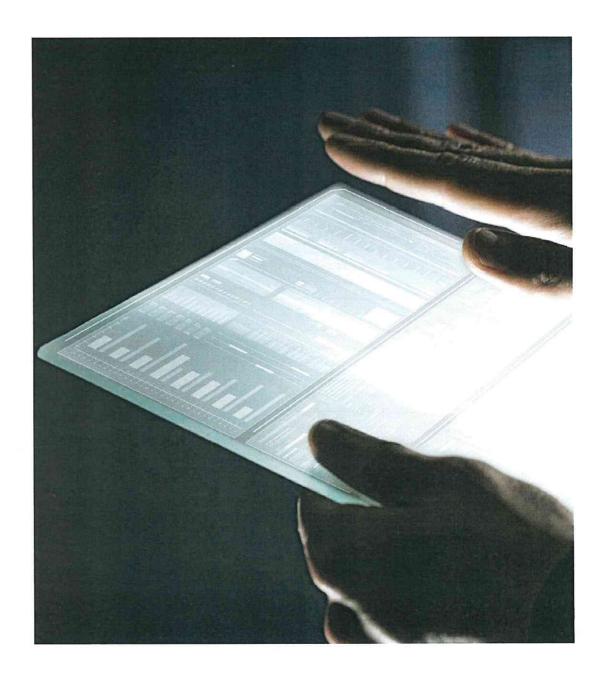
EY Data Analytics team was engaged to analyse certain aggregated data available to the State as part of the State's Covid 19 management strategy. EY's role was to analyse the available data and to present it back to Government officials to consider as part of its on-going deliberations and decision making with regard to Covid 19 restrictions. The focus is situating disease incidence rates in the context of other data (e.g. restriction changes) to produce insights, rather than performing epidemiology.



Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - 2. Proximity to the border
 - Following the national profile
 - 4. Proximity to and scale of Dublin
- We now have a far more expansive testing criteria. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- · Social gatherings, citizen congregations and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet pubs opened in all counties except Dublin in late September. This also coincided with universities opening together with specific sporting events. The 14
 day disease incidence rate per 100k started to increase ten days later in every county. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county
 when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that
 universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		✓	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		1		1	Nursing Home, Private Houses, Residential	Home Extended Family, Community Outbreak, Private House	
Mayo				1	Nursing Home, Hospital, Community Hospital/Long-Stay Unit	Private House, Nursing Home, School, Workplace	
Meath		1	1	1	Nursing Home, Private Houses, Workplace	Private Houses, Nursing Homes, Community Outbreak	_
Sligo*				1	Nursing Home, Private House, Travel Related	Private House, Extended Family, Religious/Other Ceremony	
Westmeath*				1	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Kilkenny*		1			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		✓			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		1		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		✓			Workplace, Hospital, Community Hospital/Long- Stav Unit	Private House, Workplace, Nursing Home	
Laois+		✓			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		1			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		1			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		✓	1		Nursing Home, Private Houses, Residential	Priate House, Workplace, Nursing Homes	
Louth	1	1		✓	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	/	1		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	/	✓			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	✓	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		✓	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources – CIDR, incidence rate –based on daily cumulative case data published on GeoHive to 17 November 2020.
This data is published daily. Note Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11

Carlow-Kilenny, Laois-Offaly, Longford-Westmeath and Sigo-Leitrina are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per 100k		25-Sep		ņι	28-Sep	30-Sep	01-0ct	02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	08-0ct	09-Oct	10-Oct	11-Oct	12-Oct	13-CE	14-001	18-0-ct	17-Oct	18-Oct	0	20-Oct	21-Oct	22-Oct	24-Oct	25-Oct	26-Oct	200	28	30-0ct	1	01-Nov	03-Nov	-1	05-Nov		.1	10 Nov	11-Nov	12-Nov	<u>ç</u>	14-Nov	5 6	-		20-Nov		-	Change Last 5 Days
Kerry	147,707	22	24	25	22 2	0 21	1 21	6 40	46	52	62	64	73 91	106	110	113	144 1	153 1	77 17	74 19	7 215	240	246	263	269	257 2	69 29	1 299	279	281	269 2	71 23	6 220	198 1	33 17	194	190 1	77 162	153	139 1	39 12	9 128	128	127 1	23 122	115	86	83 7		2000	-48%
Limerick	194,899	35	33	33	34 3	9 37	7 4	5 58	69	90	96	107	14 11:	9 145	160	167	182 1	189 2	07 2	08 23	31 246	248	277	280 :	290	301 2	88 25	3 306	299	310	306 3	112 27	7 269	262 2	28 22	7 229	221 2	16 218	211	207 1	98 19	5 195	211	201 2	22 238	3 236	221 2	216 21		150	-18%
Mayo	130,507	31	32	30	28 2	6 28	8 2	4 26	30	33	32	36	12 42	54	67	75	80	90 1	07 1	23 13	150	167	185	208	228	243 2	50 24	6 256	266	259	248 2	42 26	1 246	232 2	16 19	8 183	184 1	35 176	162	147 1	51 14	5 141	118	113 1	10 110	109	103	93 7		87	-20%
Meath	195,044	42	47	44	47 5	61 62	2 6	7 71	88	85	90	96	15 12	9 164	183	199	213 3	306 3	57 4	03 45	52 491	488	591	629	657	656 6	48 64	9 661	651	590	558 5	31 48	1 450	448 3	52 31	282	272 2	49 23	204	201 1	72 15	4 141	140	133 1	39 128	134	127	131 13	31 126	124	-7%
Sligo	65,535	18	24	32	27 2	7 3	1 2	7 38	55	64	75	90	07 13	7 150	163	175	186 2	208 2	241 2	91 30	14 29	325	356	366	395	406 4	09 42	3 438	438	423	397 3	59 35	4 356	333 3	04 28	5 259	220	11 185	159	154 1	54 15	4 140	128	114 1	04 95	93	76	85 8	4 73	76	-18%
Westmeath	88,770	55	54	55	47 4	8 52	2 6	2 66	64	68	80	88	96 10	0 105	115	148	167	171 2	217 2	11 2	51 29	324	337	425	435	453	55 46	0 453	461	465	415 4	40 40	2 369	372 3	54 26	6 255	229 2	16 20	184	158 1	51 16	2 133	150	150 1	13 117	113	106 1	103 10	0 92	88	-2296
Wexford	149,722	28	27	27	35 3	33	3 3	5 40	41	48	57	73	80 85	5 98	112	130	160	173 1	188 2	02 25	50 27	272	297	298	301	322	318 3	3 301	268	257	258 2	42 19	2 174	172	41 12	1 126	96	9 83	74	67 6	7 48	49	49	49 4	7 45	46	37	42 3	SELECTION	36	-22%
Kilkenny	99,232	24	26	26	26 2	6 29	9 3	8 40	45	42	43	51	51 55	61	73	87	98	105 1	109 1	23 14	2 146	154	165	165	177	174	180 17	5 176	173	171	168 1	50 13	3 131	139 1	34 13	6 134	134	41 14	133	128 1	30 12	5 126	129	126 1	18 116	116	113	110 9	8 92	106	-9%
Carlow	56,932	42	40	39	39 2	6 33	3 3	5 44	44	44	42	42	40 42	2 54	61	74	77	83 1	84 1	19 11	6 143	167	198	204	242	242	270 29	2 306	311	327	327 2	93 29	9 270	278 2	49 24	2 214	213 1	77 160	137	126 1	05 95	5 98	91	88 7	2 77	81	86	88 8	4 76	72	-11%
Clare	118,817	41	47	50	53 8	3 76	6 7	6 87	96	121	144	158	83 19	9 246	261	268	304	310 3	306 3	09 32	22 32	327	322	313	304	311	272 26	4 281	252	248	253 2	55 23	5 229	209 1	89 18	6 181	173	71 160	139	132 t	22 10	9 104	104	93 1	09 111	112	104	93 9	1 89	86	-23%
Cork	542,868	52	62	66	71 8	31 88	8 9	7 102	2 105	110	111	119	27 14	0 155	159	181	199 2	209 2	232 2	37 25	56 27	5 308	322	336	340	327	34 34	7 337	335	333	331 3	34 31	8 305	276 2	58 24	2 233	239	16 195	179	158 1	43 11	9 108	102	89 8	3 86	82	81	73 7	7 78	81	-1%
Galway	258,058	46	54	62	65 7	4 8	1 7	9 85	89	93	92	97	107 11	3 137	153	155	165	173 2	203 2	28 20	2 27	3 288	314	326	355	372	368 3	3 382	384	370	354	341 31	3 296	282 2	55 24	3 211	187	71 144	126	109 1	08 97	7 86	83	86 8	84	78	71	66 6	2 62	63	-19%
Longford	40,873	37	39	49	59 7	3 98	8 12	20 127	7 132	147	152	154	169 16	9 176	208	193	196	181 1	193 1	76 2	13 24	254	279	291	281	308	296 2	31 289	291	306	279 2	94 25	9 245	223 1	93 18	1 193	166	64 15	152	142 1	32 12	7 115	115	103 1	03 100	100	83	88 8	8 81	83	-17%
Roscommon	64,544	64	76	84	99 1	02 12	21 13	33 143	3 161	155	155	170	166 16	6 192	184	200	181	187 2	201 1	98 2	01 22	3 232	228	239	260	271	260 2	6 263	263	259	231 2	240 22	9 203	225 2	29 21	8 195	189	74 15:	152	175 1	70 17	5 163	166	163 1	41 169	9 161	167	161 16	0 166	161	0%
Offaly	77,961	59	56	63	62 6	5 6	7 7	4 77	77	99	103	104	110 12	3 130	136	140	145	141	151 1	40 17	7 20	1 195	210	224	222	224	214 23	4 217	222	227	218 2	36 19	1 162	153	30 II	2 106	100	96 97	99	85 5	99 94	4 87	95	114 1	12 117	122	126	119 12	23 103	100	-18%
Laois	84,697	34	31	32	32 :	35 4:	3 4	3 76	76	89	87	96	105 12	3 124	133	135	139	136	161 1	69 1	51 17	185	201	214	222	220	220 2	3 242	251	256	231 2	235 22	7 208	204	97 17	9 170	174	75 17	163	157 1	55 14	9 136	136	137 1	16 107	7 104	99	86 8	3 63	59	-43%
Waterford	116,176	86	67	67	59 5	3 4	4 3	8 35	34	28	31	32	40 4	5 56	64	61	88	70	83 1	09 1	31 13:	143	155	160	173	176	194 21	5 215	226	225	228 2	210 20	5 201	201	95 19	4 187	176	63 141	136	128 1	34 11	4 142	141	156 1	63 163	3 164	155	161 15	57 156	154	-6%
Tipperary	159,553	18	21	24	24 2	25 3	1 3	2 36	40	48	53	55	58 5	8 66	70	71	78	83	79 8	8 9	3 110	113	115	118	120	126	124 13	4 139	133	139	145 1	133 13	9 131	130	30 13	0 132	130	28 12	2 117	123 1	18 11	3 117	114	101 1	05 110	107	106	100 9	7 92	86	-19%
Kildare	222,504	76	75	78	77 8	35 83	2 8	0 97	95	94	87	98	99 10	8 125	146	154	168	188 1	198 2	04 2	08 24	4 257	278	293	305	303	298 3	01 306	298	289	290 2	292 27	0 242	231	210 18	6 177	169	56 14:	3 121	118 1	03 9	4 85	93	89 8	88 85	86	87	86 8	7 84	87	1%
Louth	128,884	95	104	92	80	76 7	5 7	4 79	77	88	90	85	85 8	9 116	109	116	115	152	161 1	181 18	35 18	178	221	261	293	283	272 2	6 299	311	289	296 2	293 28	5 297	297	57 21	9 193	202	89 17	7 159	155 1	57 15	6 147	151	151 1	60 157	7 168	174	186 2	02 206	213	27%
Cavan	76,176	37	49	51	47 !	56 6	7 7	9 84	88	114	134	144	164 20	0 30:	3 339	386	412	571 (641 7	35 7	60 81	1 824	910	1012	1058	1058	983 9	6 967	964	810	752 8	68 64	5 589	562	74 36	5 295	263	32 20	6 159	143 1	33 11	9 112	102	108 5	98 87	95	97	95 1	01 100	98	4%
Leitrim	32,044	34	37	37	25	19 21	5 2	5 28	3 31	31	28	34	34 5	3 81	97	125	137	147	162 2	218 2	18 22	5 240	253	262	272	278	259 2	7 222	209	200	178 1	125 12	2 109	97	84 6	56	31	28 34	37	37	17 5	6 81	81	87 :	94 94	100	106	106 9	7 84	78	-22%
Monaghan	51,386	68	93	116	135 1	34 16	6 17	73 189	9 178	207	7 226	257	257 27	70 303	3 319	331	313	362 3	350 3	68 3	50 37	5 365	402	389	406	409	384 3	75 349	363	323	310 3	305 30	3 288	269	218 20	5 171	176	66 14	2 137	121 1	22 11	6 117	124	112 1	14 10-	4 104	112	94 1	01 101	106	2%
Donegal	159,192	178	185	191	204	211 21	19 2	33 25	8 265	273	293	312	319 32	26 324	4 345	355	355	354 3	367 3	65 3	56 34	4 347	329	320	320	312	324 3	22 32	318	313	317 3	322 31	0 320	309	105 28	8 300	297	90 29	3 275	285 2	73 28	81 271	272	275 2	69 28	1 293	263	266 2	54 231	227	-23%
Wicklow	142,425	69	65	67	70	73 6	5 7	2 74	77	78	78	77	76 7	6 80	84	88	91	87	89	91 11	03 11	120	124	124	129	145	145 14	9 149	145	147	149	141 13	0 117	116	07 10	4 106	91	88 89	82	77 1	89 8	6 84	85	85 4	82 86	83	78	88 9	91 80	84	2%
Dublin	1,347,359	148	152	160	154 1	59 16	33 16	68 172	2 161	166	162	171	165 16	3 173	174	177	180	184	193 1	97 2	01 22	3 231	238	241	252	257	253 2	55 25	258	255	252 2	252 23	7 220	226	217 20	9 200	199	191 18	5 172	161	51 14	2 134	139	136	119 118	8 115	119	114 1	18 114	114	-196
National	4,761,865	80	84	88	88	92 9	6 1	01 108	8 107	114	116	124	128 13	4 150	158	167	177	190 2	207 2	217 2	31 25	1 261	279	290	302	305	302 3	7 30	307	298	291 2	286 26	8 253	247	26 2	1 201	195	84 17	3 159	150 1	42 13	3 127	128	124	117 118	8 117	114	111 1	11 106	107	-9%

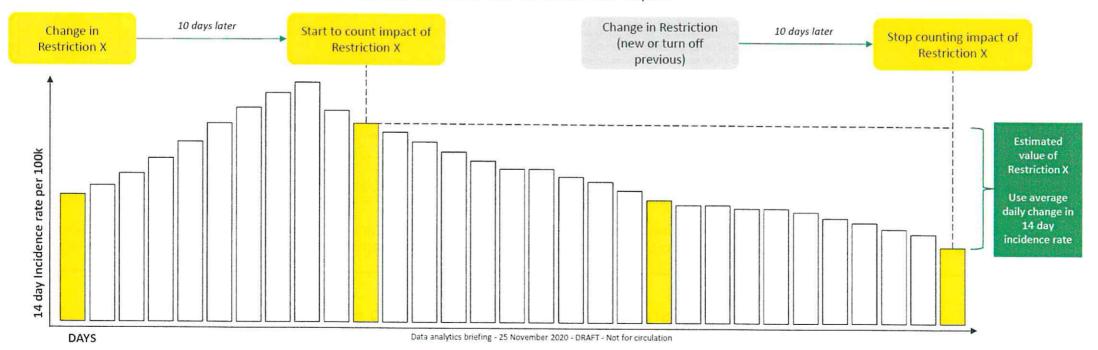
Source: Based on daily cumulative case data published on GeoHive to 22 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k per restriction. The impact is calculated using the approach described in Slide 8.

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	26/09/2020	07/10/2020	16/10)	/2020	22/10/2020
Restriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	18/08/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020	26/10	/2020	01/11/2020
Avg daily change in 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Constructio n Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	** Level 3 National	** Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	** Level 5 National (to 22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-21
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1			0	-4
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	4				-6		-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		2	-10		-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-12
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-2
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-2
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-13
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-6
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-1

Note:

The outputs should be seen as directionally useful, rather than precise statistical outputs

The reopening of wet bars

* coincided with universities
opening together with
specific sporting events

Care required when interpreting restriction

** changes in quick succession. Specifically, the more recent restriction changes (Level 3, Level 3 Max and Level 5) happened within a 15 day period

> The absolute number of weekly tests has significantly increased since Wave 1

This analysis does not also consider potential behavioural changes beyond the restrictions

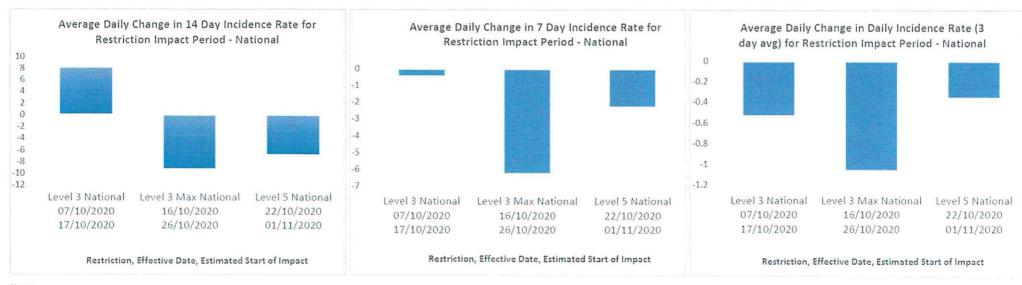
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

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The introduction of Level 3 Max and Level 5 both coincide with a reduction incidence rates

The introduction of Level 3 saw the 14 day incidence rate per 100k decrease in four counties only. However, incidence did start to reduce in all counties with the introduction of further household restrictions (Level 3 Max) and then Level 5. These three restriction changes happened within a 15 day period, with Level 3 Max only active for 6 days.

For completeness, this analysis has also been repeated for a 7 day and a daily incidence rate average over three days. All three are shown below and follow a not identical, but very similar pattern.



Note:

- Care required when interpreting restriction changes in quick succession. This analysis does not also consider potential behavioural changes beyond the restrictions
- Each measure in the above three graphs quantify the impact over a different time period; 14 days, 7 days and 1 day respective. Hence, it is expected that the size of their impact is different. That is also why they are shown to different scales on the y axis
- National measure excludes Dublin, Donegal, Cavan and Monaghan as they were under different restriction changes
- . The Level 5 reductions should be seen as additive to the reduction in Level 3 Max

Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend

Cavan profile:

- Cavan has experienced a higher 14 day disease incidence rate per 100k during the second wave than the national average
- Part of Cavan borders with NI where different restrictions are in place

Summary analysis:

- Cavan-Belturbet LEA is the only part of Cavan with a NI border. This LEA is experiencing a higher disease incidence than the national average
- Ballyjamesduff LEA had the highest incidence rate throughout October. The timing of the acceleration of growth rate in this LEA appears to correlate with the GAA county final (winners are in this LEA)
- Travel along the N03 between Belturbet and George Mitchell Bridge at the NI Border fell 33% during October (Source TII Road Travel data)

Restriction impact:

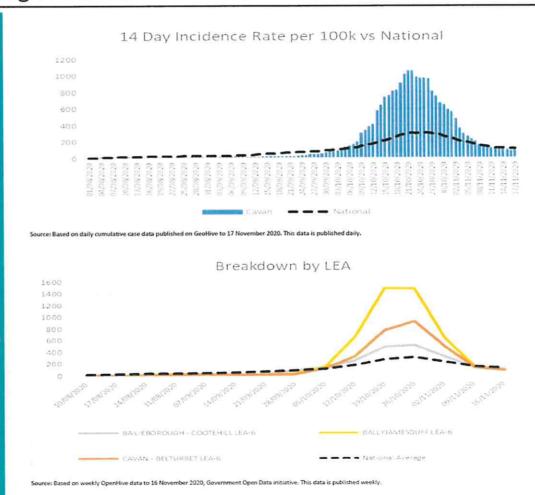
- The timing of the growth of cases appears to correlate with the events listed above and changes to restrictions in wet pubs
- Level 4 restrictions imposed for the border counties appears to have desired impact of reducing incidence level in Cavan
- · Level 5 restrictions continue to drive incidence level further

Employment Summary:

 Cavan had c.47% of its workforce on PUP or TWSS (c.15k) at the peak in early May (EY 2019 employment estimates). There are currently 4.7k on PUP (17 Nov) which is down from 9.7k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



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Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- · Dublin borders including a significant commuter population

Summary analysis:

 Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county final win (Source; GAA.ie)

Restriction impact:

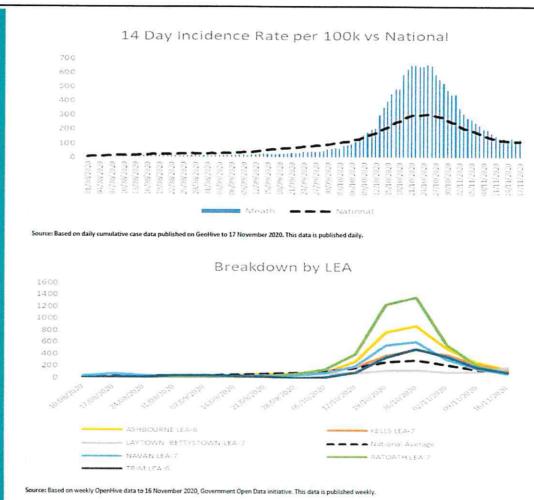
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- · Incidence level continued to rise post initial Level 3 restrictions imposed nationally,
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- Level 5 restrictions continue to drive incidence level down further

Employment summary:

 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



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The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in (Source: Donegal Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on pubs and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

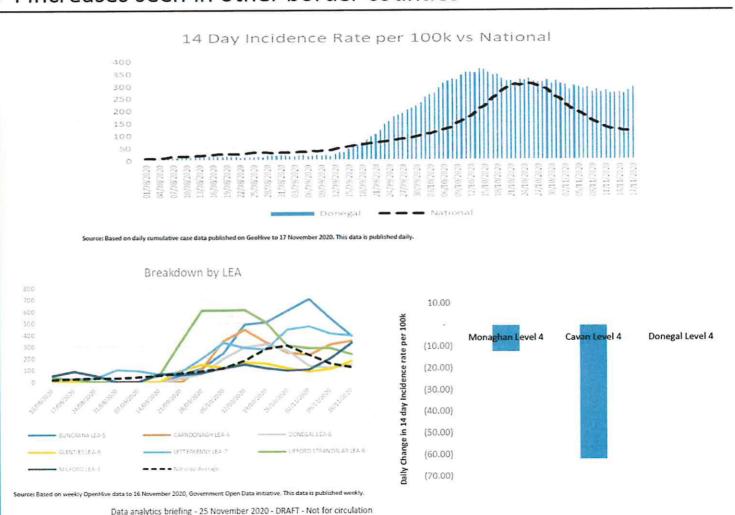
Employment summary:

 Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take helianized at severely into consideration.

The Facebook survey is a voluntary survey, managed by the University of Maryland. The mask question reads "in the last 7 days, how often did you wear a mask in makis."



Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- · Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

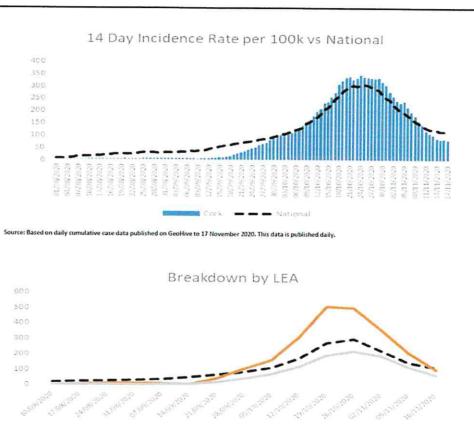
- Cases in Cork city rose as wet pubs reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which coincides with rate increases. No matches
 occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout
 Cork began to fall 10 days later

Employment summary:

At peak, c.39% of Cork's workforce were on PUP or TWSS (c.96k) (EY 2019 employment estimates).
 Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP).

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South rates increased 10 days later

Restriction impact:

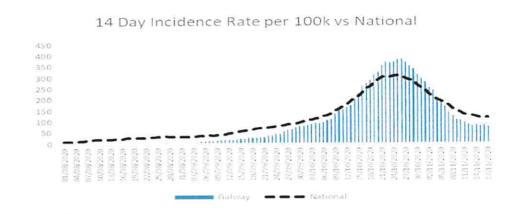
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

Employment summary:

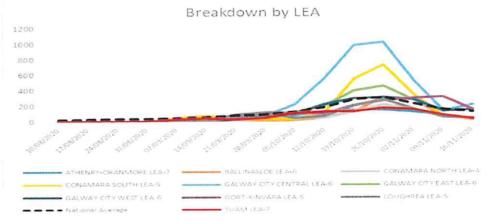
Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019
employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in
May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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Dublin LEA Analysis

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/3120	11/08/2031	0.00012020	14/09/3330	21/08/2020	Z(C/60/8Z	05/10/2020	12/10/20	19/10/2020	26/10/2020	02/11/20	09/11/2020	16/11/2020
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIM NAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
-	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
ਰ	CLONTARF LEA-5	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
듵	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
Jublin City	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	FEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
4	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
S aire	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
유하	DUNDRUM LEA-7	3	13	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
Dun Laoghaire Rathdown	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
5 %	KILLINEY-SHANKILL LEA-7	3		3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	/0.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
75	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
u.	ONGAR LEA-S	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-5	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
=	FIRHOUSE-BOHERNABREENA LEA-S	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
South Dublin	LUCAN LEA-S	3.7	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
d d	FALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
Ħ	RATHFARNHAM-TEMPLEOGUE LEA-7	3	13	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
×	TALLAGHT CENTRAL LEA-5	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-S	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall.

Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the
 national average
- Significant differences exists within each of the four county council areas of Dublin with Dún Laoghaire—Rathdown seeing lower overall incidence

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- . Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

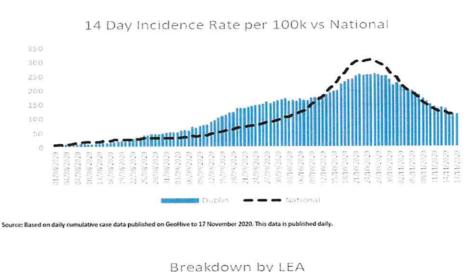
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control
 cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

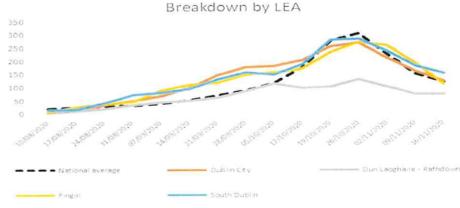
Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly

Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than
 the national average.
- . This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

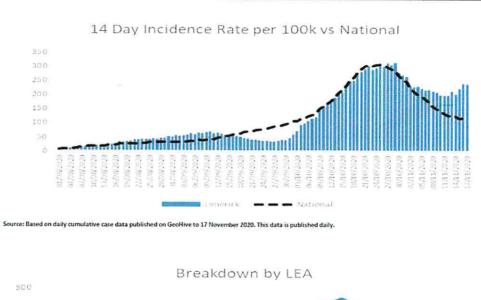
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November.
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

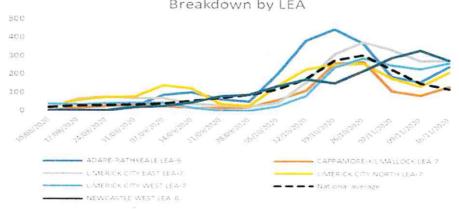
Employment summary:

Limerick had c.43% of its workforce on PUP or TWSS (c.34k) at the peak in early
May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from
22k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases

Kerry profile:

 Kerry has experienced a similar 14 day disease incidence rate per 100k during second wave to the national average. However, Listowel LEA has seen a sharp increase in its rate since early October

Summary analysis:

- North Kerry (Listowel) is most severely affected. This coincides with increased rates in southern parts of Limerick such as Newcastle West and Adare-Rathkeale, as well as Limerick city
- Killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- The remainder of the county (further south, smaller towns) is generally less affected
- Listowel's incidence levels were three times higher than the next worst-afflicted LEA. Note the small population of ~29,000 people meant 182 cases over a 2-week period prior to 26 Oct created a very high incidence rate

Restriction impact:

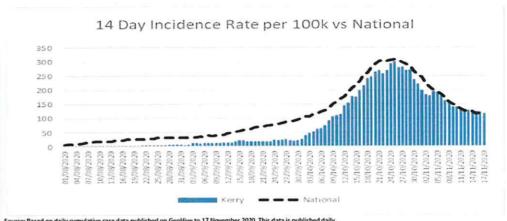
- The number of cases in Kerry started to grow around the time level 3 was introduced two weeks later, this high growth rate had largely ceased
- Improvements have levelled off somewhat across LEAs such as Tralee, Killarney and Listowel

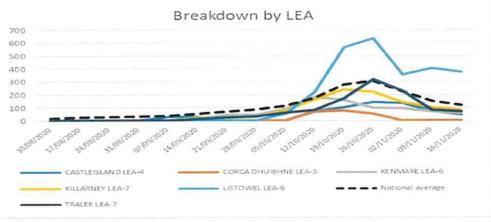
Employment summary:

 Kerry had c.49% of its workforce on PUP or TWSS (c.32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Notes

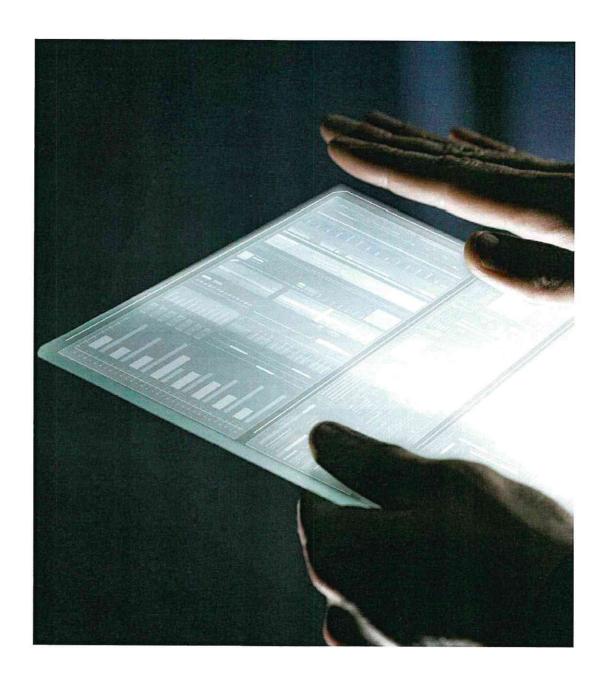
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

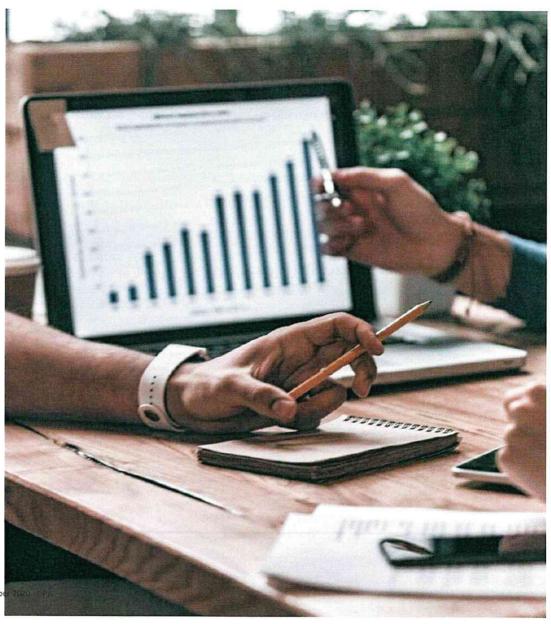
A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

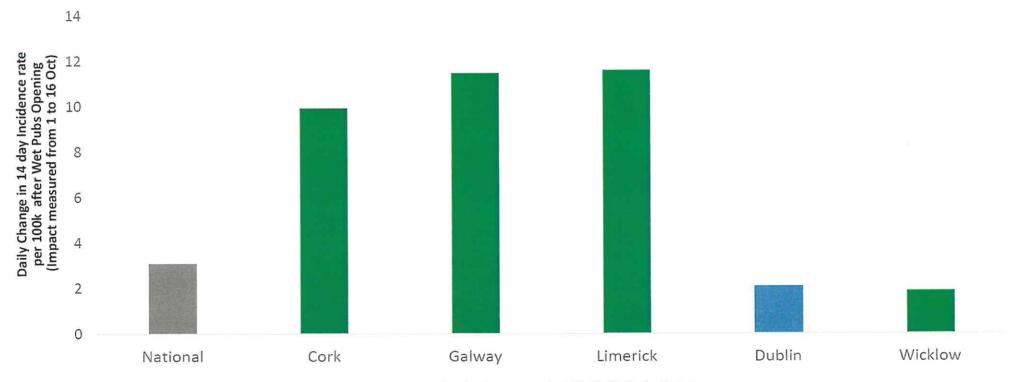
Ireland – restrictions analysis



Data analytics briefing - 25 November

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate was then lower than the national average and for larger counties

Wet pubs opened in all counties except Dublin in late September. This coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in every county. The subsequent incidence rate growth in Dublin was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Wicklow was the only county that performed better than Dublin, with a 10% lower growth rate than Dublin.



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The incidence rate did not materially increase after the three phases of re-opening during late May to early July

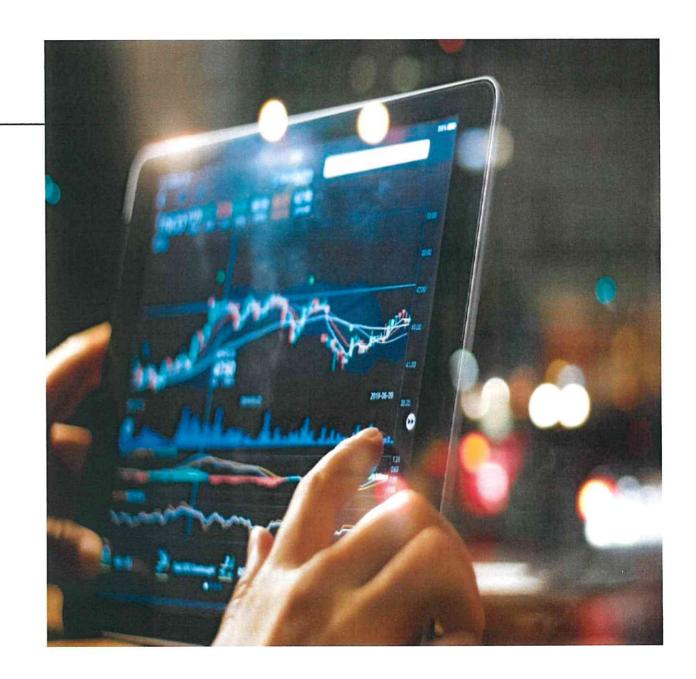
The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	06/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	25/09/2020	87/10/2020	16/10	/2020	22/10/2020
testriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	15/08/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020	26/10	/2020	01/11/2020
wg daily change in 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Constructio n Opened	Mandatory PLF		Phase 3 reopening	ace masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	Level 5 National (1 22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-21
Clare	1	4	3	0	1	-4	2	4	0	0	2	0		0		2		15		-5	4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1			0	-4
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	4				-6	, e	-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0 1	0	1		0		0		6		3	-7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7	1	12	-2		-4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0 1	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3	- 100 A 110	-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		,	-10	-14	-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-12
Tipperary	1	1	5	-1	1	-5	0	-1	0	0 1	0	3		-4		0		4	1	3	0		-12
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	4		
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-2 -13
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		2	-16		
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1	1	2		3	-16		-6 -1

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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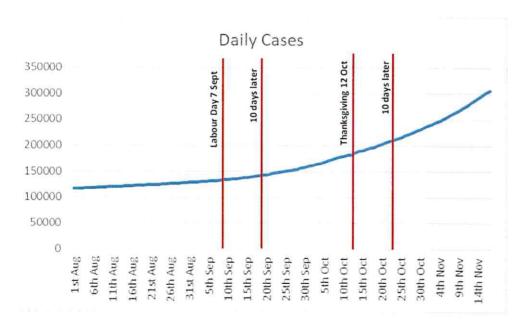
Select International Desktop Research



Canadian Thanksgiving: Testing & Tracing data and case numbers show an increase in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first wave in Spring.



Key findings:

- Canada saw an increase in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first wave in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in the increase in incidence rates
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 increased after Thanksgiving, with a 14% increase in positive cases between 12
 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar increase is noticed on 17th September, 10 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

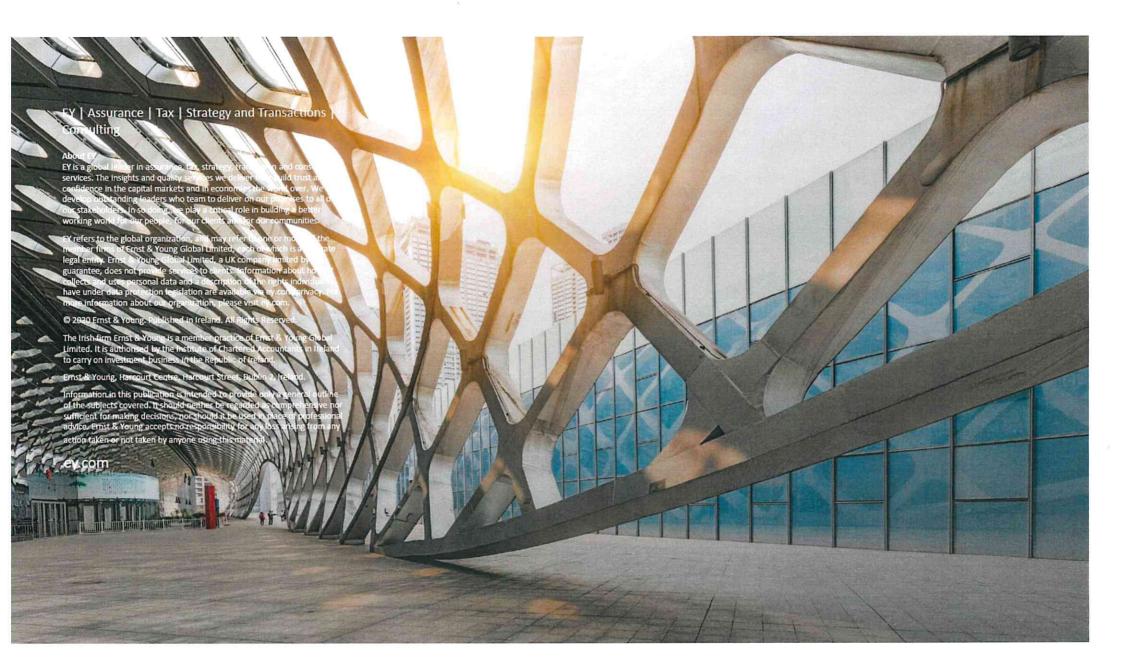
Key findings

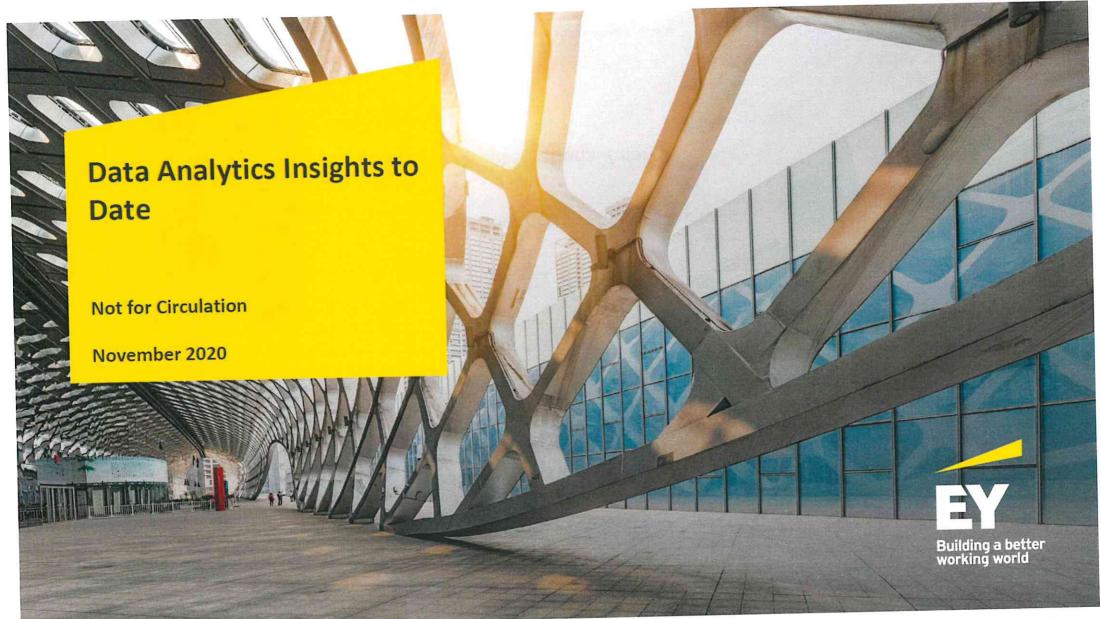
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at certain locations can be an effective alternative to closure
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of
 cases in the US cities studied. However, it is important to note that the
 median church in the U.S. has 75 regular participants in worship on Sunday
 mornings. All but five states have congregations with more than 2,000 people
 in attendance on a Sunday morning. As of 2012, there were roughly 1,600
 Protestant churches in the United States with a weekly attendance of 2,000
 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/, http://hirr.hartsem.edu/research/fastforts/fast_facts.html

Disclaimer

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda

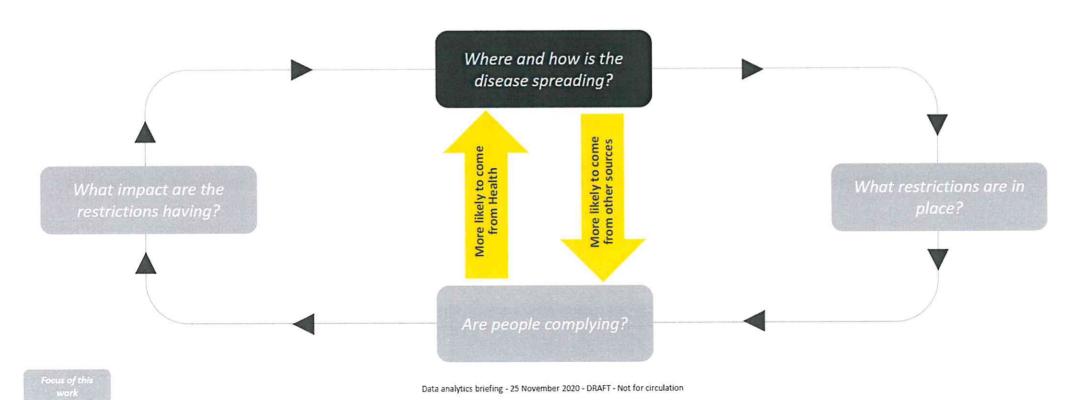




- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis

Providing data analysis to support Government decision making

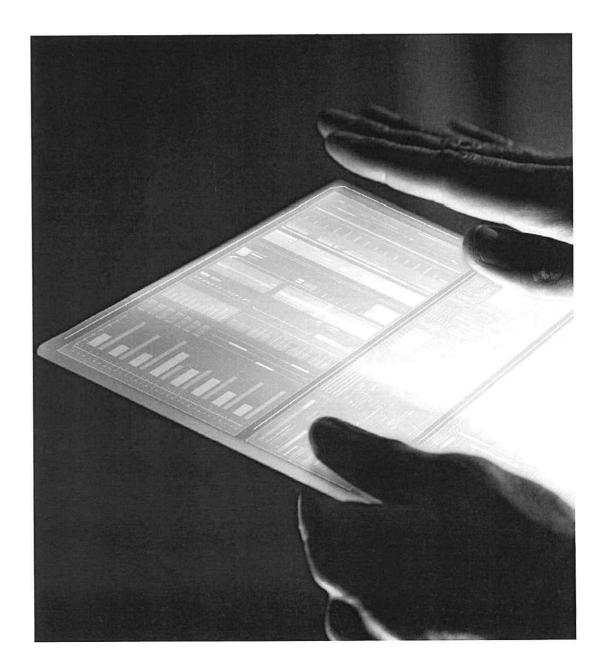
EY Data Analytics team was engaged to analyse certain aggregated data available to the State as part of the State's Covid 19 management strategy. EY's role was to analyse the available data and to present it back to Government officials to consider as part of its on-going deliberations and decision making with regard to Covid 19 restrictions. The focus is situating disease incidence rates in the context of other data (e.g. restriction changes) to produce insights, rather than performing epidemiology.



Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - Proximity to the border
 - 3. Following the national profile
 - Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- · Social gatherings, citizen congregations and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet bars opened in all counties except Dublin in late September. This also coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in in every county. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county
 when the universities opened. This difference was reduced when the universities went online. Wet bars also opened in both cities on the same week that
 universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		1		1	Nursing Home, Private Houses, Residential	Extended Family, Community Outbreak, Private	
Mayo				1	Institution Nursing Home, Hospital, Community	Private House, Nursing Home, School,	
Meath		1	1	1	Hospital/Long-Stay Unit Nursing Home, Private Houses, Workplace	Workplace Private Houses, Nursing Homes, Community	
Sligo*				-	Nursing Home, Private House, Travel Related	Outbreak — Private House, Extended Family, Religious/Other	
Westmeath*						Ceremony	
				1	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	
Kilkenny*		✓			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		✓			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		1		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing	
Galway		1		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Workplace	
Roscommon		1			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Laois*		1			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		✓			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		✓			Workplace, Private Houses, Nursing Homes	Private House, Workplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential	Priate House, Workplace, Nursing Homes	
Louth	1	1		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	1		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Coremony	
Monaghan	1	1			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	1	1			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		1	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources – CIDR, incidence rate –based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. Note Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR
**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per 100k	Population		Change Last 5 Days
Kerry	147,707	22 24 25 22 20 21 26 40 46 52 62 64 73 91 106 110 113 144 153 177 174 197 215 240 246 263 269 257 269 291 299 279 281 269 271 236 220 198 183 178 194 190 177 162 153 139 139 129 128 128 127 123 122 115 86 83 71 80 80	-48%
Limerick	194,899	35 33 34 39 37 45 58 69 90 96 107 114 119 145 160 167 182 189 207 208 231 246 248 277 280 290 301 288 293 306 299 310 306 312 277 269 262 228 227 229 221 216 218 211 207 198 195 195 211 201 222 238 236 221 216 217 205 194	-18%
Mayo	130,507	31 32 30 28 26 28 24 26 30 33 32 36 42 42 54 67 75 80 90 107 123 131 150 167 165 208 228 243 250 246 256 266 259 248 242 261 246 232 216 198 183 184 185 176 162 147 151 145 141 118 113 110 110 109 103 93 77 79 87	-20%
Meath	195,044	42 47 44 47 51 62 67 71 68 85 90 96 115 129 164 183 199 213 306 357 403 452 490 488 591 629 657 656 648 649 661 651 590 558 531 481 450 448 352 314 282 272 249 232 204 201 172 154 141 140 133 139 128 134 127 131 131 126 124	-7%
Sligo	65,535	16 24 32 27 27 31 27 38 55 64 75 90 107 137 150 163 175 186 208 241 291 304 294 325 356 366 395 406 409 423 438 438 423 397 359 354 356 333 304 285 259 220 211 189 159 154 154 154 140 128 114 104 95 33 76 85 84 73 76	-18%
Westmeath	88,770	55 54 55 47 48 52 62 66 64 68 80 88 96 100 105 115 148 167 171 217 211 251 294 324 337 425 435 453 465 460 453 461 465 415 440 402 369 372 354 266 255 229 216 208 184 158 151 162 133 150 150 113 117 113 106 103 100 92 88	-22%
Wexford	149,722	28 27 27 35 33 33 35 40 41 48 57 73 80 85 88 112 130 160 173 188 202 250 271 272 297 298 301 322 318 313 301 268 257 258 242 192 174 172 141 124 126 96 89 83 74 67 67 48 49 49 49 47 45 46 37 42 39 37 36	-22%
Kilkenny	99,232	24 26 26 26 26 29 38 40 45 42 43 51 51 59 61 73 87 98 105 109 123 142 146 154 165 165 177 174 180 175 176 173 171 168 150 133 131 139 134 136 134 134 141 141 133 128 130 125 126 129 126 118 116 116 113 110 98 92 106	-9%
Carlow	56,932	42 40 39 39 26 33 35 44 44 44 42 42 40 42 54 61 74 77 83 84 119 116 149 167 198 204 242 270 292 306 311 327 327 293 299 270 278 249 242 214 213 177 160 137 126 105 95 98 91 88 72 77 81 86 88 84 76 72	-11%
Clare	118,817	41 47 50 53 63 76 76 87 96 121 144 158 183 199 246 261 268 304 310 306 309 322 326 327 322 313 304 311 272 264 281 252 248 253 255 235 229 209 189 186 181 173 171 160 139 132 122 109 104 104 93 109 111 112 104 93 91 89 86	-23%
Cork	542,868	52 62 66 71 81 88 97 102 105 110 111 119 127 140 155 159 181 189 209 232 237 256 275 308 322 336 340 327 334 347 337 335 333 331 334 318 305 276 258 242 233 239 216 195 179 158 143 119 108 102 89 83 86 82 81 73 77 78 81	-196
Galway	258,058	46 54 62 65 74 81 79 85 89 93 92 97 107 113 137 153 155 165 173 203 228 262 273 288 314 326 355 372 368 373 382 384 370 354 341 313 296 282 255 243 211 187 171 144 126 109 108 97 86 83 86 80 84 78 71 66 62 62 63	-19%
Longford	40,873	37 39 49 59 73 98 120 127 132 147 152 154 169 169 176 208 193 196 181 193 176 213 240 254 279 291 281 306 296 281 289 291 306 279 294 259 245 223 193 181 193 166 164 157 152 142 132 127 115 115 103 103 100 100 83 88 88 81 83	-17%
Roscommon	64,544	64 76 84 99 102 121 133 143 161 155 155 170 166 166 192 184 200 181 187 201 198 201 223 232 228 239 260 271 260 276 263 263 263 269 231 240 229 203 225 229 218 195 189 174 153 152 175 170 175 163 166 169 181 169 161 160 166 161	0%
Offaly	77,961	59 56 63 62 65 67 74 77 79 99 103 104 110 123 130 136 140 145 141 151 140 177 201 195 210 224 222 224 214 224 217 222 227 218 236 191 162 153 130 112 106 100 96 97 99 85 99 94 87 95 114 112 117 122 126 119 123 103 100	-18%
Laois	84,697	34 31 32 32 35 43 43 76 76 89 87 96 105 123 124 133 135 139 136 161 169 151 174 185 201 214 222 20 22 23 242 251 256 231 235 227 208 204 197 179 170 174 175 174 183 157 155 149 136 136 137 116 107 104 99 86 83 63 59	-43%
Waterford	116,176	86 67 67 59 53 44 38 35 34 28 31 32 40 46 56 64 61 66 70 83 109 131 132 143 155 160 173 176 194 205 215 226 225 228 210 205 201 201 195 194 187 176 163 146 136 128 134 114 142 141 156 163 163 163 164 155 161 157 156 154	-6%
Tipperary	159,553	18 21 24 24 25 31 32 36 40 48 53 55 58 58 66 70 71 78 83 79 88 93 110 113 115 118 120 126 124 134 139 133 139 131 130 130 130 130 130 130 132 130 128 122 117 123 118 113 117 114 101 105 110 107 106 100 97 92 86	-19%
Kildare	222,504	76 75 78 77 85 82 80 97 95 94 87 98 99 108 125 146 154 168 188 198 204 208 244 257 278 293 305 303 298 301 306 298 289 290 292 270 242 231 210 186 177 169 156 143 121 118 103 94 85 93 89 88 85 86 87 86 87 86 87 86 87	196
Louth	128,884	95 104 92 80 76 75 74 79 77 88 90 65 85 89 116 109 116 115 152 161 181 185 188 178 221 261 293 283 272 286 299 311 289 296 293 285 297 297 257 219 193 202 189 177 159 155 157 156 147 151 151 160 157 168 174 186 202 206 213	27%
Cavan	76,176	37 49 51 47 56 67 79 84 88 114 134 144 164 200 303 339 386 412 571 641 735 760 811 824 910 1012 1058 1058 983 966 967 964 810 752 668 645 589 562 474 365 295 263 232 206 159 143 133 119 112 102 108 98 87 95 97 95 101 100 98	4%
Leitrim	32,044	34 37 37 25 19 25 25 28 31 31 28 34 34 53 81 97 125 137 147 162 218 218 225 240 253 262 272 278 259 247 222 209 200 178 125 122 109 97 84 69 56 31 28 34 37 37 47 56 81 81 87 34 94 100 106 106 97 84 78	-22%
Monaghan	61,386	68 93 116 135 134 166 173 189 178 207 226 257 257 270 303 319 331 332 362 350 368 350 375 365 402 389 406 409 384 375 349 363 323 310 305 303 288 269 218 205 171 176 166 142 137 121 122 116 117 124 112 114 104 104 104 112 94 101 101 106	2%
Donegal	159,192	178 185 191 204 211 219 233 258 265 273 293 312 319 326 324 345 355 355 355 354 367 365 356 344 347 329 320 320 312 312 324 322 329 318 313 317 322 310 320 309 305 286 300 297 290 293 275 285 273 281 271 272 275 269 281 293 263 266 254 231 227	-23%
Wicklow	142,425	69 65 67 70 73 65 72 74 77 78 78 78 76 76 80 84 88 91 87 89 91 103 119 120 124 124 129 145 149 149 141 130 117 116 107 104 106 91 88 89 82 77 89 86 84 85 85 82 86 83 78 88 91 80 84	2%
Dublin	1,347,359	148 152 160 154 159 163 168 172 161 166 162 171 165 163 173 174 177 160 184 193 197 201 223 231 238 241 252 257 253 255 255 258 255 252 252 27 220 226 217 209 200 199 191 185 172 161 151 142 134 139 136 119 118 115 119 114 118 114 114	-1%
National	4,761,865	80 84 88 89 29 69 101 108 107 114 116 124 128 134 150 158 167 177 190 207 217 231 251 261 279 290 302 307 309 307 298 291 286 268 253 247 226 211 201 195 184 173 159 150 142 133 127 128 124 117 118 117 114 111 111 106 107	-9%

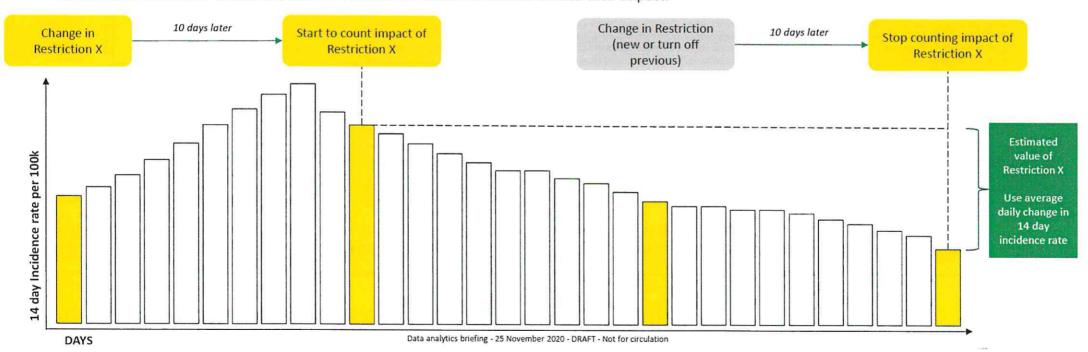
Source: Based on daily cumulative case data published on GeoHive to 22 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k per restriction. The impact is calculated using the approach described in Slide 8.

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	26/09/2020	07/10/2020	16/10	/2020	22/10/2020
Restriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	18/08/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020	26/10	/2020	01/11/2020
Avg daily change in 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Constructio n Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	** Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	** Level 5 National (to 22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-21
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1			0	-4
Dublin	3	6	11	1	-2	4	-3	-1	0	0	0	1		2		4	4				-6		-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		2	-10		-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-12
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-2
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-2
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-13
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-6
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-1

Note:

The outputs should be seen as directionally useful, rather than precise statistical outputs

The reopening of wet bars

* coincided with universities
opening together with
specific sporting events

Care required when interpreting restriction

** changes in quick succession. Specifically, the more recent restriction changes (Level 3, Level 3 Max and Level 5) happened within a 15 day period

> The absolute number of weekly tests has significantly increased since Wave 1

This analysis does not also consider potential behavioural changes beyond the restrictions

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

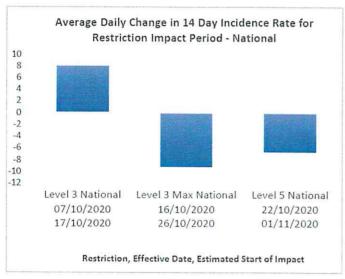
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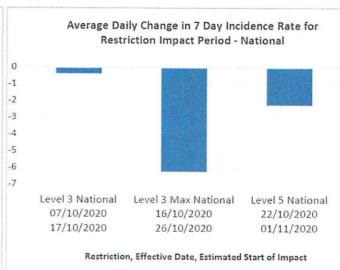
The introduction of Level 3 Max and Level 5 both coincide with a reduction incidence rates

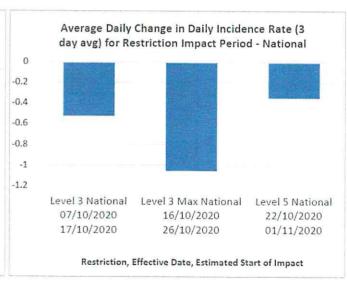
The 14 day incidence rate per 100k did not reduce for all but four counties with the introduction of Level 3. However, it did start to reduce with the introduction of further household restrictions (Level 3 Max) and then Level 5.

These three restriction changes happened within a 15 day period, with Level 3 Max was only active for 6 days.

For completeness, this analysis has also been repeated for a 7 day and a daily incidence rate average over three days. All three are shown below and follow similar, albeit reduced, patterns.



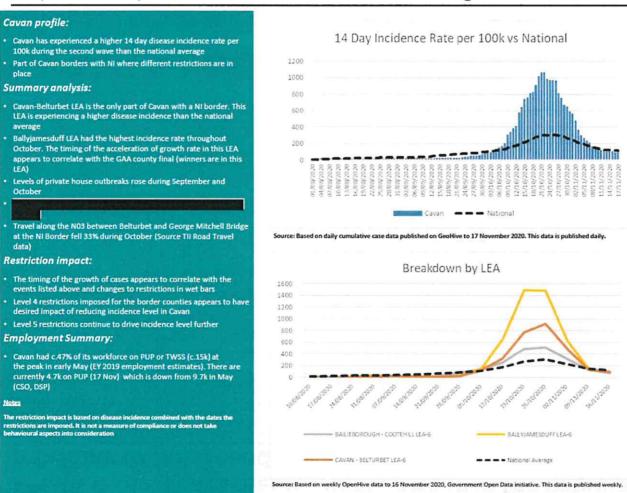


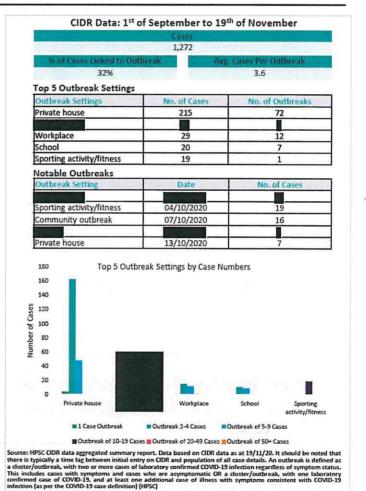


Note:

- · Care required when interpreting restriction changes in quick succession. This analysis does not also consider potential behavioural changes beyond the restrictions
- Each measure in the above three graphs quantify the impact over a different time period; 14 days, 7 days and 1 day respective. Hence, it is expected that the size of their impact is different. That is also why they are shown to different scales on the y axis
- National measure excludes Dublin, Donegal, Cavan and Monaghan as they were under different restriction changes
- The Level 5 reductions should be seen as additive to the reduction in Level 3 Max.

Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend





Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile:

- Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- . Dublin borders including a significant commuter population

Summary analysis:

- Level of private house outbreaks during September and October grew
- Continued outbreaks in nursing homes, one significant outbreak of 51 cases
- · One significant community outbreak of 29 cases
- Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county final win (Source: GAA.ie)

Restriction impact:

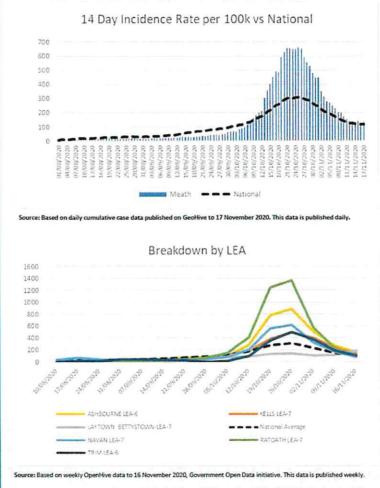
- The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet bars
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- . Level 5 restrictions continue to drive incidence level down further

Employment summary:

 Meath had c.42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



CIDR Data: 1st of September to 19th of November 2.466 **Top 5 Outbreak Settings** Outbreak Settings No. of Cases No. of Outbreaks Private house 397 121 74 Nursing home 9 Community outbreak 45 4 Workplace 38 18 School 25 10 Notable Outbreaks Outbreak Setting Date No. of Cases Nursing home 51 10/10/2020 29 Community outbreak 13/10/2020 12 Community outbreak Workplace 19/10/2020 11 10 Nursing home 300 Top 5 Outbreak Settings by Case Numbers - Meath 250 200 150 100 Private house Nursing home outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a duster/outbreak, with two or more cases of absoratory confirmed COVID-10 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a duster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per

the COVID-19 case definition) (HPSC)

The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the Ni border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in (Source: Donegal Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on bars and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

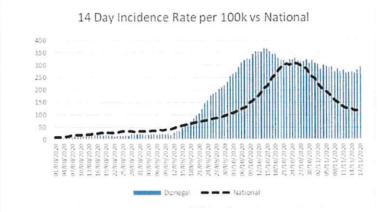
Employment summary:

 Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

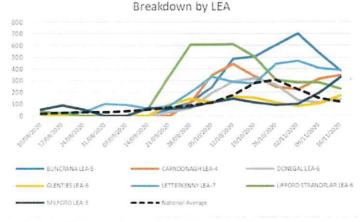
Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.

The Facebook survey is a voluntary survey, managed by the University of Maryland. The mask question reads "In the last 7 days, how often did you wear a mask in public".



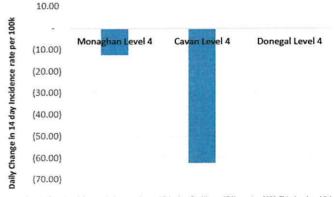
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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	of September to 19	
فالمستحدد والمستحدث	Cases	
	2,165	
% of Cases Linked to O	utbreak Ave	Cases Per Outbreak
62%		3.9
op 5 Outbreak Setting:	5	
Outbreak Settings	No. of Cases	No. of Outbreaks
rivate house	651	235
Vorkplace	159	28
lospital	126	5
xtended family	118	19
Nursing home	58	5
lotable Outbreaks	•	*
Outbreak Setting	Date	No. of Cases
Hospital	,	99
Vorkplace	23/09/2020	55
Nursing home	THE STATE OF THE S	49
ocial gathering	24/10/2020	20
Hospital		17



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily. An outhreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of filness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

 Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

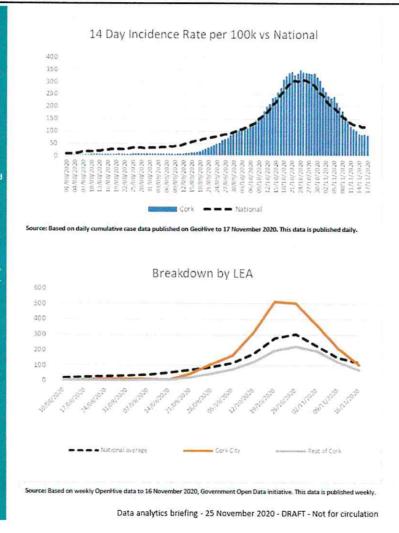
- Cases in Cork city rose as wet bars reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

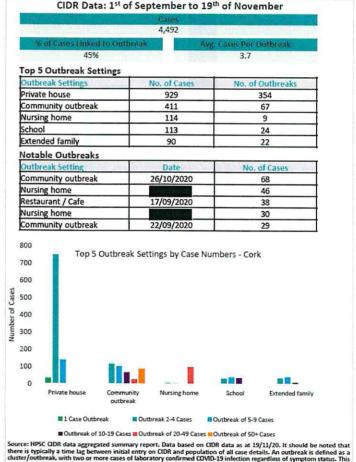
Employment summary:

 At peak, c 39% of Cork's workforce were on PUP or TWSS (c 96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.





includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed

case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per

the COVID-19 case definition) (HPSC)

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile:

- Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- It has now come back down below national average levels since early November

Summary analysis:

- Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October
- A number of key events occurred in late September which could have contributed to this increase
- Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 September
- GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South had a confirmed outbreak in mid-October.
- Throughout November, private household cases were responsible for 49% of outbreak cases, with and community outbreaks making up a large proportion of the remaining percentage

Restriction impact:

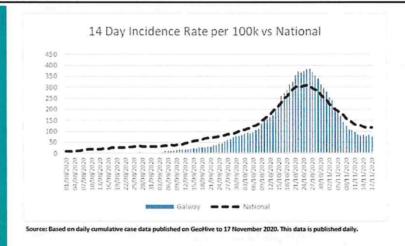
- Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November
- An exception to this is Gort-Kinvara, which saw cases continue to rise into early November

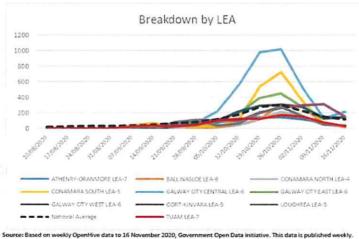
Employment summary:

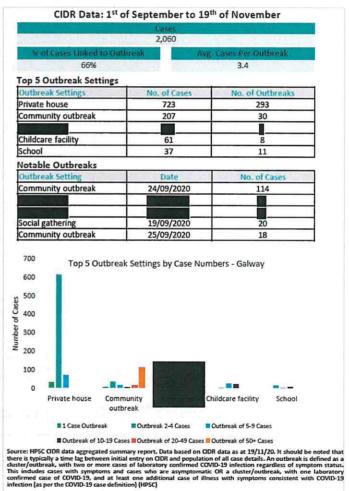
 Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration







Dublin – local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/2020	31/08/2020	07/09/2020	14/09/2020	21/09/12	28/09/2020	05/10/2020	02/01/21	05/01/61	26/10/2020	02/11/2020	09/11/2020	16/11/2020
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
_	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44,3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
Dublin City	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
=	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
dp	KIMMAGE-RATHMINES LEA-6	3	21,5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-5	15.4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
3	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
Dun Laoghaire Rathdown	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
Laoghair	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
th do	GLENCULLEN-SANDYFORD LEA-7	3	19,1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
F B	KILLINEY-SHANKILL LEA-7		No. of the		13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	/0.9	44.6	52.5
ā	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
-	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
正	ONGAR LEA-5	3		36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-5	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
State of	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
c	FIRHOUSE-BOHERNABREENA LEA-5	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
lg	LUCAN LEA-5	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublin	PALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
ŧ	RATHFARNHAM-TEMPLEOGUE LEA-7	3	3	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
S	TALLAGHT CENTRAL LEA-6	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231.4	168.9	134.2
	TALLAGHT SOUTH LEA-5	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall.

Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Dublin profile:

- Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average
- Significant differences exists within each of the four county council
 areas of Dublin with Dun Laoghaire—Rathdown seeing lower overall
 incidence.

Summary analysis:

- Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs; Dublin North, Dublin North West, Dublin North Central
- Tallaght South is the only LEA within Dublin where cases have continued to climb in November

Restriction analysis:

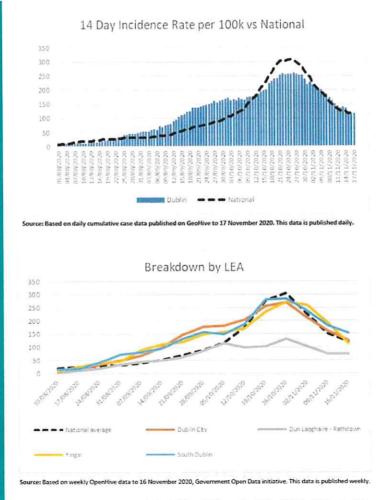
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet bars does appear to have helped Dublin with the subsequent increase in cases being slower than the national average.

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



CIDR Data: 1st of September to 19th of November 12,606 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks 2075 rivate house xtended family 291 266 27 Nursing home 249 66 192 30 Hospital Notable Outbreaks No. of Cases Outbreak Setting Date Extended family 24/09/2020 75 Nursing home 12/09/2020 38 Hotel Childcare facility 20/10/2020 38 Residential institution 02/10/2020 30 5000 Top 5 Outbreak Settings by Case Numbers - Dublin 4500 4000 3500 § 3000 2500 2000 1500 1000 500 Private house Extended family Nursing home School Hospital Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

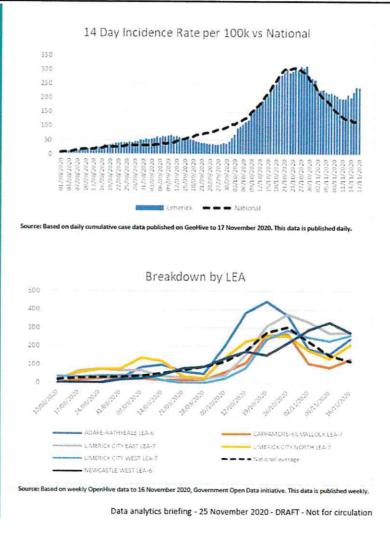
Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of filness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

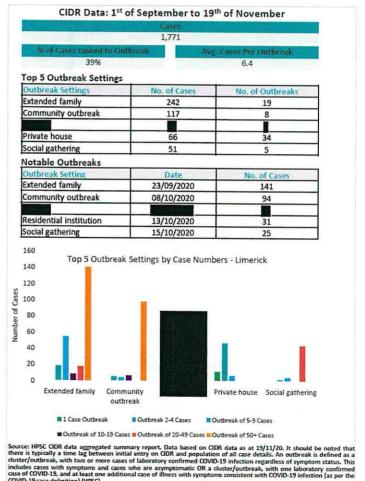
Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile: Umerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average. This is a result of the cases in Limerick not declining to the same extend in the rest of the country Summary analysis: Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November. Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November No region performs notably better than others - the remaining LEAs each exceed an incidence rate of 200 cases per 100k population Employment summary: Limerick had c.43% of its workforce on PUP

or TWSS (c.34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





COVID-19 case definition) (HPSC)

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases

Kerry profile:

Kerry has experienced a similar 14 day disease incidence rate per 100k during second wave to the national average. However, Ustowel LEA has seen a sharp increase in its rate since early October

Summary analysis:

- North Kerry (Listowel) is most severely affected. This coincides with outbreaks southern parts of Limerick such as Newcastle West and Adare-Rathkeale, as well as Limerick city
- Killarney and Tralee LEAs are both next in terms of severity of impact, containing two major Kerry towns
- The remainder of the county (further south, smaller towns) is generally less affected
- Private homes account for 33.68% of all outbreak cases since Sept
- Listowel's incidence levels were three times higher than the next worst-afflicted LEA. Note the small population of ~29,000 people meant 182 cases over a 2-week period prior to 26 Oct created a very high incidence rate

Restriction impact:

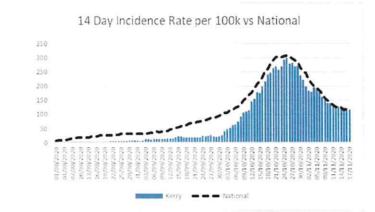
- The number of cases in Kerry started to grow around the time level 3 was introduced – two weeks later, this high growth rate had largely ceased
- Improvements have levelled off somewhat across LEAs such as Tralee, Killamey and Listowel

Employment summary:

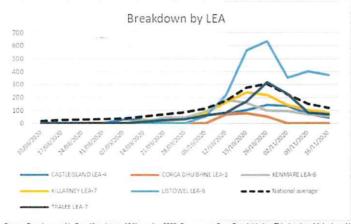
 Kerry had c.49% of its workforce on PUP or TWSS (c.32k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



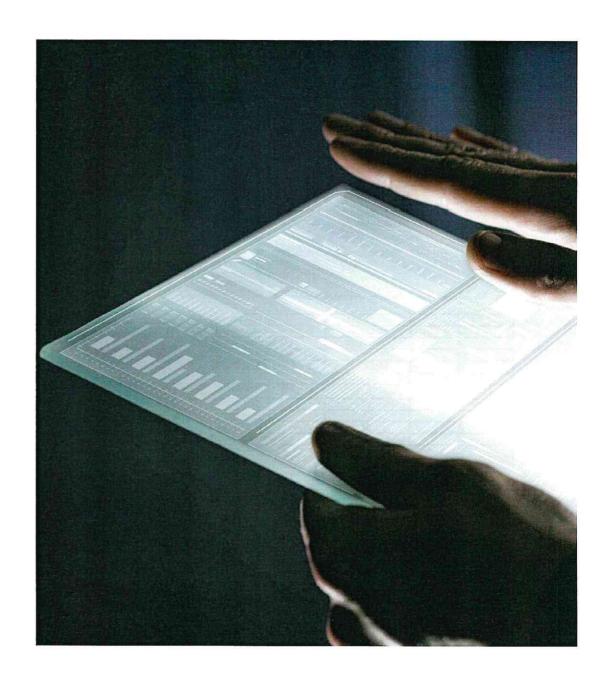
Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly

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CIDR Data: 1st of September to 19th of November Top 5 Outbreak Settings Outbreak Settings No. of Outbreaks No. of Cases Private house 150 53 Community outbreak 101 14 25 School 23 **Notable Outbreaks** Outbreak Setting Date No. of Cases Community outbreak 03/09/2020 43 Community outbreak 23/10/2020 25 Religious/Other ceremony 16/10/2020 11 Restaurant / Cafe 11/09/2020 Top 5 Outbreak Settings by Case Numbers - Kerry 120 100 80 60 40 20 Private house Extended family 1 Case Outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

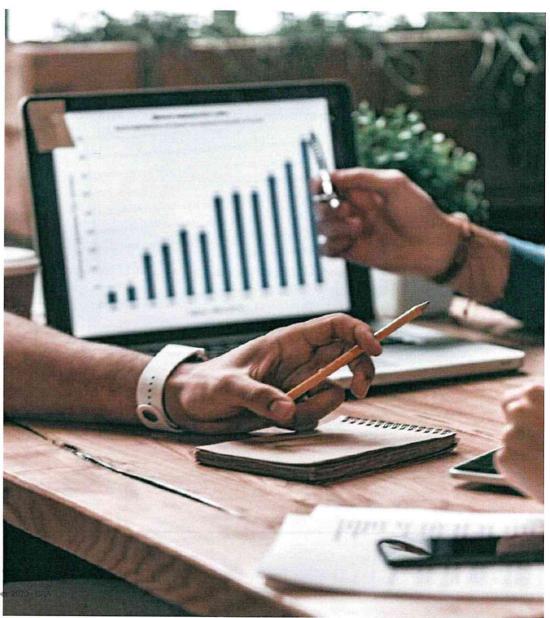
A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

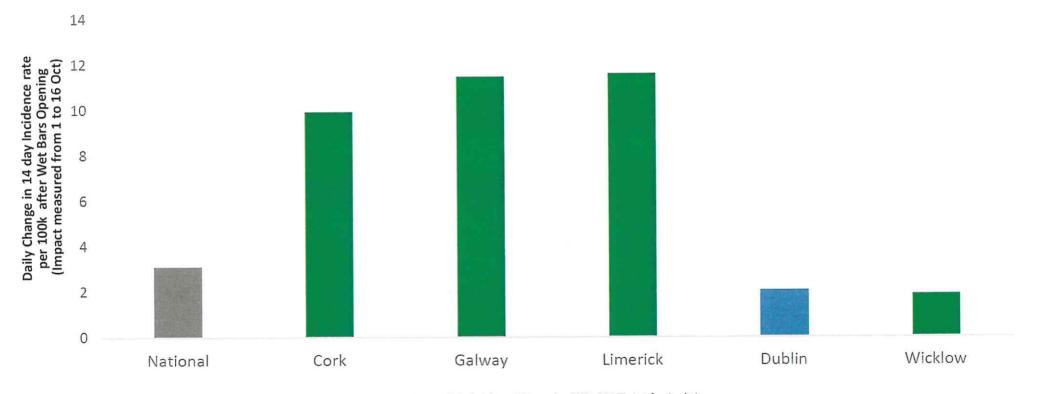
Ireland – restrictions analysis



Data analytics briefing - 25 November

Wet Bars opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate was then lower than the national average and for larger counties

Wet bars opened in all counties except Dublin in late September. This coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in every county. The subsequent incidence rate growth in Dublin was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Wicklow was the only county that performed better than Dublin, with a 10% lower growth rate than Dublin



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The incidence rate did not materially increase after the three phases of re-opening during late May to early July

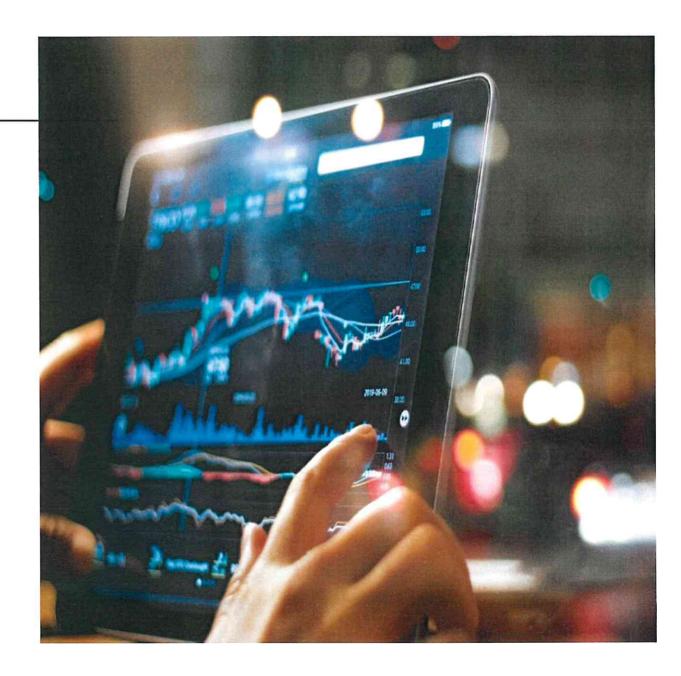
The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	25/09/2020	07/10/2020	16/10	/2020	22/10/2020
Restriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	18/08/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020		1/2020	01/11/2020
Avg daily change in 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to 5km	Constructio n Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	ace masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	Level 5 National (1 22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4	7	1	1	5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17	1	-62	-21
Clare	1	4	3	0	1	-4	2	4	0	0	2	0		0		2		15		-5	4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1			0	-4
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	4				-6		-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	.7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0 1	0	1		1		2		7		12	-2		-4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7	1	11		-3		-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		2	-10		-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17	())	16	-14		-12
Tipperary	1	1	5	-1	1	-5	0	-1	0	0 1	0	3		-4		0		4	11	3	0		-2
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	4		-2
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-13
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		
Wicklow	1	5	5	3	-1	-3		0	0	0								2		,	-10		-6 -1

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

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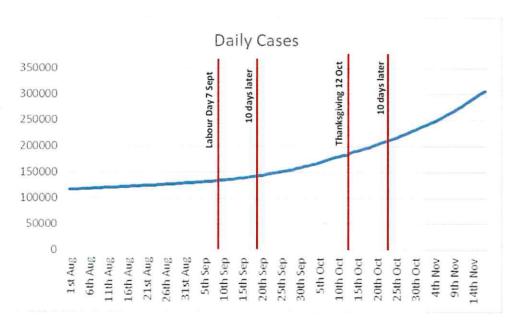
Select International Desktop Research



Canadian Thanksgiving: Testing & Tracing data and case numbers show surge in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first surge in Spring.



Key findings:

- Canada saw a surge in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first surge in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in viral spread
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 dramatically changed after Thanksgiving, with a 14% increase in positive cases
 between 12 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar spike is noticed on 17th September, 10 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

Key findings

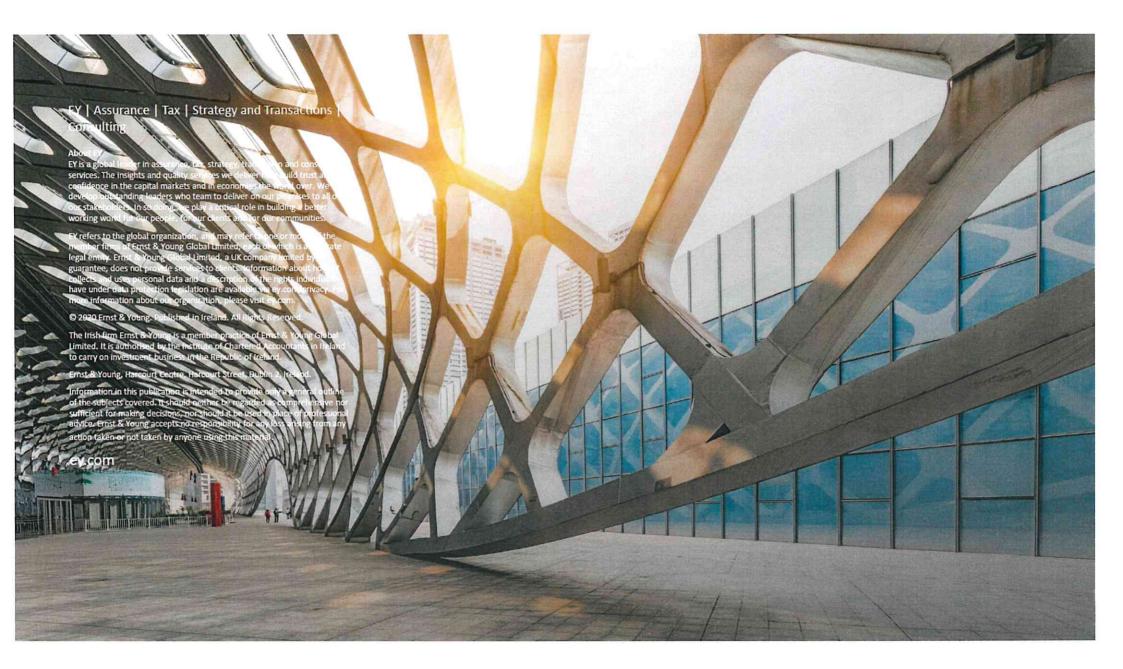
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of
 cases in the US cities studied. However, it is important to note that the
 median church in the U.S. has 75 regular participants in worship on Sunday
 mornings. All but five states have congregations with more than 2,000 people
 in attendance on a Sunday morning. As of 2012, there were roughly 1,600
 Protestant churches in the United States with a weekly attendance of 2,000
 people or more.

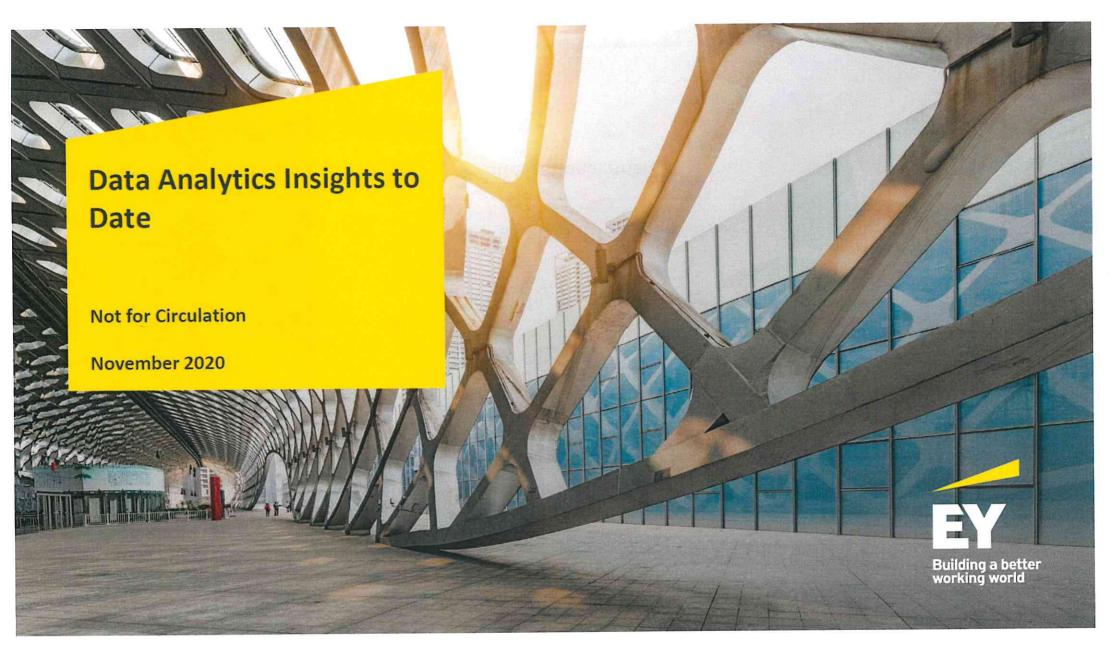
Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/

http://hirr.hartsem.edu/research/fastfacts/fast_facts.html

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





Update – Week 6

Agenda

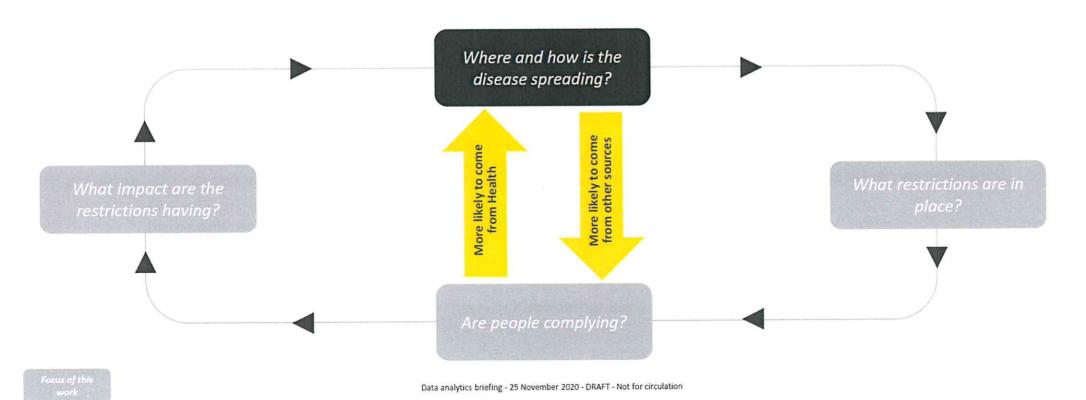




- Introduction
- County Specific Analysis
- Restrictions Impact Analysis
- International Analysis

Providing data analysis to support Government decision making

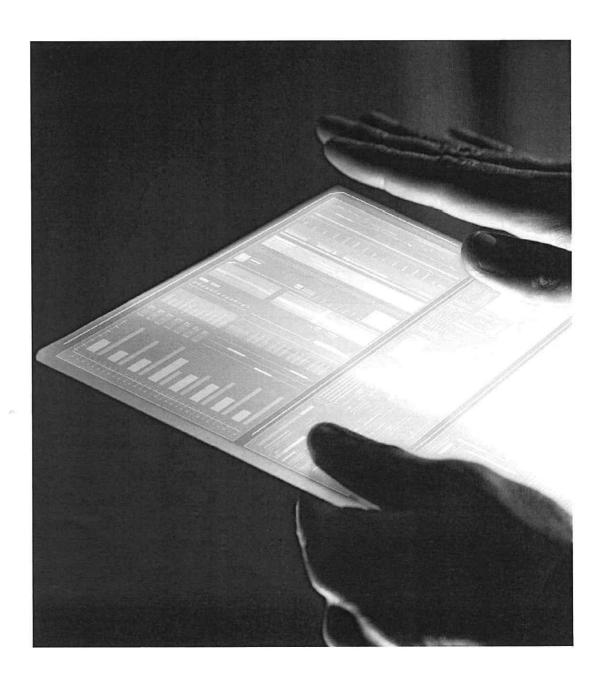
EY Data Analytics team was engaged to analyse certain aggregated data available to the State as part of the State's Covid 19 management strategy. EY's role was to analyse the available data and to present it back to Government officials to consider as part of its on-going deliberations and decision making with regard to Covid 19 restrictions. The focus is situating disease incidence rates in the context of other data (e.g. restriction changes) to produce insights, rather than performing epidemiology.



Summary of initial findings

- Extending county analysis to Local Electoral Areas (LEA) helps provide a more specific understanding of what is happening in each county. These profiles can broadly be categorised as follows:
 - Significant known outbreak event(s)
 - 2. Proximity to the border
 - 3. Following the national profile
 - Proximity to and scale of Dublin
- We now have a far more expansive testing regime. This means that it is difficult to directly compare Wave 1 and Wave 2. While accepting that, it is worth noting the shift in recorded outbreaks from being led by Nursing Homes in Wave 1 to Private Households in Wave 2. This contributes to a reduction of 15 years in the median age of identified cases from Wave 1 to Wave 2 (Source: CSO)
- Social gatherings, citizen congregations and specific local events all appeared to have contributed to Wave 2 outbreaks
- The introduction of Level 3 nationally did not reduce the 14 day incidence rate per 100k for majority of counties. The introduction of further household restrictions (Level 3 Max) from mid-October drove a reduction across most counties
- Wet pubs opened in all counties except Dublin in late September. This also coincided with universities opening together with specific sporting events. The 14
 day disease incidence rate per 100k started to increase ten days later in in every county. This increase was not seen to the same extent in Dublin
- The LEAs containing University College Cork (UCC) and National University of Ireland Galway (NUIG) both saw higher increases than the rest of their county
 when the universities opened. This difference was reduced when the universities went online. Wet pubs also opened in both cities on the same week that
 universities opened
- The northern counties, and especially LEAs on the border, do appear to be impacted by proximity to the border. Donegal is not seeing significant reductions with Level 4 that was seen in other border counties
- The reopening of construction, non-essential retail and the wider Phase 3 changes during the summer do not appear to have had a material impact on the 14 day disease incidence rate per 100k nationally or in larger counties. It should however be noted that the disease rate was low at this time

County specific analysis



County Analysis Summary

County	Border county	Known outbreaks	Dublin and surrounding area	Following national restrictions trend	Wave One – main outbreak sources	Wave Two – main outbreak sources	14 day incidence rate per 100k (26/07 – 17/11)
Kerry		✓		1	Private Houses, Residential Institutions, Hospital	Private House, Community Outbreak, Nursing	
Limerick		1		1	Nursing Home, Private Houses, Residential	Home - Extended Family, Community Outbreak, Private	
Mayo				1	Institution Nursing Home, Hospital, Community	Private House, Nursing Home, School,	
Meath		/	1	4	Hospital/Long-Stay Unit	Workplace Private Houses, Nursing Homes, Community	
		· ·	-	✓	Nursing Home, Private Houses, Workplace	Outbreak	
Sligo*				-	Nursing Home, Private House, Travel Related	Private House, Extended Family, Religious/Other Ceremony	
Westmeath*				✓	Workplace, Nursing Home, Hospital	Private House, Nursing Homes, Workplace	
Wexford				1	Hospital, Nursing Home, Private House	Private House, Social Gathering, Nursing Home	_
Kilkenny*		✓			Hospital, Private House, Community Hospital/Long-Stay Unit	Private House, Workplace, Hospital	
Carlow*		1			Hospital, Nursing Home, Private Houses	Private House, Workplace, Hospital	
Clare		✓			Nursing Home, Private Houses, Extended Family	Private House, Extended Family, Community Outbreaks	
Cork		✓		1	Workplace, Private Houses, Nursing Homes	Private House, Community Outbreak, Nursing Home	
Galway		✓		1	Hospital, Nursing Home, Private Houses	Private House, Community Outbreak, Nursing Home	
Longford*		✓			Workplace, Nursing Homes, Hospital	Private House, Mursing Home, Workplace	
Roscommon		✓			Workplace, Nursing Homes, Hospital	Private House, Nursing Home, Extended Family	
Offaly*		✓			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Laois*		✓			Workplace, Hospital, Community Hospital/Long- Stay Unit	Private House, Workplace, Nursing Home	
Waterford		✓			Workplace, Private House, Nursing Home	Private House, Workplace, Community Outbreaks	
Tipperary		✓			Workplace, Private Houses, Nursing Homes	Private House, 'w'orkplace, Nursing Home	
Kildare**		1	1		Nursing Home, Private Houses, Residential Institution	Priate House, Workplace, Nursing Homes	
Louth	1	✓		1	Nursing Home, Private House, Hospital	Private Houses, Hospitals, Residential Institutions	
Cavan	1	✓		1	Nursing Home, Private House, Workplace	Private Houses, Nursing Homes, School	
Leitrim*	1				Nursing Home, Private House, Travel Related	Private Houses, Extended Family, Religious/Other Ceremony	
Monaghan	1	✓			Nursing Home, Workplace, Residential Institution	Private Houses, Workplaces, Residential	
Donegal	/	✓			Travel Related, Nursing Home, Community Hospital/Long-Stay Unit	Private Houses, Hospitals, Extended Family	
Wicklow**			1	1	Workplace, Private House, Residential Institution	Private House, Nursing Home, Workplace	
Dublin		✓	1		Nursing Home, Private Houses, Residential Institution	Private Houses, Extended Family, Nursing Home	

Source Outbreak sources - CIDR, Incidence rate - based on daily cumulative case data published on GeoHive to 17 November 2020.

This data is published daily. Note Wave one defined as 03/03-25/07; Wave 2 is 26/07-20/11

^{*}Carlow-Kilkenny, Laois-Offaly, Longford-Westmeath and Sligo-Leitrim are combined in CIDR

**Due to Kildare outbreak data including West-Wicklow, any outbreak cases in that area have been included with Kildare, not Wicklow

Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last two months. The overall reduction in cases has levelled to 17/11, with some county incidence rates increasing.

Two Weekly Incidence Rate Per	Population	-Sep	Sep	-Sep	-Sep	-Sep	-Oct	-Oct	-0°t	oct Oct	5 5	Oct	-Oct	-Oct	i c	o c	-Oct	-Oct	-Oct	- Oct	i to	o c	oct	-Oct	-Oct	-Oct	òct	5 5	i c	oct o	-Oct	oct	10 A	Nov-	7 No. 7	Nov-	Nov.	08-Nov	Nov-	No. 7	-Nov-		Nov-	Nov-	200	>0 -V	-Nov	>0 N	22-Nov	Change Last 5
100k		25	27	28	29	30	9	02	03	8 9	S 8	07	80	66	2 7	- 2	5	14	5	9 1	- a	6	20	21	22	23	24	26.	2 5	28	29	33	2 2	02	8 2	98	90	8	1-60	÷ ;	= 5	1 6	4	()	1 0	. 6	9	2 2	22	Days
Kerry	147,707	22	4 25	22	20	21	26	40	46	52	62 6	73	91	106	110 1	13 144	4 153	177	174	197	215 2	40 24	6 263	269	257	269	291 2	293 27	79 28	81 26	9 271	236 2	20 198	183	178 19	4 190	177	62 15	3 139	139 1	29 12	8 128	127	123 1	22 11	5 86	83	71 60	0 60	-48%
Limerick	194,899	35	33	34	39	37	45	58	69	90 :	96 10	7 114	119	145	160 1	67 183	2 189	207	208	231	246 2	48 27	7 280	290	301	288	293	306 25	99 31	10 30	6 312	277 2	69 262	2 228	227 22	9 221	216	18 21	207	198 1	95 19	5 211	201	222 2	38 23	86 221	216	217 20	05 194	-18%
Mayo	130,507	31	32 30	28	26	28	24	26	30	33	32 31	42	42	54	67 7	5 80	90	107	123	131	150 11	67 185	5 208	228	243	250	246 2	256 26	6 25	59 24	8 242	261 2	46 232	2 216	198 18	3 184	185	76 16	147	151 1	45 14	11 118	113	110 1	10 10:	9 103	93	77 79	9 87	-20%
Meath	195,044	42	17 44	47	51	62	67	71	68	85	90 9	115	129	164	183 1	99 21	3 306	357	403	452	190 4	88 59	629	657	656	648	649	661 69	51 59	90 55	8 531	481 4	50 448	352	314 28	2 272	249 2	32 20	4 201	172 1	54 14	11 140	133	139 1	28 13	4 127	131	131 12	6 124	-7%
Sligo	65,535	18	24 32	27	27	31	27	38	55	64	75 9	107	137	150	163 1	75 18	6 208	241	291	304	294 3	25 35	6 366	395	406	409	423	138 43	38 42	53 39	7 359	354 3	56 333	3 304	285 2	59 220	211	89 15	154	154	154 14	0 128	114	104 \$	95 93	3 76	85	84 73	3 76	-18%
Westmeath	88,770	55	54 55	47	48	52	62	66	64	68	80 8	3 96	100	105	115 1	48 16	7 171	217	211	251	294 3	24 33	7 425	435	453	455	460	153 41	61 46	65 418	5 440	402 3	69 372	2 354	266 2	55 229	216	08 18	158	151	162 13	3 150	150	113 1	117 11:	3 106	103	100 92	2 88	-22%
Wexford	149,722	28	27 27	35	33	33	35	40	41	48	57 7	3 80	85	98	112 1	30 16	0 173	188	202	250	271 2	72 29	7 298	301	322	318	313	301 26	8 25	57 25	8 242	192 1	74 172	141	124 12	6 96	89	83 74	67	67	48 4	9 49	49	47	45 48	6 37	42	39 3	7 36	-22%
Kilkenny	99,232	24	26 26	26	26	29	38	40	45	42	43 5	1 51	59	61	73 8	37 98	105	109	123	142	146 1	54 169	5 165	177	174	180	175	176 17	73 17	71 160	8 150	133	131 139	134	136 13	4 134	141	141 13	3 128	130	25 12	6 129	126	118 1	116 11	6 113	110	98 9	2 106	-9%
Carlow	56,932	42	10 39	39	26	33	35	44	44	44	42 4	2 40	42	54	61 7	4 77	83	84	119	116	149 1	67 19	8 204	242	242	270	292	306 3	11 32	27 32	7 293	299 2	70 27	8 249	242 2	4 213	177	60 13	7 126	105	95 9	8 91	88	72 7	77 8	1 86	88	84 71	6 72	-11%
Clare	118,817	41	17 50	53	63	76	76	87	96	121	144 15	8 183	199	246	261 2	68 30	4 310	306	309	322	326 3	27 32	2 313	304	311	272	264	281 25	52 24	48 25	3 255	235 2	29 20	3 189	186 1	31 173	171	60 13	3 132	122	109 10	104	93	109	111 11:	2 104	93	91 8	9 86	-23%
Cork	542,868	52	S2 66	71	81	88	97	102	105	110	111 11	9 127	140	155	159 1	81 19	9 209	232	237	256	275 3	08 32	2 336	340	327	334	347	337 33	35 33	33 33	11 334	318 3	05 27	6 258	242 2	33 239	216	95 17	3 158	143	119 10	102	89	83 8	86 82	2 81	73	77 7	8 81	-1%
Galway	258,058	46	54 62	65	74	81	79	85	89	93	92 9	7 107	113	137	153 1	55 16	5 173	203	228	262	273 2	88 31	4 326	355	372	368	373	382 38	84 37	70 35	4 341	313 2	96 282	2 255	243 2	11 187	171	44 12	109	108	97 8	6 83	86	80 (84 78	8 71	66	62 6	2 63	-19%
Longford	40,873	37	39 49	59	73	98	120	127	132	147	152 15	4 169	169	176	208 1	93 19	6 181	193	176	213	240 2	54 27	9 291	281	308	296	281	289 2	91 30	06 27	9 294	259 2	45 22	3 193	181 19	3 166	164	57 15	2 142	132	127 11	15 115	103	103 1	00 10	0 83	88	88 8	11 83	-17%
Roscommon	64,544	64	76 84	99	102	121	133	143	161	155	155 17	0 166	166	192	184 2	00 18	1 187	201	198	201	223 2	32 22	8 239	260	271	260	276	263 26	83 25	59 23	1 240	229 2	203 225	5 229	218 19	189	174	53 15	2 175	170	175 16	3 166	169	141 1	69 16	167	161	160 16	66 161	0%
Offaly	77,961	59	56 63	62	65	67	74	77	77	99	103 10	4 110	123	130	136 1	40 14	5 141	151	140	177	201 1	95 21	0 224	222	224	214	224	217 22	22 22	27 21	8 236	191	62 153	3 130	112 10	16 100	96	97 99	85	99	94 8	7 95	114	112 1	117 12	2 126	119	123 10	3 100	-18%
Laois	84,697	34	31 32	32	35	43	43	76	76	89	87 9	6 105	123	124	133 1	35 13	9 136	161	169	151	174 1	85 20	01 214	222	220	220	233	242 2	51 25	56 23	1 235	227 2	08 204	4 197	179 17	0 174	175	74 16	3 157	155	149 13	6 136	137	116 1	07 10	14 99	86	83 6	3 59	-43%
Waterford	116,176	86	67 67	59	53	44	38	35	34	28	31 3	2 40	46	56	64 (61 66	70	83	109	131	132 1	43 15	5 160	173	176	194	205	215 22	26 22	25 22	8 210	205	201 20	1 195	194 18	7 176	163	46 13	6 128	134	114 14	2 141	156	163 1	63 16	4 155	161	157 15	56 154	-6%
Tipperary	159,553	18	21 24	24	25	31	32	36	40	48	53 5	5 58	58	66	70	71 78	83	79	88	93	110 1	13 115	5 118	120	126	124	134	139 13	33 13	39 14	5 133	139	131 130	130	130 13	2 130	128	22 11	123	118	113 11	7 114	101	105 1	110 10	7 106	100	97 9	2 86	-19%
Kildare	222,504	76	75 78	77	85	82	80	97	95	94	87 9	8 99	108	125	146 1	54 16	8 188	198	204	208	244 2	57 27	8 293	305	303	298	301	306 25	98 28	89 29	0 292	270 2	42 23	1 210	186 17	7 169	156	43 12	1 118	103	94 8	5 93	89	88	85 86	6 87	86	87 8	4 87	1%
Louth	128,884	95	04 92	2 80	76	75	74	79	77	88	90 8	5 85	89	116	109 1	16 11	5 152	161	181	185	188 1	78 22	21 261	293	283	272	286	299 3	11 28	89 29	6 293	285 2	97 29	7 257	219 15	3 202	189	77 15	9 155	157	156 14	7 151	151	160 1	57 16	8 174	186	202 20	06 213	27%
Cavan	76,176	37	49 51	47	56	67	79	84	88	114	134 14	4 164	200	303	339 3	86 41	2 57	641	735	760	811 8	24 91	10 1012	1058	1058	983	966	967 96	64 8	10 75	2 668	645 5	589 56	2 474	365 2	95 263	232	06 15	9 143	133	119 11	2 102	108	98 1	87 95	5 97	95	101 10	00 98	4%
Leitrim	32,044	34	37 37	7 25	13	25	25	28	31	31	28 3	4 34	53	81	97 1	25 13	7 147	162	218	218	225 2	40 25	3 262	272	278	259	247	222 21	09 20	00 17	8 125	122	109 97	84	69 5	6 31	28	34 37	37	47	56 8	1 81	87	34 5	94 10	0 106	106	97 8	4 78	-22%
Monaghan	61,386	68	93 116	6 13!	5 134	166	173	189	178	207	226 2	7 25	7 270	303	319 3	31 31	3 36	2 350	368	350	375 3	65 40	2 389	406	409	384	375	349 30	63 32	23 31	0 305	303 2	288 269	9 218	205 1	71 176	166	142 13	7 121	122	116 11	7 124	112	114 1	104 10	112	94	101 10	01 106	2%
Donegal	159,192	178	85 19	1 20	4 211	219	233	258	265	273	293 3	2 31	326	324	345 3	55 35	5 35	1 367	365	356	344 3	47 32	9 320	320	312	324	322	329 3	18 3	13 31	7 322	310	320 30	9 305	286 3	00 297	290	93 27	5 285	273	281 2	71 272	275	269 2	281 29	93 263	3 266	254 2	31 227	-23%
Wicklow	142,425	69	65 67	7 70	73	65	72	74	77	78	78 7	7 76	76	80	84 8	8 9	1 87	89	91	103	119 1	20 12	4 124	129	145	145	149	149 14	5 14	17 14	9 141	130	117 116	107	104 16	6 91	88	89 8:	77	89	86 8	4 85	85	82	86 83	3 78	88	91 8	0 84	2%
Dublin	1,347,359	148	52 160	0 15	4 159	163	168	172	161	166	162 17	1 16!	163	173	174 1	77 18	0 184	193	197	201	223 2	31 23	8 241	252	257	253	255	255 25	58 25	55 25	2 252	237 2	220 220	6 217	209 2	00 199	191	185 17	2 161	151	142 13	34 139	136	119	118 11	119	114	118 11	14 114	-1%
National	4,761,865	80	84 88	88	92	96	101	108	107	114	116 12	4 121	134	150	158 1	67 17	7 190	207	217	231	251 2	61 27	9 290	302	305	302	307	309 3	07 29	98 29	1 286	268 2	253 24	7 226	211 2	01 195	184	73 15	9 150	142	133 12	27 128	124	117	118 11	7 114	111	111 10	06 107	-9%

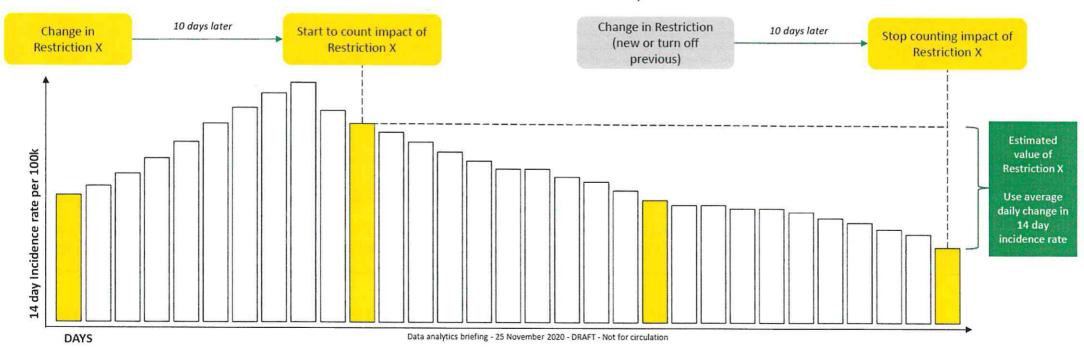
Source: Based on daily cumulative case data published on GeoHive to 22 November 2020. This data is published daily; Population: Census 2016, CSO

Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact

The below heatmap shows the average daily change in 14 day incidence rate per 100k per restriction. The impact is calculated using the approach described in Slide 8.

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	28/05/2020	08/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	26/09/2020	07/10/2020	16/10	/2020	22/20/2020
Restriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	18/06/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020	26/10	/2020	01/11/2020
Avg daily change in 14 day incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to Skm	Constructio n Opened	Mandatory PLF	Phase 2 reopening	Phase 3 reopening	Face masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	** Level 3 National	** Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	* 3 Level 5 National (22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-21
Clare	1	4	3	0	1	-4	2	-4	0	0	2	0		0		2		15		-5	-4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1			0	-4
Dublin	3	6	11	1	-2	-4	-3	-1	0	0	0	1		2		4	4				-6		-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3		11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	-4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		-4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3		-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		2	-10		-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-17
Tipperary	1	1	5	-1	1	-5	0	-1	0	0	0	3		-4		0		4		3	0		-2
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	-4		-2
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-1
Wexford	0	0	1	-1	0	-1	0	0	0	0	0	1		0		0		13		3	-16		-6
Wicklow	1	5	5	3	-1	-3	-1	0	0	0	-1	1		1		1		2		3	-5		-1

Note:

The outputs should be seen as directionally useful, rather than precise statistical outputs

The reopening of wet bars

coincided with universities
opening together with
specific sporting events

Care required when interpreting restriction

** changes in quick succession. Specifically, the more recent restriction changes (Level 3, Level 3 Max and Level 5) happened within a 15 day period

The absolute number of weekly tests has significantly increased since Wave 1

This analysis does not also consider potential behavioural changes beyond the restrictions

Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. Measures the average daily change in the 14 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

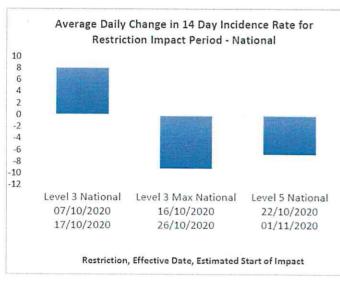
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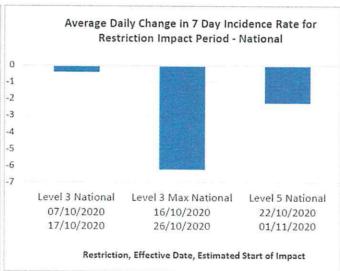
The introduction of Level 3 Max and Level 5 both coincide with a reduction incidence rates

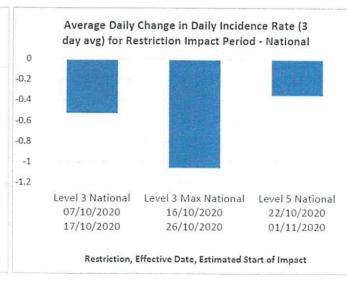
The 14 day incidence rate per 100k did not reduce for all but four counties with the introduction of Level 3. However, it did start to reduce with the introduction of further household restrictions (Level 3 Max) and then Level 5.

These three restriction changes happened within a 15 day period, with Level 3 Max was only active for 6 days.

For completeness, this analysis has also been repeated for a 7 day and a daily incidence rate average over three days. All three are shown below and follow similar, albeit reduced, patterns.





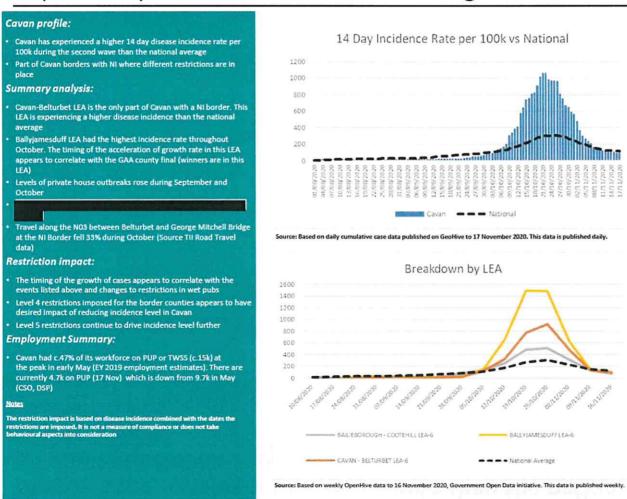


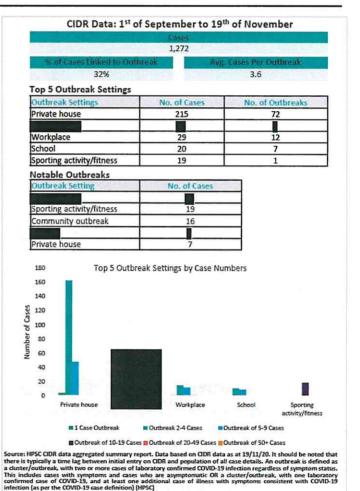
Note:

- · Care required when interpreting restriction changes in quick succession. This analysis does not also consider potential behavioural changes beyond the restrictions
- Each measure in the above three graphs quantify the impact over a different time period; 14 days, 7 days and 1 day respective. Hence, it is expected that the size of their impact is different. That is also why they are shown to different scales on the y axis
- · National measure excludes Dublin, Donegal, Cavan and Monaghan as they were under different restriction changes
- The Level 5 reductions should be seen as additive to the reduction in Level 3 Max

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Cavan's three LEAs follow a different path. One is being driven by outbreaks, one impacted by the border and one more aligned with the national trend





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Meath is seeing a higher incidence rate than the national average. This is influenced by proximity to Dublin and specific outbreak events

Meath profile: · Meath has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average · Dublin borders including a significant commuter population Summary analysis:

- . Level of private house outbreaks during September and October
- · Continued outbreaks in nursing homes, one significant outbreak
- · One significant community outbreak of 29 cases
- · Ratoath LEA has the highest incidence rate. The timing of this acceleration of growth rate appears to correlate with GAA county final win (Source: GAA.ie)

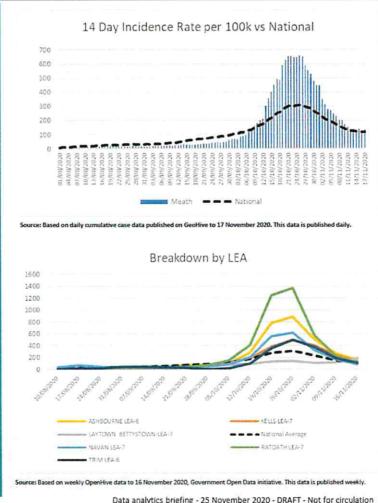
Restriction impact:

- . The timing of the growth of cases appears to correlate with the events listed above and the changes to restrictions in wet pubs
- Incidence level continued to rise post initial Level 3 restrictions imposed nationally
- · Level 3 (max) restrictions imposed nationally appear to have desired impact of reducing incidence levels
- · Level 5 restrictions continue to drive incidence level down further

Employment summary:

. Meath had c 42% of its workforce on PUP or TWSS (c.40k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (13k versus 25k) levels (CSO, DSP)

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



CIDR Data: 1st of September to 19th of November 2,466 27% 3.3 Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 397 121 Nursing home 74 Community outbreak 45 4 Workplace 38 18 School 25 **Notable Outbreaks** Outbreak Setting No. of Cases Nursing home 51 Community outbreak 29 Community outbreak 12 Workplace 11 Nursing home 10 300 Top 5 Outbreak Settings by Case Numbers - Meath 250 200 150 100 Private house outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. Outbreak is defined as a distate/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a duster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per

the COVID-19 case definition) (HPSC)

The border is contributing to Donegal's higher rate of cases. Donegal is not seeing the benefit of recent Level 4 increases seen in other border counties

Donegal profile:

- Donegal has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average
- Disease incidence higher and earlier versus national average, and reducing at a slower rate
- Eastern Donegal borders with NI where different restrictions are in place

Summary analysis:

- Lifford and Stranolar LEA close to the NI border with Derry, experienced an earlier and higher disease incidence
- Other eastern parts of Donegal (Buncrana, Letterkenny and Carndonagh) have the next highest incidence rates
- A large hospital outbreak in resulted in 99 cases in

 (Source: Donegal Daily)
- Private Household attributable to 67% of outbreaks in the county from September to October, but only 30% in November

Restriction impact:

- Disease incidence continued to rise after level 3 Donegal announcement
- Specific restrictions in NI (1/10) on pubs and restaurants appeared to have helped reduce rate in Donegal
- Despite level 3 max and level 5 being effective in other counties, cases in Donegal fell at a lower rate compared to national levels
- Similarly, Level 4 reduced the cases in Monaghan and Cavan, but not Donegal. Mask compliance in Donegal also reduced (against national and previous Donegal trend) with Level 4 restrictions (Facebook survey data)

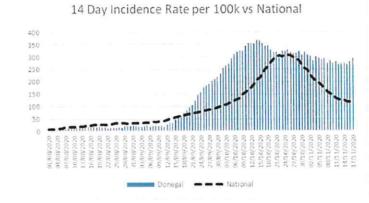
Employment summary:

 Donegal had c.49% of its workforce on PUP or TWSS (c 30k) at the peak in early May (EY 2019 employment estimates). The numbers currently on PUP (17 Nov) remain lower than peak (12k versus 23k) (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

The Facebook survey is a voluntary survey, managed by the University of Maryland. The mask question reads "in the last 7 days, how often did you wear a mask in public".

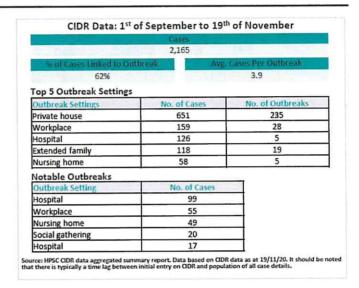


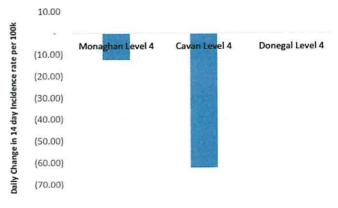
Source: Based on daily cumulative case data published on GeoHive to 17 November 2020. This data is published daily.



Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

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Cork is broadly aligned with the national trend. Cork City is driving up the incidence rates across the county

Cork profile:

Cork is broadly aligned with the national average for the 14 day disease incidence rate per 100k during second wave

Summary analysis:

- Cork City is the most impacted area, with the rest of the county following with a reduced incident rate
- Cases in Cork City South Central, the LEA containing UCC (started returning on 21 Sept), were twice as high as other LEAs in Cork city during mid October. This gap declines in November as the universities went online

Restriction impact:

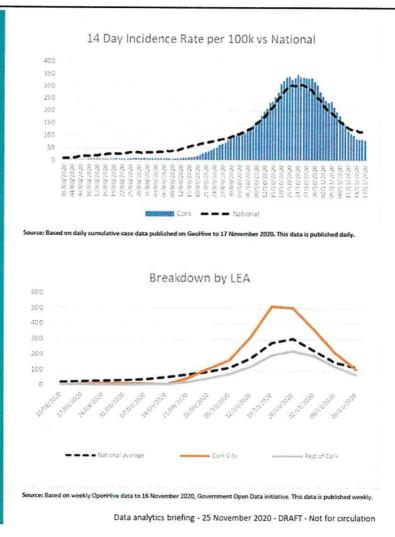
- Cases in Cork city rose as wet pubs reopened (21 Sept). Cases around the rest of the county followed shortly after
- There were a number of GAA games in early October, which were linked with outbreaks. No matches occurred after this, with level 3 restrictions being applied around this time (6 Oct). Cases throughout Cork began to fall 10 days later

Employment summary:

 At peak, c 39% of Cork's workforce were on PUP or TWSS (c 96k) (EY 2019 employment estimates). Current PUP levels (17 Nov) are lower than the previous peak (35k versus 62k in May) (CSO, DSP)

Note

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

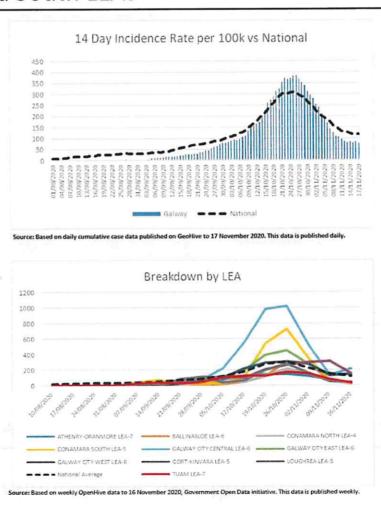


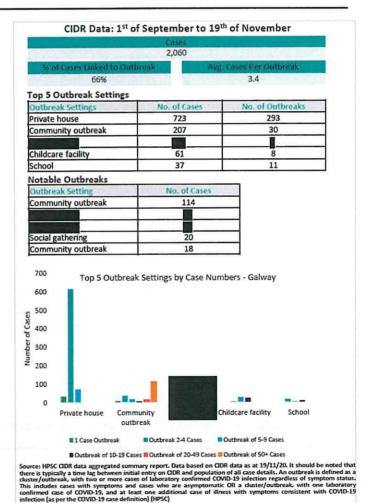
CIDR Data: 1st of September to 19th of November Top 5 Outbreak Settings Outbreak Settings No. of Cases No. of Outbreaks Private house 929 354 Community outbreak 411 67 Nursing home 114 9 School 113 24 Extended family 90 22 Notable Outbreaks Outbreak Setting No. of Cases Community outbreak 68 Nursing home 46 Restaurant / Cafe 38 Nursing home 30 Community outbreak 29 800 Top 5 Outbreak Settings by Case Numbers - Cork 700 600 ਲੈ 500 400 300 200 100 Community Extended family outbreak ■1 Case Outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed.

case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per

Galway rose above the national average during the second wave, driven by Galway City Central and Connemara South LEAs

Galway profile: Galway experienced a higher 14 day disease incidence rate per 100k during second wave than the national average It has now come back down below national average levels since early November Summary analysis: Galway City Central, Connemara South and Galway City East have had the highest 14-day incidence rates throughout October A number of key events occurred in late September which could have contributed to this increase Cases within Galway City Central LEA appear to have increased in this period following students returning to NUIG from 21 GAA senior championship football semi-finals and finals also occurred in the last week of September and first week of October. Connemara South had a confirmed outbreak in mid-Throughout November, private household cases were responsible for 49% of outbreak cases, with community outbreaks making up a large proportion of the remaining percentage Restriction impact: Cases begin to decline ten days after the national level 3 lockdown came into effect (17/10), falling below national levels in November An exception to this is Gort-Kinvara, which saw cases continue to rise into early November Employment summary: Galway had c.39% of its workforce on PUP or TWSS (c.49k) at the peak in early May (EY 2019 employment estimates). There are currently 19.5k on PUP (17 Nov) which is down from 32.5k in May (CSO, DSP) The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





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Dublin – local authority breakdowns over time

The below heatmap shows the Dublin LEA 14 day incidence rate per 100k population since early August. Some areas are seeing higher incidence rates.

		10/08/2020	17/08/2020	24/08/2020	31/08/2020	0.02/60/10	14/09/2020	21/09/2020	28/09/2020	05/10/2020	12/10/2020	19/10/2020	26/10/2020	02/11/20	09/11/2020	16/11/3030
	ARTANE-WHITEHALL LEA-6	15.6	13.7	33.2	35.2	64.5	88	107.5	140.7	170.1	271.7	383.1	377.3	265.9	177.9	111.4
	BALLYFERMOT-DRIMNAGH LEA-5	3	3	32.6	43.4	60.8	112.9	165	184.5	245.3	310.4	321.3	332.1	277.9	191	143.3
	BALLYMUN-FINGLAS LEA-6	3	12.7	32.7	43.6	56.4	110.9	267.2	270.9	174.5	263.6	463.6	492.6	345.4	272.7	221.8
>	CARRA GLASNEVIN LEA 7	13.6	22.2	30.7	44.3	52.9	85.2	126.2	134.7	146.6	191	252.3	264.3	185.8	160.3	138.1
Dublin City	CLONTARF LEA-6	3	9.2	57.2	60.9	38.8	83.1	140.3	153.2	134.7	107	138.4	169.8	142.1	114.4	73.8
들	DONAGHMEDE LEA-5	16.8	12	21.6	31.3	40.9	57.7	134.6	173.1	163.5	151.5	163.5	233.2	240.4	170.7	89
ž	KIMMAGE-RATHMINES LEA-6	3	21.5	35.8	50.1	75.2	111	162.9	282.8	306.1	250.6	245.3	211.2	223.8	188	123.5
_	NORTH INNER CITY LEA-7	22	28.3	40.9	50.3	62.9	92.7	130.5	179.2	221.7	213.8	205.9	238.9	205.9	121	84.9
	PEMBROKE LEA-5	15,4	22	13.2	33	70.4	74.8	57.2	57.2	81.4	116.6	189.1	173.7	90.2	88	59.4
	SOUTH EAST INNER CITY LEA-5	3	12.3	32	46.8	91.1	113.3	130.5	169.9	169.9	145.3	187.2	209.3	160.1	120.7	133
	SOUTH WEST INNER CITY LEA-5	3	16.5	40.1	101.5	146.4	151.1	196	188.9	151.1	184.2	233.8	240.9	177.1	151.1	186.6
	BLACKROCK LEA-6	3	3	3	41.5	50.4	32.6	47.4	65.2	77.1	59.3	112.7	195.7	145.3	68.2	68.2
S alre	DUN LAOGHAIRE LEA-7	3	3	33.6	64.9	60.1	57.7	72.1	88.9	124.9	103.3	88.9	110.5	100.9	76.9	72.1
Dun Laoghaire Rathdown	DUNDRUM LEA-7	3	3	3	29.4	69.4	58.7	50.7	88.1	125.5	114.8	101.5	112.1	96.1	66.8	80.1
The se	GLENCULLEN-SANDYFORD LEA-7	3	19.1	24.6	13.7	19.1	60.1	79.2	101	122.9	98.3	76.5	87.4	106.5	98.3	68.3
E &	KILLINEY-SHANKILL LEA-7	3	3	3	13.1	23.6	49.9	65.6	68.3	115.5	120.8	105	10/./	/0.9	44.6	52.5
۵	STILLORGAN LEA-6	3	3	22.9	36.1	39.3	36.1	55.7	108.2	121.3	85.2	137.7	183.6	104.9	91.8	101.6
	BALBRIGGAN LEA-5	3	19.1	16.4	52	123.1	155.9	172.3	134	76.6	95.7	158.6	191.4	227	183.2	109.4
	BLANCHARDSTOWN-MULHUDDART LEA-S	3	25.5	76.5	93.5	138.8	169.9	124.6	136	175.6	229.4	351.2	402.2	371	266.2	147.3
76	CASTLEKNOCK LEA-6	10.8	43.4	54.2	43.4	95.4	110.6	104.1	125.7	143.1	162.6	253.7	297	199.5	130.1	114.9
Fingal	HOWTH-MALAHIDE LEA-7	23.2	30.3	26.7	19.6	41	65.9	110.4	147.8	153.2	165.7	204.8	235.1	217.3	163.9	92.6
Œ	ONGAR LEA-5	3	3	36.3	67	80.9	106	147.9	175.8	223.3	256.7	281.9	307	245.6	150.7	134
	RUSH-LUSK LEA-5	3	20.2	31.7	28.8	75	86.5	98.1	150	115.4	83.6	158.6	187.5	190.3	144.2	43.3
	SWORDS LEA-7	3	27.3	33.1	31.1	85.7	109	89.5	169.4	200.5	194.7	245.3	295.9	371.8	288.1	140.2
	CLONDALKIN LEA-7	30.1	19.3	53.7	81.7	68.8	70.9	152.6	197.8	184.9	242.9	367.6	384.8	285.9	212.8	180.6
⊆	FIRHOUSE-BOHERNABREENA LEA-5	20.5	17.5	43.9	73.1	67.2	55.6	73.1	78.9	99.4	181.3	242.7	231	190	122.8	102.3
- P	LUCAN LEA-5	3	3	38.9	62.8	80.8	83.8	71.8	137.6	188.5	227.4	341.1	380	278.3	134.6	122.7
South Dublin	PALMERSTOWN-FONTHILL LEA-5	3	23.7	65.7	107.8	94.6	84.1	142	184	123.6	194.6	386.5	331.3	260.3	226.1	165.6
ort	RATHFARNHAM-TEMPLEOGUE LEA-7	3	3	12.5	35.5	48	75.1	127.3	160.7	146.1	133.6	181.6	196.2	160.7	112.7	112.7
Ŋ	TALLAGHT CENTRAL LEA-6	3	20.8	41.7	53.2	85.6	157.4	166.6	136.5	138.8	145.8	182.8	224.5	231,4	168.9	134.2
	TALLAGHT SOUTH LEA-S	36.7	28.2	36.7	93	124.1	124.1	166.4	183.3	160.7	203	290.4	267.9	279.1	304.5	251

There appears to be a correlation between areas hit hard in Wave 1 and Wave 2 (acknowledging differences in testing criteria), with areas hit hard across both waves including areas such as Blanchardstown-Mulhuddart, Ongar, Lucan, Clondalkin and Artane-Whitehall.

Dublin includes over a quarter of Ireland's population. It therefore includes many stories and strongly aligns with national case levels

Not surprisingly, Dublin's 14 day disease incidence rate per 100k during second wave is in line with the national average Significant differences exists within each of the four county council areas of Dublin with Dún Laoghaire–Rathdown seeing lower overall incidence Summary analysis: Highest incidence rates in areas such as Lucan, Ballymun and Swords. Largest outbreaks also focused in the corresponding CCAs;

Dublin North, Dublin North West, Dublin North Central

Tallaght South is the only LEA within Dublin where cases have

Restriction analysis:

continued to climb in November

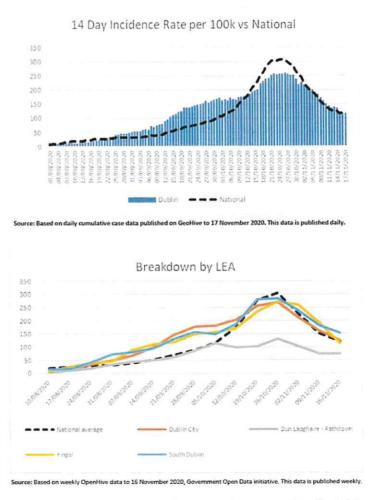
- Cases in Dublin took longer to decline after Level 3, indicating Level 5 was needed here to control cases
- Not opening the wet pubs does appear to have helped Dublin with the subsequent increase in cases being slower than the national average

Employment summary:

 At peak, Dublin had c.40% of workers on either PUP or TWSS (c. 270k) (EY 2019 employment estimates). Current PUP levels are at 114k (17 Nov), compared to a peak of 176k in May (CSO, DSP)

Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration.



CIDR Data: 1st of September to 19th of November 12,606 Top 5 Outbreak Settings Outbreak Settings No. of Outbreaks Private house 2075 Extended family Nursing home 27 66 School 30 Hospital Notable Outbreaks Outbreak Setting No. of Cases Extended family Nursing home 75 Hotel 38 Childcare facility 38 Residential institution 30 5000 Top 5 Outbreak Settings by Case Numbers - Dublin 4500 4000 3500 3000 2500 2000 1500 1000 500 Private house Extended family Nursing home School Hospital Outbreak of 5-9 Cases ■ 1 Case Outbreak Outbreak 2-4 Cases ■ Outbreak of 10-19 Cases ■ Outbreak of 20-49 Cases ■ Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defended as a cluster/outbreak, with two or more cases of absoratory confirmed COVID-15 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one blaboratory confirmed case of CIVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per

the COVID-19 case definition) (HPSC)

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Cases in Limerick during Sept and Oct were driven by very large extended family and community outbreaks

Limerick profile:

- Limerick has experienced a higher 14 day disease incidence rate per 100k during second wave than the national average.
- This is a result of the cases in Limerick not declining to the same extend in the rest of the country

Summary analysis:

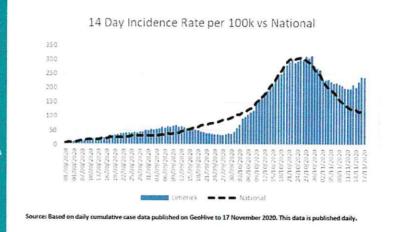
- Two southernmost LEAs were hardest hit at different points; Adare-Rathkeale during October, then Newcastle West in November.
- Limerick City East was the worst performing area within Limerick City, and within the county on 2nd November
- No region performs notably better than others the remaining LEAs each exceed an incidence rate of 200 cases per 100k population

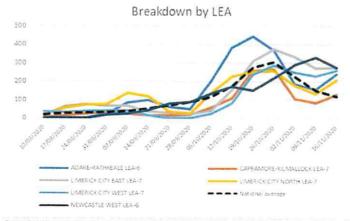
Employment summary:

 Limerick had c.43% of its workforce on PUP or TWSS (c.34k) at the peak in early May (EY 2019 employment estimates). There are currently 14k on PUP (17 Nov) which is down from 22k in May (CSO, DSP)

Hotes

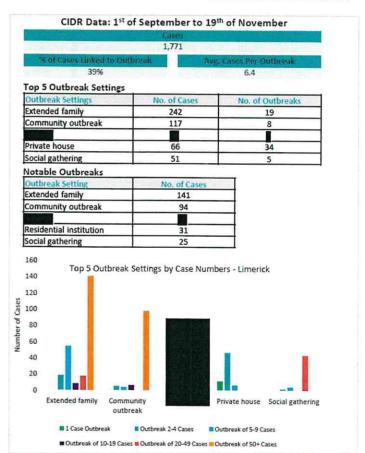
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





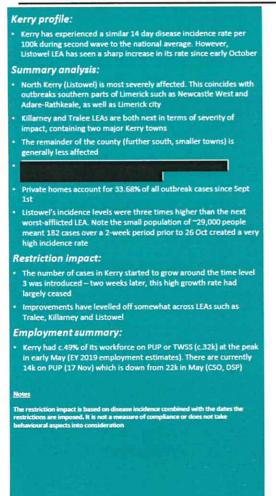
Source: Based on weekly OpenHive data to 16 November 2020, Government Open Data initiative. This data is published weekly.

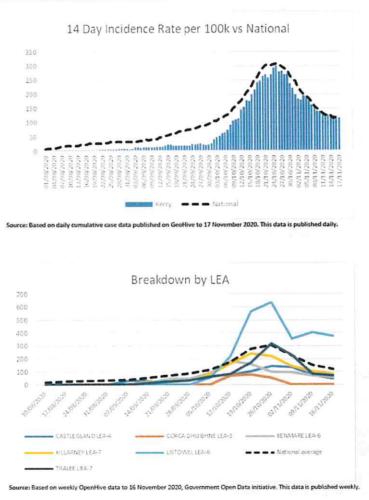
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Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the COVID-19 case definition) (HPSC)

Kerry is seeing lower cases than the national average, with Listowel bordering Limerick having the highest number of recent cases



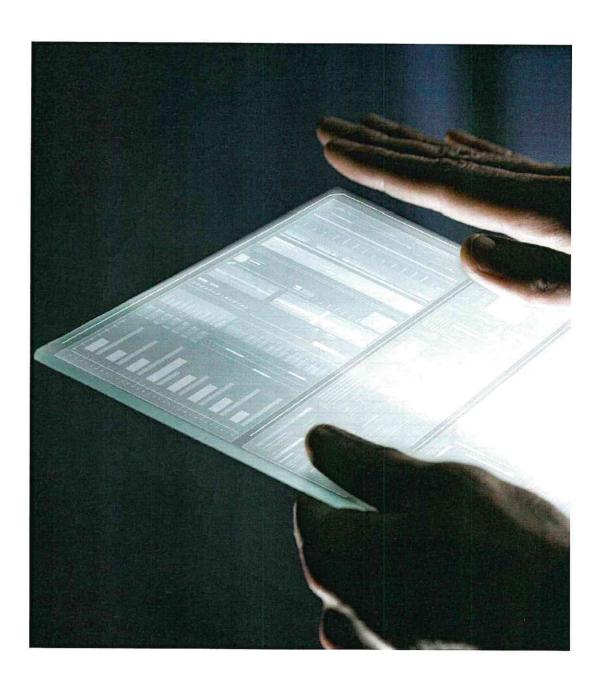


CIDR Data: 1st of September to 19th of November Top 5 Outbreak Settings Outbreak Settings No. of Outbreaks No. of Cases Private house Community outbreak 101 14 Extended family 25 23 School **Notable Outbreaks** Outbreak Setting No. of Cases Community outbreak 43 25 Community outbreak Religious/Other ceremony 11 Restaurant / Cafe 11 Top 5 Outbreak Settings by Case Numbers - Kerry 120 100 80 60 40 20 Private house xtended family outbreak Outbreak 2-4 Cases Outbreak of 5-9 Cases Curthreak of 10-19 Cases Outbreak of 20-49 Cases Outbreak of 50+ Cases Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 19/11/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. An outbreak is defined as a cluster/outbreak, with two or more cases of laboratory confirmed COVID-19 infection regardless of symptom status. This includes cases with symptoms and cases who are asymptomatic OR a cluster/outbreak, with one laboratory confirmed case of COVID-19, and at least one additional case of illness with symptoms consistent with COVID-19 infection (as per the

COVID-19 case definition) (HPSC)

Data analytics briefing - 25 November 2020 - DRAFT - Not for circulation

Restrictions impact analysis



We have been looking to quantify restrictions in three ways



Ireland restriction analysis

A detailed analysis of restriction measures and impacts on incidence rates across the 26 counties – highlighting the most and least effective restrictions based on changes to incidence rates over an extended period. Expanded to include university opening and NI restrictions for border counties and presented today



International restriction analysis

A detailed analysis of restriction measures and impacts across EU peer countries to quantify the impact of restrictions post-implementation. Currently completing detailed analysis for initial 10 EU countries



International desktop research

Desktop research was undertaken looking at the impacts of restrictions across the world, leveraging peer research to understand risk of certain settings and restrictions. Key points summarized in regular COVID-19 insights publication and with new research included today

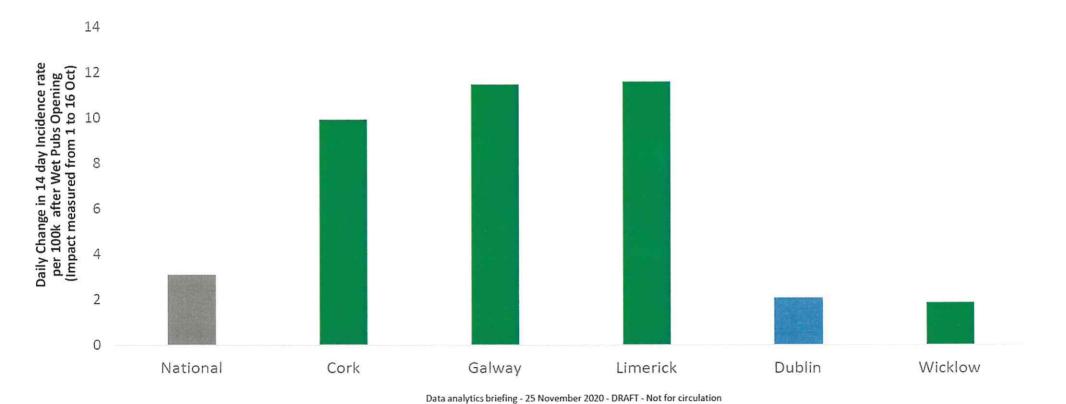
Ireland – restrictions analysis



Data analytics briefing - 25 November

Wet Pubs opened across the country, but not Dublin, on 21 September. The increase in Dublin's incidence rate was then lower than the national average and for larger counties

Wet pubs opened in all counties except Dublin in late September. This coincided with universities opening together with specific sporting events. The 14 day disease incidence rate per 100k started to increase ten days later in every county. The subsequent incidence rate growth in Dublin was 33% lower than the national average and 79% to 82% lower than other counties with larger cities. Wicklow was the only county that performed better than Dublin, with a 10% lower growth rate than Dublin.



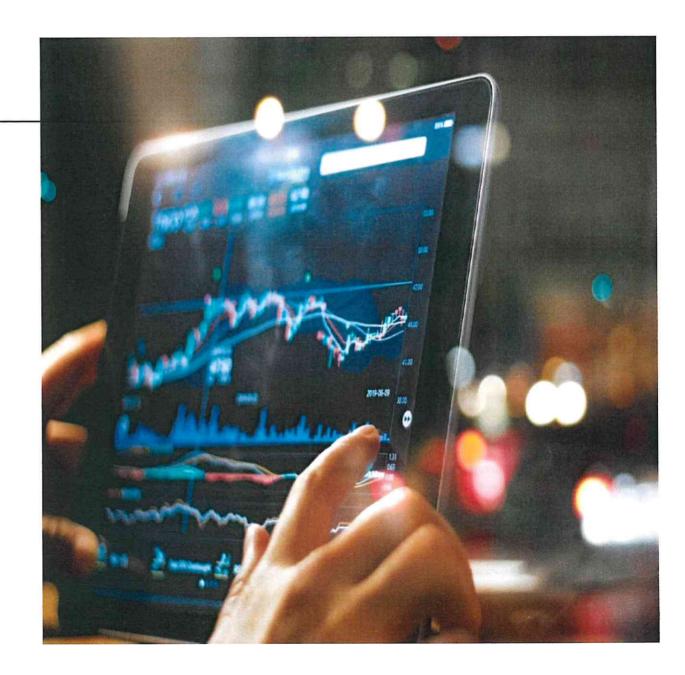
The incidence rate did not materially increase after the three phases of re-opening during late May to early July

The reopening of construction, non-essential retail and the wider Phase 3 openings did not appear to have a material impact on the cases nationally or in larger counties. Note that disease incidence rates were low at this time

Restriction Effective Date	29/02/2020	12/03/2020	15/03/2020	24/03/2020	27/03/2020	01/05/2020	15/05/2020	29/05/2020	08/06/2020	29/06/2020	13/07/2020	21/07/2020	08/08/2020	19/08/2020	21/08/2020	31/08/2020	19/09/2020	21/09/2020	25/09/2020	07/10/2020	16/10	/2020	22/10/2020
Restriction Estimated Start of Impact	10/03/2020	22/03/2020	25/03/2020	03/04/2020	06/04/2020	11/05/2020	25/05/2020	07/06/2020	18/06/2020	09/07/2020	23/07/2020	31/07/2020	18/08/2020	29/08/2020	31/08/2020	10/09/2020	29/09/2020	01/10/2020	06/10/2020	17/10/2020	26/10	/2020	01/11/2020
Avg daily change in 14 day Incidence rate per 100k	No restrictions	Childcare closed, School Closed	Bars closed	Retail, restaurants etc closed	Stay at home order (2km)	Stay at home increased to Skm	Constructio n Opened	Mandatory PLF	4	Phase 3 reopening	ace masks on public transport	Green List	Lockdown Laois, Offaly Kildare	Face masks in shops	Lockdown lifted for Laois, Offaly, extended for Kildare	Schools + childcare opened	Level 3 Dublin	Wet Bars Opened except Dublin	Level 3 Donegal	Level 3 National	Level 3 Max National	Level 4 Donegal, Cavan, Monaghan	Level 5 National (t 22 Nov)
Carlow	0	0	1	-2	2	-5	1	-2	-1	0	0	2		-4		1		5		17	-7		-9
Cavan	0	0	8	18	0	-6	-3	-3	0	0	0	0		0		3		43		17		-62	-21
Clare	1	4	3	0	1	4	2	-4	0	0	2	0		0		2		15		-5	-4		-6
Cork	2	2	3	-3	-1	1	-2	-1	0	0	0	0		0		4		10		7	-5		-9
Donegal	0	0	5	5	-2	-1	0	0	0	0	0	1		0		9		12	1	- 0		0	-4
Dublin	3	6	11	1	-2	4	-3	-1	0	0	0	1		2		4	4		(2)		-6		-5
Galway	1	1	2	-2	0	0	-1	-1	0	0	0	0		1		3	-	11		12	-15		-10
Kerry	1	5	3	4	-1	0	0	0	0	0	0	0		1		0		11		9	-10		-6
Kildare	1	2	5	3	0	4	-1	0	0	0	3	9	-7	-5	-2	1		8		7	-9		-7
Kilkenny	1	1	4	-3	-1	0	-3	0	0	0	0	1		0		0		6		3	-7		-2
Laois	1	0	1	0	0	-2	0	0	0	0	2	2	-2	-2	0	1		7		8	-7		-7
Leitrim	1	0	3	2	0	-1	-1	0	1	-1	0	0		4		-1		12		0	-17		-1
Limerick	1	1	5	-1	-1	-2	-1	0	0	0	1	1		2		-1		12		7	-5		-3
Longford	1	1	3	4	7	-20	-1	-1	0	0	0	0		2		2		6		5	-8		-6
Louth	1	1	3	1	0	-3	0	-1	0	0	0	1		1		2		7		12	-2		4
Mayo	0	1	4	10	-1	-2	-2	0	0	0	0	0		0		1		7		12	-3		-7
Meath	1	2	3	8	0	-3	-1	0	0	0	0	0		1		2		24		19	-34		-15
Monaghan	0	0	3	17	0	-2	-2	-3	0	0	0	1		1		7		11		-3	COLUMN TOWNS	-12	-7
Offaly	1	1	6	-2	2	2	-12	0	0	0	0	7	-9	-1	2	1		6		2	-10	La Carte	-2
Roscommon	0	1	1	2	6	-14	0	-2	0	0	0	1		0		5		4		4	-10		-3
Sligo	1	0	3	-4	0	-2	0	0	2	-2	0	0		0		1		17		16	-14		-12
Tipperary	1	1	5	-1	1	-5	0	-1	0	0 1	0	3		-4		0		4		3	0		-2
Waterford	1	3	2	-3	-1	0	0	0	0	0	0	1		1		1		6		9	4		-2
Westmeath	2	3	7	2	3	-13	-1	-1	0	0	0	0		1		1		12		18	-15		-13
Wexford	0	0	1	-1	0	-1	. 0	0	0	0	0	1		0		0		13		3	-16		-6
Wicklow	1	5	5	3	-1	-3	.1	0	0	0	1	3				·		2		3	-16		-0

^{*} Phase 3 re-opening included places of worship, gyms, cinemas, theatres, leisure facilities, personal services, sports, public transport 50% capacity & face coverings), mass gatherings (50 indoors, 200 outdoors), adult education and community facilities, health and well being related services, restaurants and cafes (on site food service), hotels and other accommodation facilities, driving schools and tests

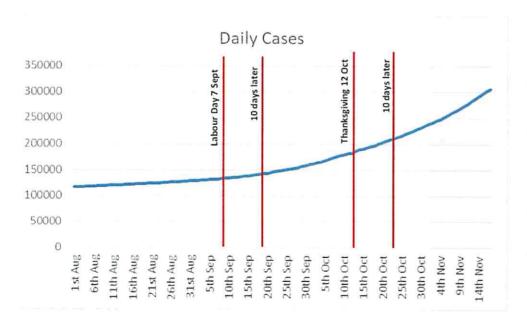
Select International Desktop Research



Canadian Thanksgiving: Testing & Tracing data and case numbers show an increase in confirmed cases post Canadian Thanksgiving on 12 October

Background

Canadian Thanksgiving took place on 12 October 2020. While Prime Minister Justin Trudeau made an informal request for Canadians to cancel gatherings to focus on 'having a shot at Christmas', post Thanksgiving saw an increase in cases with the highest rates since the first wave in Spring.



Key findings:

- Canada saw an increase in COVID-19 cases in the days and weeks that followed Thanksgiving, the highest rates since the first wave in the spring
- On October 12, the day Canada celebrated Thanksgiving, the country had recorded almost 183k total cases, according to data from the Canadian Government
- The number of total cases, which was already increasing, continued to climb;
 4,109 new daily cases were recorded exactly two weeks later on 26 October. At this point, Canada's total number of cases had risen to around 220k
- Canadian Testing and Tracing records show that Thanksgiving gatherings directly resulted in the increase in incidence rates
- "Cases were indeed increasing already, but we definitely saw an increase in the
 rate of transmission after Thanksgiving." The percentage increase in cases
 increased after Thanksgiving, with a 14% increase in positive cases between 12
 and 22 October
- Total number of positive cases has doubled from 155,000 on 28 September to over 310,000 on 18th November
- A similar increase is noticed on 17th September, 10 days after Canadian Labour day was celebrated

US research: Full-service restaurants, fitness centres and religious organisations generating highest risk of infection

Approach

Stanford University analysis of potential spread of C-19 in the 10 largest US metropolitan areas, using hourly mobility data across different points of interest (restaurants, gyms, stores etc.)

Calculates potential visits and infections over two months generated by the re-opening of certain locations.

POI categories ranked in decreasing order of associated additional infections that would occur if the location is opened



Results

- The Stanford Mobility Network Model Simulation concluded that on average across metro areas, reopening full-service restaurants, fitness centres and religious organisations produces the largest predicted increase in infections.
- Take-out restaurants, grocery stores, department stores and pharmacies resulted in low positivity rates.
- This pattern was seen in the 3 US cities studied.

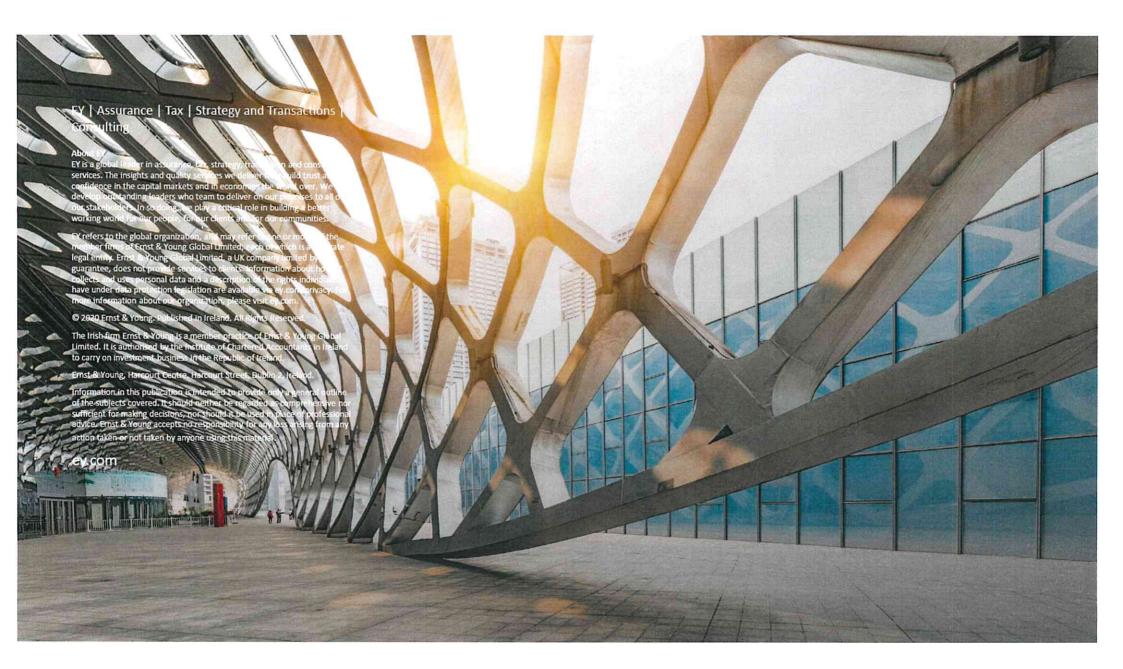
Key findings

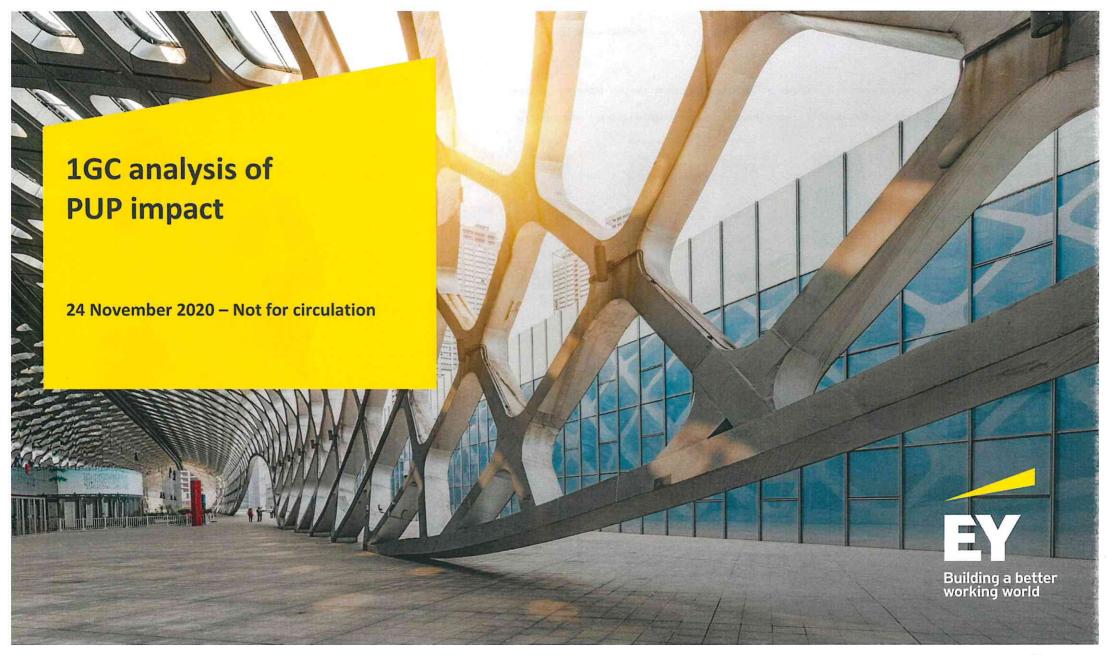
- The model calculates the additional cases that would occur if each location is opened, using the COVID_19 Mobility Modelling Simulation over time (between 1st March and 10th May) and the associated positivity rate of the population who visit the location.
- Small fraction of POIs accounted for majority of infections at POIs, e.g. 10% of POIs in Chicago accounted for 85% of infections at POIs and almost 60% of all cases. These riskier places come from multiple categories, but tend to have higher densities of visitors, and visitors who stay longer. Model predicts POIs are 70% of all infections.
- Restricting maximum occupancy at each location is more effective than uniformly reducing occupancy.
- Higher infection rates among disadvantaged racial and socioeconomic groups solely from differences in mobility. This aligns to Irish data where a higher proportion of C-19 cases have been attributed to disadvantaged areas (40% of cases versus 37% of population) (CSO, cases to 30/10).
- As seen in the Mobility Model, religious organisations led to high levels of cases in the US cities studied. However, it is important to note that the median church in the U.S. has 75 regular participants in worship on Sunday mornings. All but five states have congregations with more than 2,000 people in attendance on a Sunday morning. As of 2012, there were roughly 1,600 Protestant churches in the United States with a weekly attendance of 2,000 people or more.

Source: Mobility network models of COVID-19 explain inequities and inform reopening, Published November 2020, Stanford University: COVID-19 Mobility Network Modeling, http://covid-mobility.stanford.edu/ http://civid-mobility.stanford.edu/ http://civid-mobility.stanf

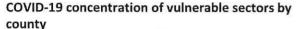
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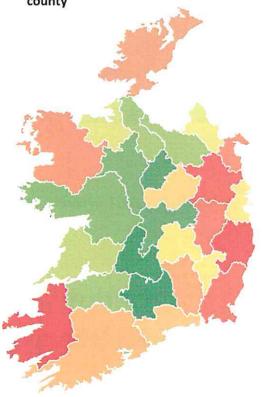
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PUP analysis: Kerry, Wicklow and Meath highest concentration of employment in vulnerable sectors





Source: EY analysis using EY 2019 local employment Census consistent estimates Note: PUP = Pandemic Unemployment Payment

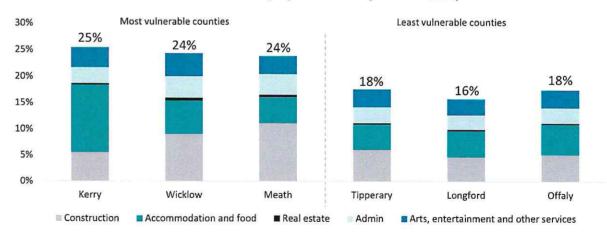
Most vulnerable Least vulnerable

Legend

Each employment sector was rated according to its risk of Covid-19 disruption (1 = low, 5 = high). Each county was assigned a rank based on its employment shares to create a measure of Covid-19 vulnerability.

- Kerry, Wicklow, Meath, Wexford and Kildare have the highest vulnerability given their sectoral composition, which is skewed more towards hospitality and public-facing sectors
- Tipperary, Longford, Offaly and Roscommon have the lowest vulnerability rank

Vulnerable sector employment shares (2019 estimate)

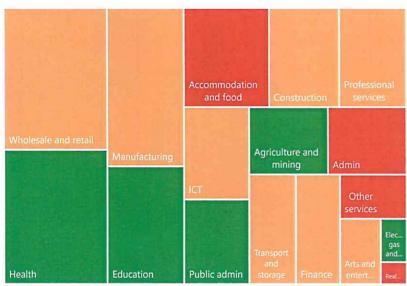


Source: EY 2019 Census consistent employment estimates. Vulnerable sectors were ranked either 4 or 5 in terms of their potential exposure to Covid-19 impacts

PUP analysis: The importance of vulnerable sectors as a source of employment

The charts below depict the proportion of employment in each of the main sectors of the economy, nationally and in Kerry.

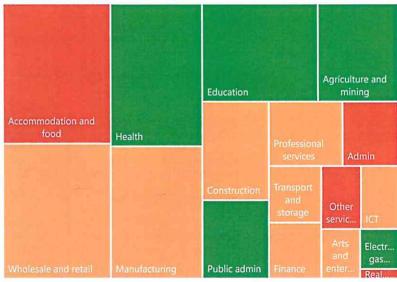
National sector employment (2019 Q4)



Source: DSP PUP recipients 24 November 2020, CSO LFS 2019 Q4 employment, EY analysis

- · Vulnerable sectors are major employers across the country
- Public services offer a degree of insulation to Covid-19 labour market impacts

Kerry sector employment (2019 estimate)



Source: EY 2019 Census consistent forecasts

- Accommodation & food is an important employment sector nationally, but is the highest employing sector in Kerry
- Wholesale & retail and accommodation & food make up approx. 25% of total employment in Kerry

egend: shading represents share of national sectors availing of PUP





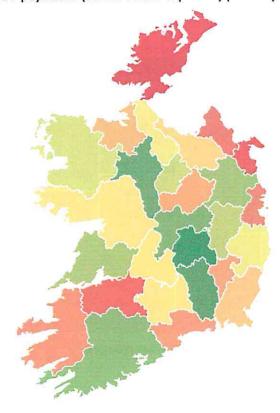
6% to 25%



26% +

PUP analysis: Border counties have more PUP recipients than expected given sectoral mix

PUP payments (actual versus expected) (24 Nov)



Source: DSP PUP recipients 24 Nov, EY analysis using EY 2019 Census consistent employment estimates

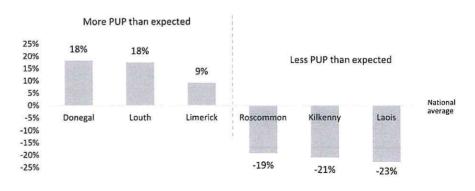
More PUP than expected Less PUP than expected

Legend

An expected level of PUP incidence was calculated by applying national sectoral PUP rates to the employment structure in each county. The difference between this expected PUP incidence and the actual PUP incidence shows where there are other factors explaining levels of PUP, other than sectoral composition. It is likely that this reflects specific guidelines and regulations in these counties or factors such as demographics, density etc.

- Donegal, Louth, Limerick, Monaghan and Dublin currently (24 Nov) have more people on PUP than their sectoral mix would predict
- Donegal, Dublin and Monaghan have been at higher restriction levels than the rest of the country for longer and this is reflected in their higher than expected PUP levels
- · Laois, Kilkenny, Roscommon, Offaly and Cork have proportionally less than predicted
- Of the 26 counties, 12 are within five percentage points of what would be expected given their sectors. This indicates that sectoral mix is not the only determinant of PUP levels in the majority of counties
- Donegal, Louth, Limerick and Roscommon have the highest Covid-19 14-day incidence rate per 100k population (as at 23/11/20). This indicates that Covid-19 incidence levels may contribute to higher levels of PUP, but again, is not the only explanation, as Roscommon suggests

Actual PUP recipients minus expected PUP (24 Nov)



Source: DSP PUP recipients 24 Nov, EY analysis using EY 2019 Census consistent employment estimates

PUP levels increased with Level 5, but remain c.41% below previous peak

PUP % share of 2019 Q4 employment

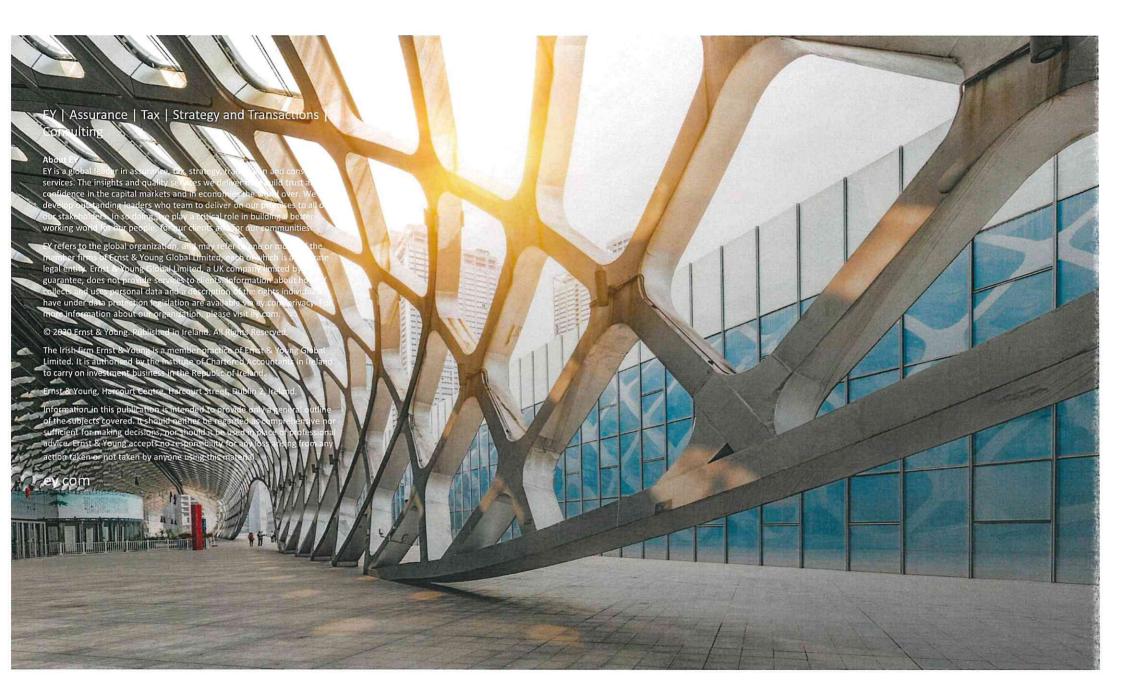
	Peak	Today
Accommodation and food	72%	57%
Real estate	68%	46%
Other services	63%	50%
Construction	54%	14%
Admin	41%	27%
Wholesale and retail	29%	18%
Arts and entertainment	25%	21%
Professional services	18%	9%
Transport and storage	17%	9%
Manufacturing	15%	6%
Public admin	12%	5%
Finance	12%	7%
Education	11%	5%
ICT	9%	6%
Electricity, gas and water supply	9%	5%
Agriculture and mining	8%	4%
Health	8%	3%
Total	25%	15%

- PUP levels are one form of labour market disruption, people may also be on wage subsidy or unemployment benefits depending on personal circumstances and the decisions made by their employer. Currently, the wage subsidy data is not available as a weekly estimate by sector and monthly averages have overlap with PUP levels, particularly as restrictions change
- Accommodation & food, real estate and other services still have highest proportion of employees on PUP (as at 24 Nov). These sectors also have the highest proportion of those on the wage subsidy scheme (EWSS) using the latest sectoral breakdowns available (DSP October monthly average)
- The arts & entertainment sector has been effectively closed since March and PUP levels are close to their previous peak
- Construction has had the biggest fall since peak, which is reflective of construction sites remaining
 open under current restrictions compared to being closed earlier in the year
- Despite broadly similar restrictions across a number of sectors, the share of people on PUP is lower in all sectors, suggesting either a level of adaptation to working under current restrictions or a higher deployment of wage subsidy

Source: CSO 'peak' PUP levels as at 3/5/20; DSP 'today' PUP levels as at 24/11/20; CSO 2019 Q4 employment. Note: EWSS = Employment Wage Subsidy Scheme

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1GC Priority Use Case Analysis (w/c 30/11) Based on briefing sessions w/c 23/11

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDENCY	OWNER
Industrialise insights	Update and industrialise dashboards	 County dashboard Include LEA data 	High	CIDR data for outbreak analysis from HSE	Graham, Fiona, Kenny
Outbreak analysis	Undertake analysis using HSPC data	Complete outbreak analysis using existing data	High	None	Nik, Nitin
Restrictions analysis	Create restrictions dashboard	 Create dashboard Include additional incidence data (3, 5,7,14-day) to enhance findings Include additional time-lags (7,10,14) for analysing incidence rate changes 	High	None	Graham, Fiona
Transport dashboard	Complete transport dashboard	 Update dashboard for latest data Compare to last year's travel pattern Plan for Christmas monitoring 	High	None	Kenny
Stay at home index	Access data through Geohive and provide initial insights	 Access existing data to create insights Merge with disease prevalence Get Stay at Home Index from 3 mobile (dependency) 	High	Awaiting Geohive access	Rory M, John
Facebook survey analysis	Complete Facebook dashboard	Update dashboard for latest dataUndertake initial analysis	High	None	Rory M
International research	Complete desktop research and present findings	 Retrospective analysis of Thanksgiving/ Diwali and other large events Pubs/restaurants additional research Other key international studies 	Medium	Wait c.10-days from Thanksgiving for case data	Emma
Events	Identify a way of tracking events in Ireland to allow better monitoring of Covid outcomes	Identify source(s) of eventsDesign solution to track them	Medium	None	Emma, TBC
Google mobility data	Update and track Google and Apply mobility data to identify trends at certain locations/categories	 Create dashboard Monitor changes over time 	Medium	None	Cillian B
Analysis of media/press	Track positive and negative Covid-related press sentiment and triangulate with other data sources	TBC approach	Medium	None	ТВС
Analysis of flight data	Identify and track flight and passenger information to allow monitoring over Christmas	 Identify sources of information Design solution to track 	Medium	None	Prashant, Jamie



1GC Status Report (04/12/2020)



Reason for Status (if not GREEN)

- 1GC Azure environment build progressing, detailed design and configuration in progress
- Progression on Social Distancing Index has paused pending sign off from Dept. of Health

Milestone	Status	Date Last Period	Due Date
Use Case Prioritisation (Weekly)		25/12	25/12
1GC Briefing Pack (as required)		25/12	25/12
Social Distancing Index decision		27/11	ТВС
Deploy 1GC Azure Environment		11/12	11/12
Complete 1GC DPIA		11/12	11/12

Key Achievements

- Briefing session completed on 4/12, Key agenda items included agreement of restriction and compliance monitoring approach
- Received test data to validate the Development environment prior to build of Test & Production environments
- Commenced the development of Azure Data Factory pipelines in the Development Environment
- Created new mobility dashboards using data from TII/Google/Apple
- Created new dashboard focused on Dublin footfall
- Developed an events tracker and associated plan to monitor future events / activities
- Completed updated economic analysis
- Secured access to the GeoHive platform for 3 mobile mobility use cases
- ► Session complete on (4/12) with HSE to outline data sources to be ingested into the 1GC environment

Items for Attention

Highlights / Risks / Issues / Decisions

- Decision and sign off on proposed insight governance
- ▶ Sign off of HSE environment access agreements
- DPIA sign off (including Data & Platform Owner decisions)
- Complete phase 2 SOW

Planned Activities / Forward Look

- Complete weekly briefing on 11/12
- Complete phase 2 SOW
- Validate Development environment and all user access
- Commence Test Environment build activities
- Begin to identify the impact of Level 3 restrictions
- Incorporate 3 mobile data into exiting data insights such as County Dashboard
- Data flow options to be presented to HSE (w/e 11/12)
- 1GC Insights Briefing to IIS Director



1GC Detailed Update

Area	Achievements	Forward Look
Governance	Achievements Briefing session completed on 4/12, Key agenda items included agreement of restriction and compliance monitoring approach Progressed HSE documentation required to secure access to 1GC Azure Environment.	Forward Look Complete weekly briefing on 11/12 Data flow options to be presented to HSE (w/e 11/12) IGC Insights Briefing to IIS Director Complete phase 2 SOW
1GC Azure Build	Achievements Received test data to validate the Development environment prior to build of Test & Production environments Commenced the development of Azure Data Factory pipelines in the Development Environment	Forward Look • Validate Development environment and all user access • Commence Test Environment build activities
Data & Insights	Achievements Created new mobility dashboards using data from TII/Google/Apple Created new dashboard focused on Dublin footfall Developed an events tracker and associated plan to monitor future events / activities Completed updated economic analysis Session complete on (4/12) with HSE to outline data sources to be ingested into the 1GC environment	Forward Look • Begin to identify the impact of Level 3 restrictions • Incorporate 3 mobile data into exiting data insights such as County Dashboard

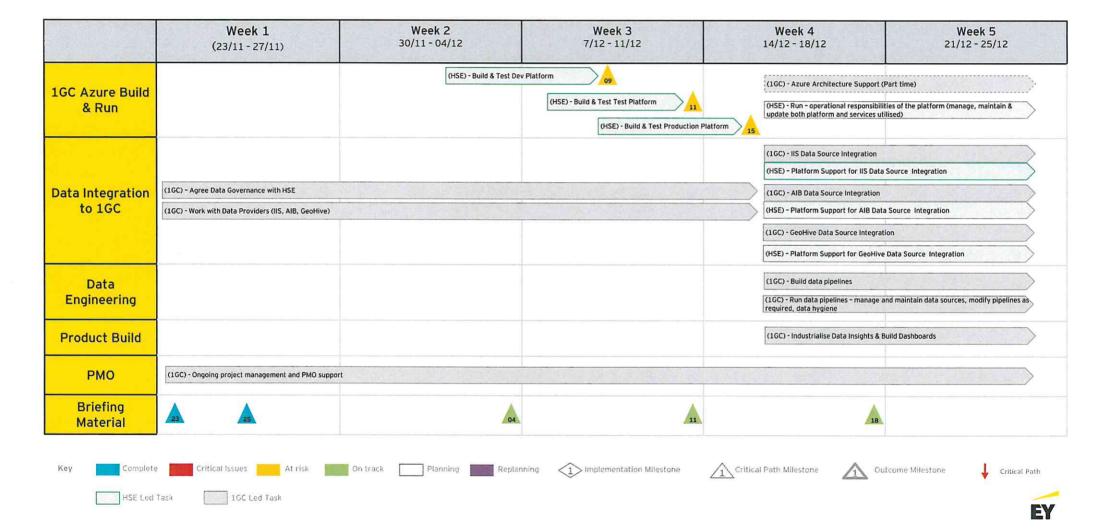
1GC Resource Tracker

ea	Team Member	Role	Last Week (Days)	Next Week Forecast (Days)
	Paul Pierotti	Responsible Executive	5	5
Governance	Emmanuel Adeleke	Programme Manager and Stakeholder Engagement Lead	5	5
	Emma O' Sullivan	Programme Office	5	5
1GC	Nigel Foley	Delivery Lead	5	5
Azure Build	Paul Browne	Cloud Engineer	4	5
	Cillian Leonowicz	Insight Design Lead	5	5
	Nikunj Maheshwari	Data Scientist	5	5
	Graham Catchpole	Senior Data Analyst	2.5	2.5
	Ross Morrison	Data Engineer	2	4
	Rory Murphy	Data Analyst	5	5
	Fiona Murphy	Data Scientist	5	5
Data & Insights	Eve Bannon	Senior Data Analyst	5	5
	John Hallahan	Op Model Design Manager	5	5
	Cillian Bisset	Data Analyst	5	5
	Nitin Goutham	Data Engineer	5	4
	Kenny Hazlett	Data Engineer	5	5
	Jamie McIlveen	Data Analyst	5	5
	Preshant Kandhare	Data Engineer	5	5
	Jason Guy	Data Protection	1	2



1GC Plan on a Page - Phase 2

Draft Pending Key Planning Decisions



EY | Assurance | Tax | Transactions | Advisory

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Update - Week 7

Agenda



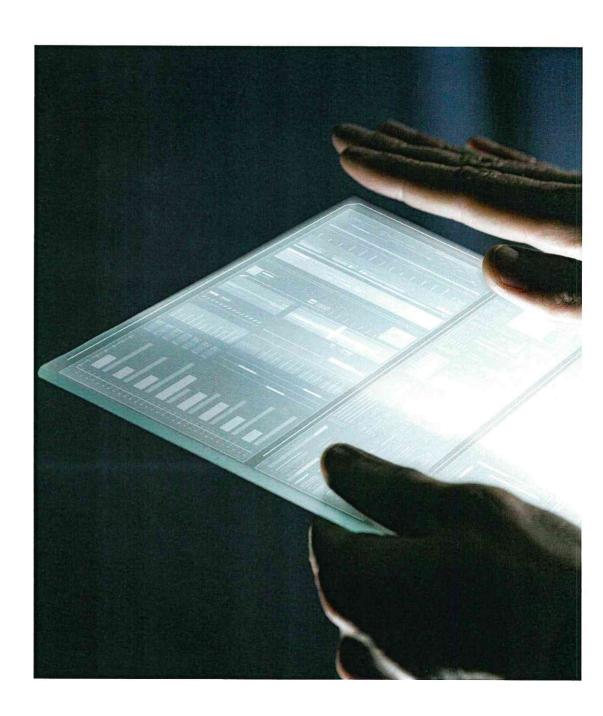


- ❖ Feedback on last week
- Update on county analysis
- Plan for monitoring impact of restrictions
- Project updates

Feedback on last week



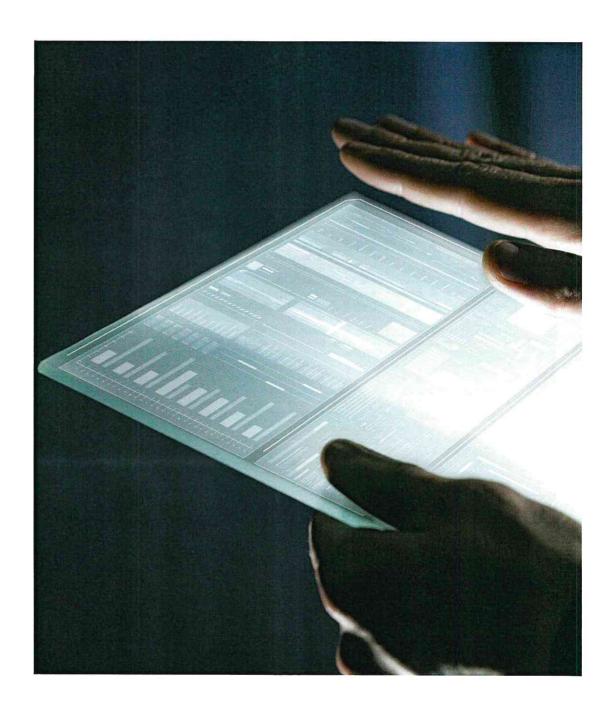
Update on analysis



14 Day Incidence Rate by County (as at 30/11/2020)

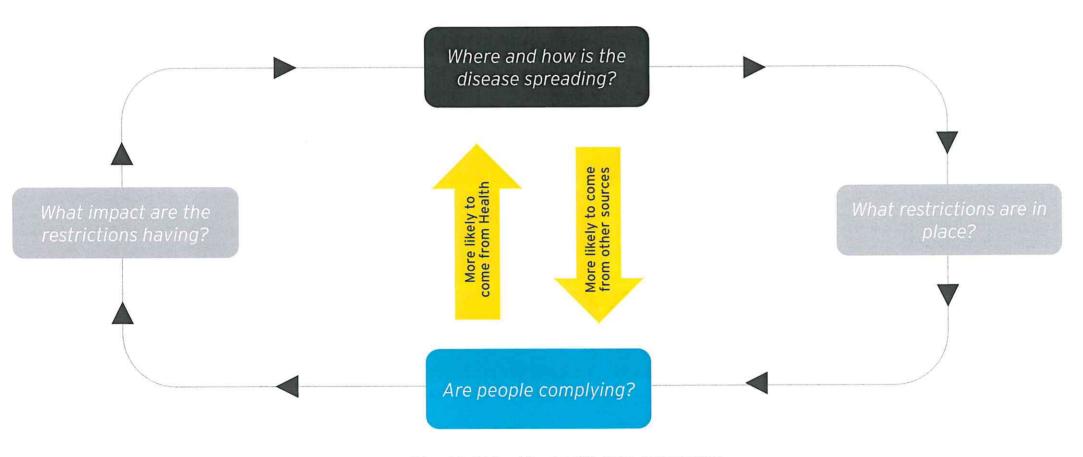
Two Weekly Incidence Rate Per 100k	Population	03-0ct	05-0ct	07-Oct	08-Oct	h c	1 1		1	14-Oct	16-Oct	17-0ct	19-Oct	20-Oct	21-Oct	22-Oct	23-Oct	25-Oct	26-Oct	27-Oct	28-Oct	30-04	31-00	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	07-Nov	08-Nov	10-Nov	11-Nov	12-Nov	14-Nov	15-Nov	16-Nov	18-Nov	19-Nov	20-Nov	21-Nov	23-Nov	24-Nov	25-Nov	26-Nov	28-Nov	29-Nov 30-Nov	Change Last 5 Days
Carlow	56,932	44 44	42 4	2 40	42 5	54 6	51 74	77	83	84 1	9 116	149	167 19	8 204	242	242	270 2	92 30	6 311	327	327 29	93 25	99 2	70 278	249	242	214	213 177	7 160	137 1	26 105	95	98	91 88	72	77	81 86	88	84	76 7	2 70	70	76	70 E	5 76	76 75	
Cavan	76,176	88 114 1	134 14	14 164	200 3	303 33	39 386	6 412	571	641 7	35 760	811	324 91	0 1012	## 1	058	983 5	96 96	7 964	810	752 66	68 64	45 5	9 562	2 474	365	295	263 232	2 206	159 1	43 133	119	112	02 10	98	87 :	95 97	7 95	101	100 9	8 92	97	91	76 7	4 67	66 67	-26%
Clare	118,817	96 121 1	144 15	58 183	199 2	246 2	61 268	8 304	310	306 3	09 322	326	327 32	2 313	304	311	272	264 28	1 252	248	253 25	55 23	35 2	29 209	189	186	181	173 171	1 160	139 1	32 122	109	104	04 93	109	111 1	112 10	4 93	91	89 8	6 83	80	79	74 6	9 71	51 53	-33%
Cork	542,868	105 110	111 11	19 127	140 1	155 15	59 181	1 199	209	232 2	37 256	275	308 32	2 336	340	327	334	347 33	7 335	333	331 33	34 3	118 31	05 276	258	242	233 2	239 216	195	179 1	58 143	119	108	02 89	83	86 1	82 8	1 73	77	78 8	1 81	84	82	77 7	6 73	68 63	-23%
Donegal	159,192	265 273 2	293 3	12 319	326 3	324 3	45 355	5 355	354	367 3	55 356	344	347 32	9 320	320	312	324	322 32	9 318	313	317 33	22 3	310 33	20 309	305	286	300	297 290	0 293	275 2	85 27	281	271 2	72 27	269	281 2	293 26	3 266	254	231 2	27 23	9 248	217	215 2	15 220	222 21	
Dublin	1,347,359	161 166 1	162 1	71 165	163 1	173 17	74 177	7 180	184	193 1	7 201	223	231 23	8 241	252	257	253	255 25	5 258	255	252 25	52 2	37 2	20 226	8 217	209	200	199 191	1 185	172	61 151	142	134	39 13	119	118 1	115 11	9 114	118	114 11	14 11:	3 114	113	108 10	102	102 103	-10%
Galway	258,058	89 93	92 9	7 107	113 1	137 15	53 155	5 165	173	203 2	28 262	273	288 31	4 326	355	372	368	373 38	2 384	370	354 3	41 3	313 2	96 282	2 255	243	211	187 171	1 144	126 1	09 108	97	86	83 86	80	84	78 7	1 66	62	62 6	3 65	62	54	51 4	6 44	50 50	-7%
Kerry	147,707	46 52	62 6	4 73	91 1	106 1	10 113	144	153	177 1	4 197	215	240 24	6 263	269	257	269	291 29	9 279	281	269 2	71 2	36 2	20 198	183	178	194	190 177	7 162	153 1	39 139	129	128	28 12	123	122	115 86	83	71	60 6	0 60	51	51	48 E	0 44	41 43	-16%
Kildare	222,504	95 94	87 9	8 99	108 1	125 14	46 154	4 168	188	198 2	04 208	244	257 27	8 293	305	303	298	301 30	6 298	289	290 2	92 2	70 2	42 23	1 210	186	177	169 156	6 143	121	18 103	94	85	93 89	88	85	86 87	7 86	87	84 8	7 82	2 81	79	72 8	5 65	62 6	-22%
Kilkenny	99,232	45 42	43 5	51 51	59	61 7	73 87	98	105	109 1	23 142	146	154 16	5 165	177	174	180	175 17	6 173	171	168 15	50 13	33 1	31 139	134	136	134	134 141	1 141	133 1	28 130	125	126	129 12	118	116	116 11	3 110	98	92 10	06 10	7 101	130	125 1	25 132	134 14	14%
Laois	84,697	76 89	87 9	6 105	123 1	124 13	33 135	5 139	136	161 1	9 151	174	185 20	01 214	222	220	220	233 24	2 251	256	231 2	35 2	27 2	08 204	4 197	179	170	174 175	5 174	163 1	57 158	149	136	136 13	116	107 1	104 93	9 86	83	63 5	9 53	3 53	53	58 E	5 51	54 5	200
Leitrim	32,044	31 31	28 3	4 34	53	81 9	37 125	5 137	147	162 2	18 218	225	240 25	3 262	272	278	259	247 22	2 209	200	178 12	25 12	22 10	9 97	84	69	56	31 28	34	37	37 47	56	81	81 87	94	94 1	100 10	6 106	97	84 7	8 78	69	59	34 3	4 25	16 15	-68%
Limerick	194,899	69 90	96 10	07 114	119 1	145 16	60 167	7 182	189	207 2	08 231	246	248 27	77 280	290	301	288	293 30	6 299	3 310	306 3	12 2	77 2	69 26	2 228	227	229	221 216	6 218	211 2	07 198	195	195	211 20	1 222	238 2	236 22	21 216	217	205 19	34 19	2 189	187	180 1	70 166	143 13	-28%
Longford	40,873	132 147	152 1	54 169	169 1	176 2	08 193	3 196	181	193 1	76 213	240	254 27	79 291	281	308	296	281 28	9 291	1 306	279 2	94 2	59 2	45 22	3 193	181	193	166 164	4 157	152	42 132	127	115	115 10	103	100 1	100 8	3 88	88	81 8	3 83	3 93	91	91 1	81 81	86 8	-3%
Louth	128,884	77 88	90 8	5 85	89	116 16	09 116	8 115	152	161 1	81 185	188	178 2	21 261	293	283	272	286 29	9 311	289	296 2	93 2	85 2	97 29	7 257	219	193	202 189	9 177	159	55 157	7 156	147	151 15	160	157 1	168 17	4 186	202	206 2	13 21	3 204	199	196 1	39 182	177 18	-9%
Mayo	130,507	30 33	32 3	6 42	42	54 6	75	80	90	107 1	23 131	150	167 18	5 208	228	243	250	246 25	6 266	259	248 2	42 2	261 2	46 23	2 216	198	183	184 185	5 176	162	47 15	145	141	118 11:	110	110 1	109 10	3 93	77	79 8	7 88	86	93	84 7	9 80	84 8	-8%
Meath	195,044	68 85	90 9	6 115	129 1	164 11	83 199	9 213	306	357 4	03 452	490	488 5	91 629	657	656	648	649 66	1 651	1 530	558 5	31 4	181 4	50 44	8 352	314	282	272 24	9 232	204	201 172	2 154	141	140 13	3 139	128 1	134 12	7 131	131	126 12	24 11	8 118	108	103	8 102	85 8	-25%
Monaghan	61,386	178 207	226 2	57 257	270 3	303 3	319 33	1 313	362	350 3	68 350	375	365 40	2 389	406	409	384	375 34	9 363	3 323	310 3	05 3	03 2	88 26	9 218	205	171	176 166	6 142	137	21 122	2 116	117	124 11:	114	104 1	104 11	2 94	101	101 10	06 10	8 99	103	83 7	8 81	98 10	0%
Offaly	77,961	77 99	103 1	04 110	123 1	130 1	36 140	0 145	141	151 1	10 177	201	195 2	10 224	222	224	214	224 21	7 222	2 227	218 2	36 t	191 1	82 153	3 130	112	106	100 96	97	99	35 99	94	87	95 11-	112	117 1	122 12	6 119	123	103 10	00 99	9 78	81	72 (5 49	49 4	-44%
Roscommon	64,544	161 155	155 1	70 166	166 1	192 1	84 20	0 181	187	201 1	98 201	223	232 2	28 239	260	271	260	276 26	3 263	3 259	231 2	40 2	229 2	03 22	5 229	218	195	189 174	4 153	152	75 170	175	163	166 16	141	169	161 16	7 161	160	166 1	61 13	3 130	122	118 1	21 105	96 6	-48%
Sligo	65,535	55 64	75 9	0 107	137	150 1	63 175	5 186	208	241 2	91 304	294	325 3	56 366	395	406	409	423 43	8 438	8 423	397 3	59 3	354 3	56 33	3 304	285	259	220 21	1 189	159	54 15	154	140	128 11	104	95	93 70	6 85	84	73 7	6 70	0 64	56	61 8	18 81	56 5	-3%
Tipperary	159,553	40 48	53 5	55 58	58	66 7	70 71	78	83	79 6	8 93	110	113 1	5 118	120	126	124	134 13	9 133	3 139	145 1	33 1	139 1	31 130	0 130	130	132	130 121	8 122	117	23 118	113	117	114 10	1 105	110	107 10	6 100	97	92 8	6 9	0 85	93	92 4	80 87	79 7	-15%
Waterford	116,176	34 28	31 3	2 40	46	56 6	64 61	1 66	70	83 1	09 131	132	143 15	55 160	173	176	194	205 21	5 226	6 225	228 2	10 2	205 2	01 20	1 195	194	187	176 16:	3 146	136	28 13	114	142	141 15	163	163	164 15	5 161	157	156 1	54 14	9 140	150	118 1	14 102	85 7	-50%
Westmeath	88,770	64 68	80 8	8 96	100	105 1	115 146	8 167	171	217 2	11 25	294	324 3	37 425	435	453	455	460 45	3 461	1 465	415 4	40 4	102 3	69 37	2 354	266	255	229 21	6 208	184	58 15	1 162	133	150 15	113	117	113 10	6 103	100	92 8	8 8	7 80	71	72	51 39	41 2	-60%
Wexford	149,722	41 48	57 7	73 80	85	98 1	112 131	0 160	173	188 2	02 250	271	272 2	97 298	301	322	318	313 30	1 268	8 257	258 2	42 1	192 1	74 173	2 141	124	126	96 89	83	74	67 67	48	49	49 49	47	45	46 3	7 42	39	37 3	6 3	6 34	36	32	30 25	23 2	-22%
Wicklow	142,425	77 78	78 7	77 76	76	80 8	84 88	91	87	89	91 103	119	120 12	24 124	129	145	145	149 14	9 145	147	149 1	41 1	130 1	17 116	107	104	106	91 88	89	82	77 89	86	84	85 85	82	86	83 7	8 88	91	80 8	4 9	0 77	79	78	4 85	93 9	16%
National	4,761,865	107 114	116 t	24 128	134	150 1	158 167	7 177	190	207 2	17 23	251	261 2	79 290	302	305	302	307 30	9 307	7 298	291 2	86 2	268 2	53 24	7 226	211	201	195 184	4 173	159	50 14:	2 133	127	128 12	117	118	117 11	4 m	111	106 10	07 10	6 104	102	97	93 91	88 8	-16%

Plan for monitoring impact of restrictions



Answering four key questions to support government decision making

Helping improve visibility and decision making by combining and analysing data across government



Data analytics briefing - 4 December 2020 - DRAFT - Not for circulation

Specific assets and insights informing how we are performing and identifying future risks

Where and how is the disease spreading?

LEA incidence rates 3, 5 and 7-day incidence rates by LEA

Disease transmission source and settings Source: HSE

Testing & Tracing Output

Outbreaks

Analysis of recent outbreaks by setting.
Source: CIDR
Updated: daily

What restrictions are in place?

Current restriction level Current government

restrictions in place
Source: Government guidelines

Events

Upcoming and past events to inform analysis Source: Online event databases Updated: daily

Are people complying?

Stay at home index

Measure trips within and outside counties.
Source: 3mobile
Updated: daily, 40 hour lag

Traffic data

Traffic counter data by road, vehicle type.
Source: Til
Updated: daily

Dublin footfall

Pedestrian counters for key
Dublin city centre roads.
Source: DCC
Updated: Hourly, monthly publish

Outbreaks

Analysis of recent outbreaks by setting. Source: CIDR Updated: Daily

Social Distance Index

Measure congregation levels by POI and LEA Source: 3mobile Updated: daily, 40 hour lag

Mobility

Measure of mobility by key purpose e.g. retail/recreation, Source: Google, Apple Updated: daily

Adherence Self Reporting

Survey Mask, Close Contacts, Handwash, etc Source: HSE, Facabook survey Updated: daily

Venues

Adherence to restrictions across places of worship, restaurants, workplaces, transport.

Garda enforcement

Fixed fine notices related to Covid-19 breaches. Source: Gardaí Updated: TBC

What impact are the restrictions having?

Restrictions analysis

Analysis of impact of each restriction on disease incidence. Source: Openhive Updated: daily

Data analytics briefing - 4 December 2020 - DRAFT - Not for circulation

Identifying higher risk events

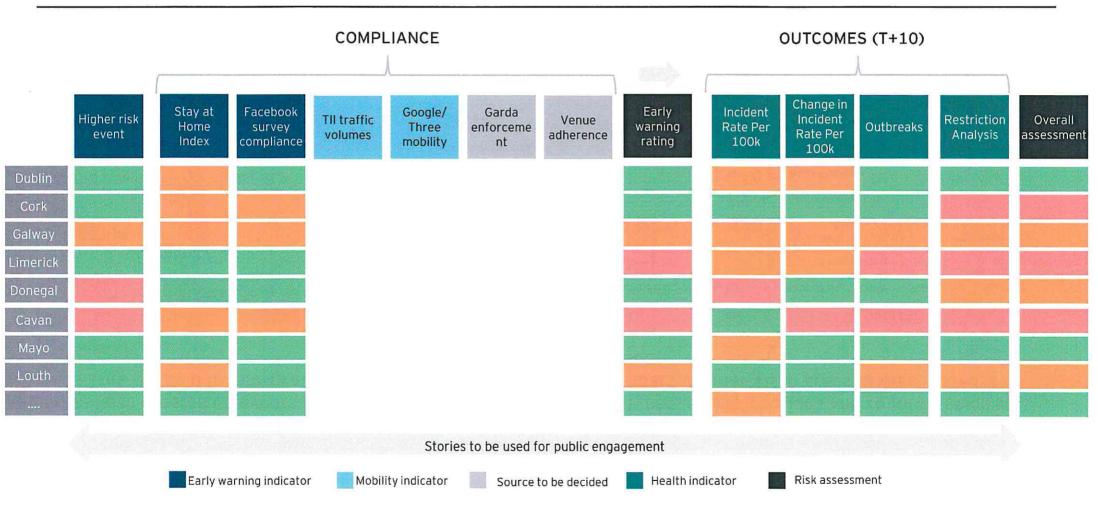
We have created an events tracker in order to identify key event types, dates, locations and counties involved.

This will help to inform early warning tracking, as well as retrospective analysis in areas in which disease incidences have increased.

Key event categories	# on	Upcoming events in December	Date	Locations to monitor
key event categories	tracker	GAA Hurling All-Ireland Senior Championship Final	13 Dec	Croke Park, Counties involved: Limerick, Waterford
Community	0.6	GAA Football All-Ireland Senior Championship Final	19 Dec	Croke Park, Counties involved: TBC
Eventbrite, Farmer's market, etc.	86	GAA Football All-Ireland Senior Championship Semi-Finals	5/6 Dec	Croke Park, Counties involved: Cavan v Dublin/ Mayo v Tipperary
Christmas	10	Horse Racing Christmas festival	26-29 Dec	Leopardstown, Dublin and Limerick
Markets, Santa's grotto events, etc.	10	International Rugby: Ireland v Scotland	5 Dec	Aviva Stadium
Sport		Local Rugby Fixtures	5, 12 Dec	Mayo, Dublin, Galway, Westmeath, travel to NI
GAA, horse racing, rugby, etc.	76	Glow Cork	2 Dec -12 Jan	Cork
Music	3	Winterval Waterford	4-23 Dec	Waterford
Events over holiday period	3	Dublin Castle Christmas Markets	12-22 Dec	Dublin

Source: GAA, Irish Rugby, Aviva, Irish Racing, Ireland.com, Eventbrite

Helping to monitor ongoing performance on the run up to and during Christmas

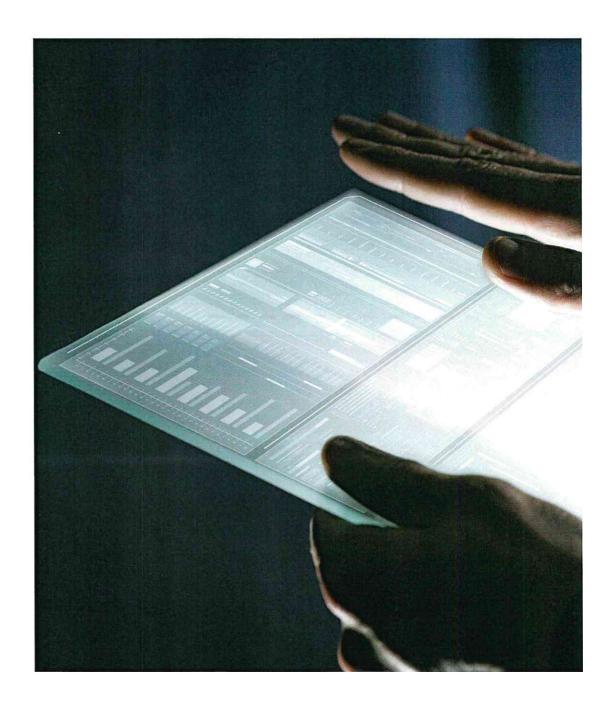


Ensuring the right metrics to monitor ongoing compliance



Is there anything else we should be considering?

Project updates



Progress update

GOVERNANCE AND SET UP

- ► Delivered weekly Progress Report and Progress Update meeting today
- ▶ Issued second SOW with HSE
- Completed HSE IT Supplier Questionnaire
- ► Issued 1GC HSE Detailed Data Request and workshop to go though in detail
- ► Issued draft Data Protection Impact Assessment to HSE and awaiting feedback
- ► Issued 1GC HSE Insight Governance approach to HSE and awaiting feedback
- ► HSE stood up 1GC platform and now in detailed testing
- Confirmed access to Stay at Home Index and wider GeoHive access

USE CASE DESIGN

- Created Google Mobility prototype for presentation today
- Created Facebook Survey prototype for presentation today
- ► Created Dublin Footfall prototype for presentation today
- Created Future events long list to be shown today
- Created TII Transport prototype for presentation today
- ► Designed Stay at Home Index prototype while awaiting data
- ► Awaiting AIB Payments Data

INSIGHT DEVELOPMENT

- ► Expanded C-19 Heatmap for 3 and 5 days changes
- Expanded Restrictions Impact tool to include 7 day and rolling 3 day average as well as for allowing changes to 10 day future view
- ► Expanded International Restriction Impact quantification

1GC Insights Delivery Governance Structure

Room 350 Briefings Weekly (incl. ad-hoc requirements)

Secretary General (DoT), Assistant Secretary General (DoT)



1GC Insights Review Group (Weekly)

1GC Team (Prog. Exec and Delivery Lead), IIS Director, HSPC Director, DoT nominated rep, Other nominated stakeholders (as required)

- Review feedback from room 350 briefings
- Agree priority use cases and delivery approach
- Confirm data and DPIA requirements
- Confirm 1GC insights delivery mechanism and platform
- ■Update rolling 6 week plan
- Review cadence and frequency of governance meetings over time



1GC Insights Delivery (Daily)

1GC project team

- Insights delivery across all data sources
- Continuous delivery and validation with relevant data providers (e.g. CSO, AIB, TII, DOH)
- Additional / complementary analysis and insights (e.g. international research, ad-hoc DoT requests)



1GC & HSE Team stand up (Daily)

1GC Team (Prog. Exec and Delivery Lead), National Director, IIS Director, CIO, CTO, HSPC Director, Other stakeholders (as nominated by the HSE)

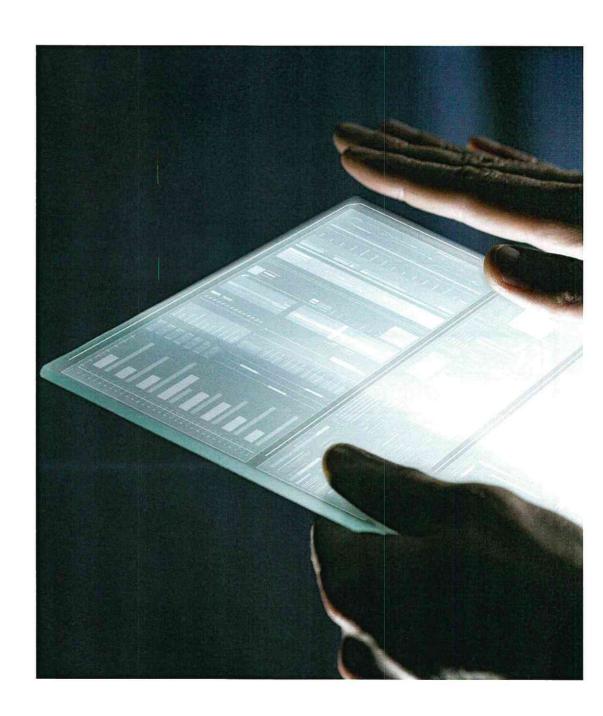
- Daily progress update & actions
- Ongoing review, and update of data governance requirements (e.g. DPIA)
- Daily progress updates, risks and issues resolution
- Continuous validation and refinement of 1GC use cases
- 1GC data platform decisions

Weekly (incl. adhoc) delivery of insights across disease monitoring, restrictions, compliance and additional requirements

Where we are with the key DoT and Government dependencies

REQUIREMENT	USE CASES	STATUS	DESCRIPTION
1GC Data Owner and Data Protection Impact Assessment	Many	DOT Action	 Clarity required on 1GC data owner organisation and responsible individual We have also created an initial Data Protection Impact Assessment and ask for guidance on whether and how to engage with the Data Protection Commissioner Note this does not include any personal identifiable data, which means it is excluded from data protection. Need to o rely on existing data sharing agreements to meet timeframe
Financial Services companies create and share payment related Use Cases	Business Compliance by Industry (Instore Online)	DOT Action	 AIB now completed analysis and awaiting confirmation of method to publish. They need it either to go to CBI or have a request from DOT Clarity required on Data Protection Owner and method for sharing
Align with NPHET	All Health Related	For Discussion	 Request to get NPHET forecasts of future disease spread to incorporate into Christmas briefings
Access to appropriate mobility data	► Social Distance Index	Continue Monitoring	Awaiting DOT decision on Social Distance Index
Stand Up Appropriate Analytics Environment within HSE	Many	Team Priority to Resolve	 Detailed design now published and working though specific comments from HSE Technology. Progressing well Needs continued prioritisation and leveraging existing infrastructure to deliver within required timeframe
Government Departments to create and share specific Use Cases	Many	Team Progressing	 Already have access to GeoHive and CSO Confirming specific approach with various government departments, including any data governance and sharing

Appendix



5 Day Incidence Rate by County (as at 30/11/2020)

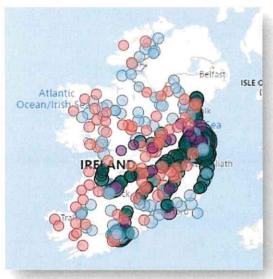
5 Day Incidence Rate Per 100k	Population	03-Oct	04-Oct	05-Oct		07-Oct		09-Oct		11-Oct	12-Oct		14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	13 Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	75-Nov	75-Nov	28-Nov	29-Nov	30-Nov	Change Last 5 Days
Carlow	56,932	26	26	18	18	5	9	19	26	37	47	49	47	77	74	98	111	132	102	132	102	123	113	133	116	133	104	79	67	58	61	54	51	47	44	23	30	33	28	26	21	18 2	21 1	9 21	37	33	42	44	35	28	25	12	9	12	12	14 2	5 33	40	229%
Cavan	76,176	51	70	76	75	95	129	206	234	274	273	3 400	378	437	421	450	323	345	352	393	375	365	290	231	179	152	147	139	98	76	75	67	49	43	49	35	22	24	26	22	34	45 4	2 4	1 4	34	32	38	35	38	35	28	21	25	24	21	17 1	6 9	11	-56%
Clare	118,817	63	77	90	99	111	114	137	136	129	144	145	106	91	108	85	94	105	104	93	100	82	78	97	93	82	88	82	61	61	55	40	35	40	45	45	50	50	44	30	26 2	26 2	26 2	3 4	42	42	40	44	26	28	24	23	18	14	11	9 1	0 13	16	12%
Cork	542,868	50	48	46	47	52	62	74	80	96	107	109	120	122	122	125	147	136	145	136	115	99	105	97	102	114	117	108	102	95	90	64	54	51	48	40	42	35	27	19	20	21 2	24 2	6 2	30	27	30	33	33	35	34	28	30	25	20	19 1	8 13	11	-55%
Donegal	159,192	116	117	131	146	143	144	145	148	134	116	113	123	108	111	104	111	92	102	108	113	122	142	143	114	114	116	107	92	106	107	81	66	98	90	102	130	133	99	90	107	85 8	39 9	7 10	2 80	89	89	81	88	80	66	75	72	70	70	77 7	7 77	74	5%
Dublin	1,347,359	64	60	55	58	48	50	58	66	69	76	84	88	88	90	107	107	101	102	100	83	80	84	83	82	83	87	85	73	68	77	66	60	62	63	44	51	46	43	34	38 :	34 4	10 4	3 4	5 42	41	42	41	43	46	45	37	34	34	29 2	29 3	2 34	31	-8%
Galway	258,058	39	36	31	41	45	50	67	89	86	90	95	107	112	143	147	151	142	139	138	145	147	148	14	119	93	93	79	74	59	63	43	41	35	40	36	37	24	17	14	19 2	22 :	31 3	6 3	31	33	24	20	17	15	10	10	9	12	10	14 1	6 24	27	123%
Kerry	147,707	31	37	47	41	36	53	62	56	59	84	69	79	73	111	102	124	117	131	108	95	91	101	94	93	93	79	59	49	43	41	31	37	66	65	71	79	69	39	43	31 2	25 2	24 3	0 2	1 24	24	24	20	19	17	14	13	12	11	14	14 1	4 14	16	44%
Kildare	222,504	43	42	44	50	37	48	62	78	80	91	105	98	91	98	120	111	124	139	133	107	104	101	92	84	91	90	82	62	63	52	44	33	40	34	28	33	28	25	25	28	25 3	35 3	4 3	7 35	33	34	31	28	32	29	20	20	20	13	13 1	8 18	18	-11%
Kilkenny	99,232	24	25	23	23	20	22	29	40	46	59	58	58	69	78	73	75	80	66	55	50	55	50	57	55	55	46	43	34	30	42	45	51	56	53	57	57	54	49	51	30	28 3	30 2	8 3	36	41	40	37	37	33	44	43	42	62	61	49 5	3 63	54	-13%
Laois	84,697	59	65	53	61	38	51	46	54	52	47	33	63	63	71	93	115	93	106	109	97	80	86	80	77	70	74	65	55	50	63	59	51	52	63	51	63	64	64	51	48	27 2	28 3	0 2	4 18	19	15	12	18	18	19	18	18	19	22	25 2	7 25	20	6%
Leitrim	32,044	19	19	12	19	19	28	59	78	100	105	9 100	91	128	103	106	112	103	62	72	81	78	72	55	47	22	9	8	3	6	9	9	6	6	3	9	22	28	28	37	37	53 4	17 5	6 5	6 47	25	31	22	12	12	6	0	0	0	3	3	3 3	6	100%
Limerick	194,899	47	63	88	69	64	60	66	74	74	83	88	82	75	104	111	122	139	141	123	114	105	91	101	92	97	100	94	74	82	74	61	56	76	67	59	81	84	69	74	79	72 7	74 7	6 9	7 103	96	86	82	54	48	42	41	47	49	47	50 5	60 52	50	3%
Longford	40,873	78	76	59	39	46	49	54	81	78	76	7	91	59	103	122	145	144	154	115	117	95	83	76	86	69	73	71	73	76	66	59	42	49	39	37	46	46	34	34	37	29 3	37 3	7 3	7 32	27	17	24	22	27	29	34	39	39	39	34 3	14 25	29	-25%
Louth	128,884	28	36	43	40	35	42	57	52	57	55	5 88	72	92	97	101	61	102	120	142	137	15	116	96	74	94	96	99	82	87	70	64	47	50	42	43	36	36	36	49	63	69 7	74 8	2 7	3 64	68	74	78	85	85	81	75	67	60	60	50 5	0 46	47	-21%
Mayo	130,507	13	17	19	21	23	23	31	44	48	48	54	60	64	67	84	94	97	105	120	116	114	105	5 96	86	70	58	60	73	64	67	65	61	41	54	67	65	60	50	37	18	25 2	29 3	0 2	7 31	28	26	34	34	34	38	35	29	34	29	21 2	21 25	23	-32%
Meath	195,044	32	45	43	48	63	82	101	115	124	122	2 19	223	251	287	7 305	22	27	7 27	261	3 24	3 26	173	3 15	116	130	133	133	107	107	85	72	57	69	70	62	53	46	35	31	38	42	43 3	9 5	2 46	50	56	68	53	51	36	26	18	15	18	17 2	23 18	19	23%
Monaghan	61,386	65	94	85	109	111	127	137	153	156	140	0 17	153	137	104	127	98	137	130	166	16	156	12	5 116	98	85	78	67	59	52	- 44	46	31	34	49	54	49	47	47	31	28	42 4	46 4	4 3	6 34	18	23	31	41	46	49	42	36	29	24	18 1	18 34	34	17%
Offaly	77,961	42	53	62	54	54	59	50	51	58	56	3 46	47	38	77	99	113	121	139	99	82	69	65	5 50	56	49	51	50	51	38	38	32	14	14	21	13	33	37	35	47	49	40	47 6	8 5	1 55	49	45	26	24	19	15	8	6	6	9	13 1	18 22	13	200%
Roscommon	64,544	70	70	60	67	60	46	70	65	71	71	1 77	81	87	74	112	115	87	107	119	95	98	113	3 96	74	65	5 51	51	40	51	81	85	85	85	81	46	37	29	54	46	53	60 5	54 4	5 5	1 78	84	87	73	65	34	29	20	15	15	12	14 1	17 17	20	30%
Sligo	65,535	37	47	55	70	76	85	89	98	101	95	5 85	108	140	143	145	168	165	145	168	19	173	169	5 17	2 137	102	2 98	76	60	63	75	76	72	73	61	50	50	46	32	37	40	27 2	29 2	3 2	4 17	24	21	32	31	29	29	26	15	12	15	11 1	14 17	15	25%
Tipperary	159,553	23	30	28	27	25	24	24	26	29	34	4 36	31	39	43	56	60	64	57	53	40	36	45	5 45	47	50	52	38	43	54	51	49	53	46	39	34	37	36	38	38	37	33	41 3	31 3	8 46	43	38	38	26	19	16	22	23	33	33	34 2	29 3	31	-6%
Waterford	116,176	12	11	15	15	21	26	36	37	40	37	7 3	39	59	79	77	84	87	65	63	7	87	87	7 9	90	82	73	64	69	53	60	54	49	45	46	49	38	37	32	40	25	59	74 8	0 8	9 107	71	59	51	43	31	28	26	19	18	22	34 3	33 34	28	52%
Westmeath	88,770	28	27	37	36	43	53	62	61	88	98	96	133	123	133	155	180	157	25	0 22	6 21	193	18	4 110	124	108	8 92	104	82	64	87	96	75	79	71	37	38	34	27	30	38	28	48 5	6 4	8 5	55	35	24	25	14	9	8	8	9	8	11 :	9 9	8	-13%
Wexford	149,722	17	22	28	39	43	49	58	63	71	103	3 10:	3 111	115	146	128	12	137	135	5 94	101	10-	80	7	70	43	51	44	37	33	35	19	17	27	22	21	22	24	12	14	11	11	11 1	5 1	5 16	13	16	15	14	15	14	11	6	7	5	5	4 5	8	9%
Wicklow	142,425	40	33	32	27	24	20	21	25	25	33	3 38	40	46	57	68	66	67	61	51	46	46	45	3 4	48	40	44	39	38	40	34	26	24	27	20	18	31	27	19	39	42	34	41 4	8 2	7 25	22	20	23	27	25	29	31	27	29	32	30 4	14 43	38	29%
National	4,761,865	48	50	50	53	51	56	67	75	79	88	6 9	99	102	112	122	2 12	123	2 126	120	2 11	10	7 10:	2 9	7 90	88	88	82	71	68	69	58	51	54	53	45	49	45	39	35	37	35	40 4	2 4	4 43	41	41	40	38	37	35	30	28	28	26	26 2	28 25	27	-3%

3 Day Incidence Rate by County (as at 30/11/2020)

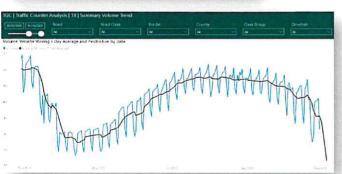
3 Day ncidence Rate Per 100k	Population	03-Oct	04-Oct	19-0ct	07-Oct	08-Oct	09-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-00	Z1-Oct	23 Oct	23-00	24-Oct	79-Oct	20-02	10-17	28-Oct	30.00	31,00	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	VONI-CI	17 Nov	10 Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	NON-OF	Change Las 5 Days
Carlow	56,932	16	16	E 4	2	7	18	3 25	5 32	2 30	30	28	54	56	81	63	86	58	77	51 8	4 7	74 :	95 7	70 8	35	49 3	7 2	28 2	5 47	37	30	14	14	19	19	19	19	11	7	9	14	18	21 2	3 2	3 2	8 2	5 2	3 9	4	5	5	11	9	9	18	26 :	37	250%
Cavan	76,176	29	45 5	4 5	8 6	9	1 17	6 19	3 20	3 12	241	280	357	224	200	134	203 2	59 2	94 2	30 14	17 1	01 1	13 10	08 9	92 1	64 6	2 5	59 3	7 28	33	34	28	18	14	12	9	18	18	25	30	29	25	14 1	7 2	1 2	6 2	3 2	1 14	13	9	16	17	14	5	1	4	11	-38%
Clare	118,817	36	56 E	8 7	1 7	0 6	1 93	3 93	3 85	7	70	71	40	48	56	73	68	58	47 !	50 5	2 5	53 1	55 E	7 5	54	43 4	2 3	35 3	1 27	22	15	19	35	37	32	20	19	16	13	14	16	15 :	32 2	9 3	4 1	4 17	16	17	13	11	7	7	5	5	7	9	13	100%
Cork	542,868	30	28 2	7 2	8 3	3 4	5 5	5 55	5 62	2 68	74	79	69	75	72	99	93	89	65	51 5	3 6	32	72 6	8 6	00 1	72 6	8 6	0 4	6 41	34	26	22	31	27	24	13	10	8	12	18	19	16	16 1	7 2	0 2	0 18	2	2 22	2 21	14	13	12	14	10	8	7	5	-62%
Donegal	159,192	79	77 7	2 9	0 10	3 9	2 7	5 77	7 80	73	57	64	70	79	55	59	45	67	76	75 7	9 7	79 :	97 6	8 4	17	52 7	3 7	5 5	8 46	41	33	67	67	83	73	75	63	27	58	59	74	52	45 5	0 5	1 6	0 5	3 4	4 41	36	48	45	48	35	41	55	52 4	15	-6%
Dublin	1,347,359	38	34 2	5 3	4 3	1 3	2 3	4 44	5	3 49	50	53	56	59	68	68	63	51	52 !	50 4	6 4	17 !	52 5	54 8	50	49 4	9 4	41 3	6 43	43	41	26	32	27	32	24	25	16	19	23	30	30 2	27 2	2 2	0 2	6 2	3 2	26	25	20	16	18	18	20	18	21 2	20	9%
Galway	258,058	20	24 2	0 2	5 2	3	9 5	1 64	6	50	45	72	86	108	90	84	72	78	95 9	97 9	2 8	32	70 6	7 4	12	44 4	2 5	2 3	3 26	13	24	24	29	21	15	9	5	6	16	20	26	22 2	20 1	5 1	6 1	4 1	-4	6	8	8	5	7	6	10	12	19	19	194%
Kerry	147,707	29	27 2	5 2	0 2	3 3	5 48	3 45	5 26	45	48	68	40	68	67	93	74	69	52	5 5	4 6	87 (68 E	54 3	38 :	39 3	2 2	23 1	8 20	22	27	49	51	53	35	31	16	16	16	21	12	16	15 1	6 1	5 1	2 12	. 9	8	8	5	7	7	9	10	9	8	8	20%
Kildare	222,504	31	29 1	5 2	7 2	7 3	6 4	57	7 55	56	62	60	57	53	77	82	85	76	76	61 4	6 5	53 (62 E	66	51	44 5	1 3	3 2	9 2	26	20	22	19	16	18	14	18	11	17	18	24	24 2	23 1	7 1	3 2	1 2) 18	15	15	13	9	9	9	8	10	13	13	53%
Kilkenny	99,232	20	12 :) t	2 1	1 1	18	25	36	4:	37	30	38	55	57	43	32	31	36	28 3	3 2	27 :	38 3	86 3	33 2	22 1	5 1	7 2	0 32	33	36	31	28	38	34	37	23	22	14	13	16	21 2	24 2	0 2	6 2	6 2	2 2	13	33	32	31	38	31	40	23	33 4	13	13%
Laois	84,697	39	51 1	9 2	4 2	3	7 35	5 35	5 25	5 2	15	46	51	63	52	67	68	64	57	55 4	11 4	16	17 5	3 3	39 :	35 3	4 3	3 2	8 37	39	35	22	32	37	50	37	35	20	21	13	14	17	17	1 3		i 1	15	13	9	6	11	15	18	17	14	13	11	-31%
Leitrim	32,044	12	12 :	9 6	9	2	8 5	3 65	76	5 5	50	44	87	81	75	34	44	14	41 !	3 5	0 4	4 :	22	9	3	0 3	1	3 6	6	6	3	0	0	9	22	28	19	16	19	47	37	37	19 1	9 1	6 1	2 12	6	0	0	0	0	0	3	3	3	0	3	100%
Limerick	194,899	38	50 4	3 4	1 3	2	9 46	5 50	3 50	5 48	43	54	45	71	77	90	89	75	72 !	3 5	4 5	56	60 E	8 6	0 !	54 5	9 3	37 4	1 40	40	33	39	47	43	45	50	49	41	38	48	50	46 6	S6 6	7 6	8 3	8 2	5 2	25	28	24	24	31	36	31	25	29 :	31	0%
Longford	40,873	34	27 2	9 2	7 2	7 2	4 42	2 64	56	45	15	54	46	88	81	105	95	78	54 !	4 4	6 6	34 :	37 4	4 3	39 4	44 4	9 4	2 4	6 34	29	15	24	27	29	27	22	22	15	20	22	24	22 2	22 1	5 1	2 !	5 15	17	24	17	17	27	27	29	12	12	17 2	22	-18%
Louth	128,884	19	26 2	7 2	8 18	11	4	3 44	43	3 16	54	57	81	52	45	23	63 1	01 1	33 8	0 5	4 3	37 (60 E	6 5	57 !	54 6	3 4	8 4	7 28	35	23	29	25	24	21	17	22	37	50	54	42	41	41 4	1 4	0 4	3 5	5	53	43	33	36	36	37	26	24	22	34	-6%
Mayo	130,507	11	12	1 1:	2 15	1	5 23	3 32	2 37	7 31	25	35	48	51	55	56	65	70	76	4 6	5 8	51 5	50 4	8 3	38 2	28 2	5 5	53 5	3 46	20	21	27	41	52	44	28	10	13	11	18	20	21	15 1	2 1	7 1	9 2	5 2	20	21	21	20	16	14	13	8	15	18	14%
Meath	195,044	15	27 3	0 3	8 4	3 5	4 80	83	3 80	63	135	179	212	171	149	112	70 1	77 2	211 1	19 9	9 7	75 8	86 E	7 7	76	76 9	2 6	2 4	1 29	41	42	46	38	33	25	18	19	16	26	32	30	19 2	27 2	9 4	3 3	3 4	31	24	11	6	9	9	16	10	13	9	11	22%
Monaghan	61,386	29	54 5	9 8	6 7	7 7	2 8	1 10	1 116	80	90	78	98	49	54	51	111 1	01 1	17	8 7	7 7	70	55 5	59 3	37 :	39 3	9 2	29 3	3 15	26	18	20	36	37	41	16	13	18	18	36	31	29	11	7 1	0 1	8 21	3	25	28	20	16	15	11	10	8	26 ;	31	11156
Offaly	77,961	31	42 3	8 3	5 2	3 2	B 31	36	33	3 30	23	28	18	64	81	97	72	58	50	2 2	8 3	38 2	26 3	37 2	26	30 3	2 2	28 2	4 14	10	8	4	13	13	30	24	26	27	24	35	24	45 3	38 3	2 1	5 1	8 15	14	6	5	1	3	5	8	12	13	15	12	125%
Roscommon	64,544	45	37 3	6 3	6 3	3	1 40	40	60	36	43	50	56	57	67	71	62	51 (62 7	4 6	2 5	56	53 3	39 2	26	17 3	3 2	8 3	9 56	62	67	33	34	17	14	15	40	43	40	20	23	33 3	34 8	5 5	9 5	9 2	1!	12	15	14	8	2	5	14	15	12	8	400%
Sligo	65,535	34	43 4	3 3	8 4	4 6	4 6	1 64	50	50	52	69	110	111	87	76	95 1	10 1	14 1	14 10	4 9	92 8	85 7	9 5	52 2	27 3	1 4	3 4	6 50	44	40	41	31	29	21	24	23	17	23	17	17	6	14	1 1	B 1	4 2	2	18	15	9	8	3	8	11	tt	9	8	150%
Tipperary	159,553	15	19 1	8 ti	3 17	1	1 16	19	2	22	22	19	23	27	46	43	40	24	19 2	23 2	2 3	33 :	33 (31 2	27 2	25 2	4 2	7 3	3 39	31	23	22	23	20	22	20	26	23	21	17	23	21 2	28 2	6 2	9 2	3 13	1	8	6	19	16	28	19	18	14	15 2	25	-1196
Waterford	116,176	7	7	11 9	16	11	3 21	3 28	3 22	2 17	15	28	49	68	56	40	35	37	46	0 6	2 5	59	61 5	50 3	34	40 3	3 4	8 2	9 3	26	29	33	21	31	19	21	15	22	19	46	55	71 5	52 4	7 3	7 2	5 19	2	20	14	8	7	15	15	28	22	19	9	-41%
Westmeath	88,770	18	12 2	1 2	8 3	3	4 31	3	63	72	69	83	64	100	95	126	107 1	59 1	46 1	50 6	9 6	54 6	63 7	18 7	74	45 4	4 3	37 5	0 57	55	55	29	25	19	18	18	19	17	24	19	36	37	37 2	6 1	8 2	3 10	7	5	3	6	5	7	5	7	8	6	3	-50%
Wexford	149,722	12	15 1	9 3	1 3	3	3 3	3 39	53	3 79	78	73	51	90	96	84	65	58	83 !	9 5	3 5	51 :	32 2	29 2	22	31 2	5 2	25 1	1 13	13	8	17	14	18	8	10	8	6	5	7	7	13	11	3 !		3 1	1	8	4	5	3	5	3	3	Type:	2	7	57%
Wicklow	142,425	25	15 1	3 1	5 15	5 13	2 9	14	20	27	25	25	27	39	55	45	35	20	24 :	33 3	10 3	34	24 2	26 2	24 2	25 2	4 2	22 2	2 20	13	8	14	16	14	17	15	15	24	29	32	18	21	18 1	3 6		0 19	2	2 19	11	13	21	23	20	14	27	32	31	33%
National	4,761,865	30	31 2	7 3	3 3	2 3	6 45	5 5	1 56	5 5	57	65	68	73	74	75	75	72	73 (3 5	7 8	SC 1	53 E	56 4	18	47 4	9 4	2 2	6 35	22	21	20	21	29	20	22	22	17	21	25	20	27 2	26 2	4 2	70 95	4 2	Colors of the last	160	19	100100	SA SER	17	16	40	16	17	10	8%

Transport dashboard detail

Transport dashboard extracts









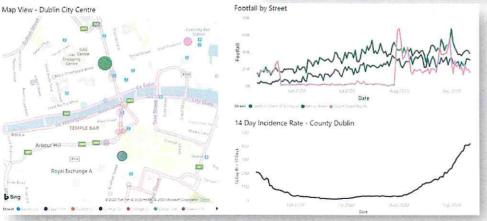
- Transport dashboard prototype built using daily TII traffic counter data and validated with TII
- Data set provides traffic volumes at a day level by road, road class, county, class group
- Initial transport insights completed no clear correlation found between reduced traffic volumes and reductions in incidence rates within counties
- Dashboard can be updated daily (subject to TII data being published daily) and can be used for ad-hoc analysis as required going forward

Data analytics briefing - 4 December 2020 - DRAFT - Not for circulation

Dublin City Centre footfall dashboard detail

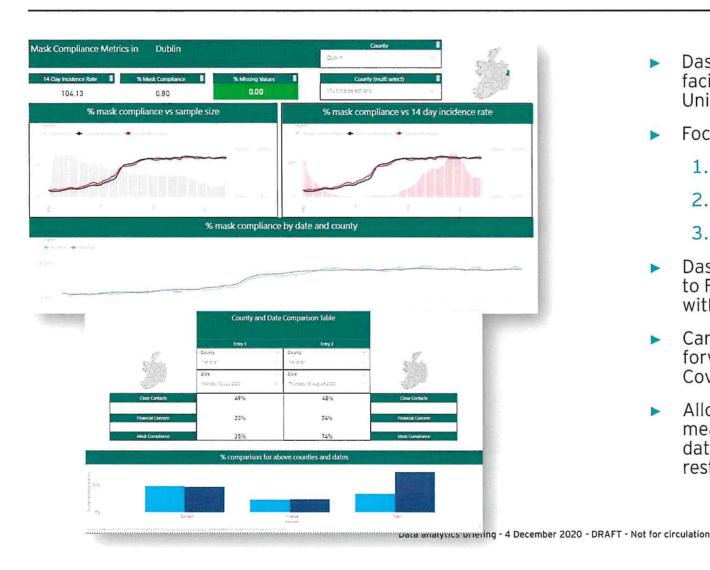
Footfall Dashboard Extracts





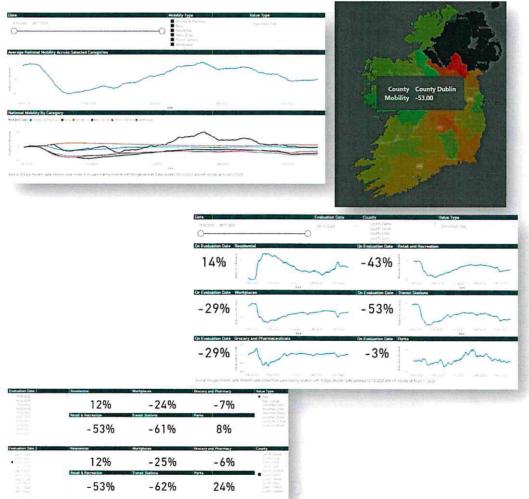
- Footfall Dashboard prototype built using daily Smart Dublin counter data
- Data set provides daily footfall volumes by street in Dublin City Centre
- Initial analysis observes Dublin City Centre Footfall and 14 Day Incidence Rate of County Dublin (provided by ECDC)
- Smart Dublin counter data updated monthly currently by Dublin City Council

Facebook survey dashboard detail



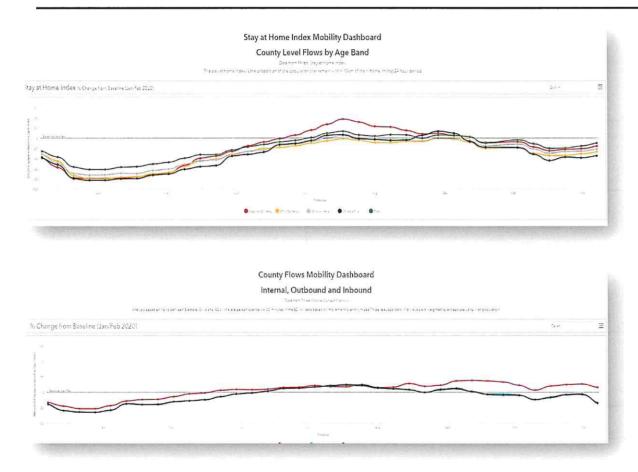
- Dashboard built using survey data facilitated by Facebook, conducted by the University of Maryland
- Focus on three key issues reported:
 - 1. Mask compliance
 - Contacts outside household
 - 3. Financial worries
- Dashboard can be updated daily (subject to Facebook data being published daily) with a two-day lag time
- Can be used for analysis as required going forward to measure compliance with Covid-19 restrictions
- Allows for comparison of these three measures for two specific counties and/or dates to precisely determine impact of restriction changes and other key evens

Google/Apple Mobility Dashboard detail



- Both datasets are updated daily, with a short lag
- The Apple dataset contains the number of direction requests for driving/transit/walking as a percentage relative to baseline of Jan 13th, at a national level
- The Google dataset uses the median value for that day of the week in the five week period of Jan 3rd Feb 6th as baseline, and reports across 6 broad location types, at a national and county level
 - In some cases, Google censor data prior to release if there is relatively little in some category for some county on some date
 - The dashboard enables the following analysis:
 - Examine national and county level trends across multiple mobility categories over time
 - Directly compare one of a number of mobility metrics on two different dates
 - Map mobility to examine similarities in nearby regions on a given day
 - Can filtering for specific dates to examine event impact at an aggregate level, or get a snapshot of a certain county at that point in time

Stay at home index detail



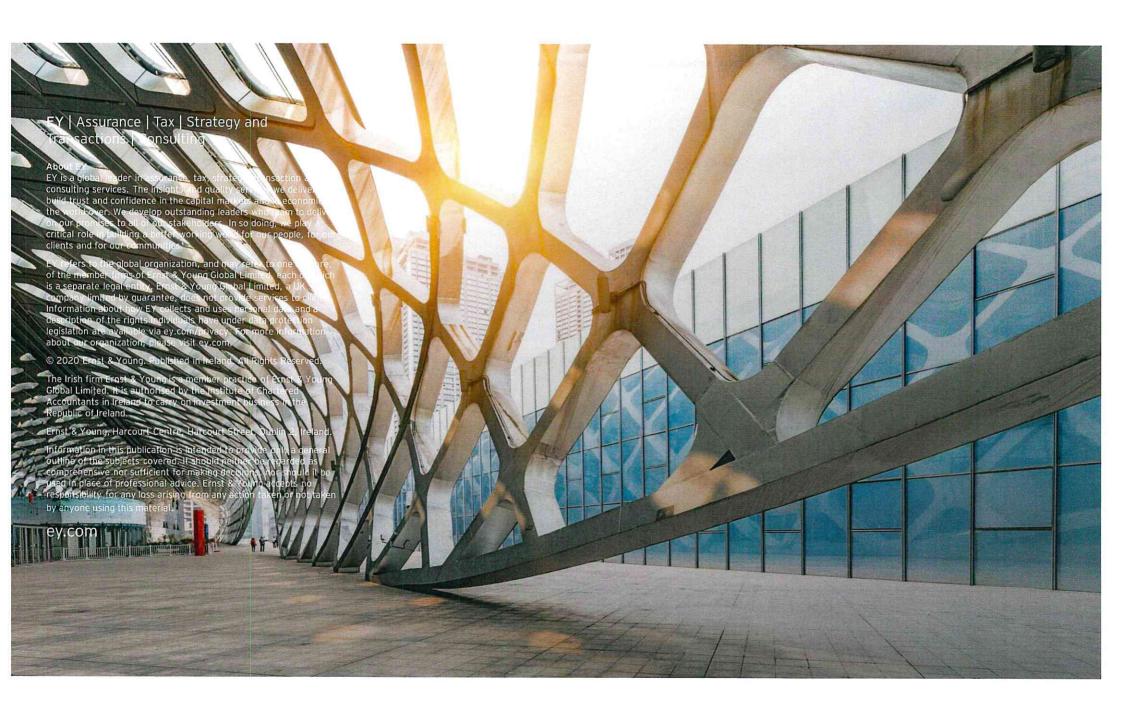
- Uses mobile data to evaluate movement throughout the country at different points in time
- Broken down into three key areas:
 - Stay at home index: Shows proportion of population that remained within 10km of their home, broken down by age groups
 - County level flow: Shows movement into, within and out of each county compared to levels seen in January and February
 - 3. Origin-destination flow: Visual display of movement into and out of a given ED
- Using this data, along with other mobility data, movement throughout the country will be examined to better understand the spread of C-19

Summary of international research

Title	Summary	Key Findings
Bloomberg Analysis, 23 Nov [<u>1</u>]	53 countries investigated on 10 metrics (cases, mortality, testing, vaccine, impact of restrictions, etc.)	Ireland ranked 23 overall in the resilience score out of 53 countries. Performed poorly for lockdown severity and communal mobility (ranked 52 th); Ranked 9 th for universal healthcare coverage, and joint 3 rd for access to vaccine
Effects of human mobility restrictions on the spread of COVID-19 in Shenzhen, China: a modelling study using mobile phone data, Aug '20 [2]	Important to monitor mobility, as higher mobility is closely linked to greater C-19 spread; Even reducing mobility by a small amount helps to reduce the flow of C-19	Mobility restrictions of 20% would flattened the peak number of cases by 33% and delay to the peak number by 2 week; Restrictions specifically on symptomatic individuals and high risk regions magnified this positive effect
The role of transport accessibility within the spread of the Coronavirus pandemic in Italy [3]	Areas with lower railway accessibility had few total cases, less severe lockdown in these areas may have been just as effective	The more accessible an area is the easier it is for the virus to reach; Apply lockdowns in proportion to the transport accessibility of the areas; Greater population densities have a higher probability of contagion
A Virus That Knows No Borders? Exposure to and Restrictions of International Travel and the Global Diffusion of COVID-19 [4,5,6]	A virus only moves with its host; A country's exposure to international travel is strongly associated with higher COVID-19 mortality rates	Countries with travel restrictions in early March had mortality rates 62% lower than those that restricted travel later or not at all; Mandatory quarantines were found to be more effective than entry bans
Case studies on restaurants and bars in the USA, Japan, China [7,8,9,10]	Close contact settings with poor ventilation and large crowds tended to have more outbreaks	Layout of air conditioning units influenced infection rates in a restaurant; While doing so would reduce cases, it may not be possible for restaurants to reopen profitably at 20% capacity
Case studies on reopening gyms and dance studios in EU and South Korea (SK) [11,12,13]	Reopening gyms, when social distancing is maintained, does not appear to incur a large number of new cases, but more research is needed; Proper ventilation is essential in reducing C-19 spread	Only 487 positive cases out of 62 million gym visits across several EU countries (0.78 infections per 100,000 visits); 112 person outbreak from dance classes but none from yoga or pilates classes in the same gyms (SK)

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information



1GC Priority Use Case Analysis (w/c 7/12) Based on briefing session 4/12

USE CASE	DESCRIPTION	OUTSTANDING ACTIONS	PRIORITY	DEPENDENCY	OWNER	STATUS
County analysis	County disease incidence rates	Refresh data and provide insights	High	None	Fiona	Ongoing
LEA heatmaps	LEA incidence rates	Refresh data and provide insights	High	None	Fiona	Ongoing
Restrictions analysis	Impact of restriction on incidence rates	 Refresh data and provide insights 	High	None	Fiona	Ongoing
Outbreak analysis	Source of outbreaks analysis	Continue analysing outbreaks	High	Awaiting CIDR data access from HSE	ТВС	Awaiting data
Update activity data to assist with press briefings	TransportDublin footfallFacebookMobility	 Update regularly and provide insights Agree calendar of updates ahead of press briefings Agree briefing requirements with Comms team Test if activity linked with incidence rates 	High	None	Kenny, Rory M, Fiona, Jamie, Cillian B	Ongoing
Covid app	Close contact analysis	Check if close contact data available from Covid app	High	Accessing data	Cillian L	Ongoing
International research	 Complete desktop research and present findings 	Produce new insights deck	High	None	Emma, Nik, John	Ongoing
Payments data	 Payments data by category and county 	 Create prototype insights Made decision about ongoing requirement Test if activity linked with incidence rates 	High	None	Rory M, Cillian B	Ongoing
Stay at home index	Analysis of those moving outside 10km	 Access data Generate insights Test if mobility linked with incidence rates in counties 	High	Data from CSO	John, Cillian L	Awaiting data
NTA leap card data	Leap card usage across public transport	Access dataGenerate insights	Medium	Accessing data	ТВС	Awaiting data
Events impact	Analyse impacts of events on cases	 Continue to add to events tracker Confirm list of events with Comms team Test if activity linked with incidence rates 	Medium	None	Eve, Fiona, Nik, Emma	Ongoing
International passengers	Find source of incoming passengers	 Analyse if feasible Investigate use of PLF for incoming passenger information 	Medium	Source of data required	Eve, Paul	Awaiting data
County risk view	Risk indicator per county based on key metrics	 Decide on key metrics Generate RAG rating 	Medium	None	TBC	Ongoing
Garda activity	Garda fines	Follow up with GS/ JohnIncorporate data into analysis	Medium	Response from GS	Eve, Paul	Escalate



Update - Week 8

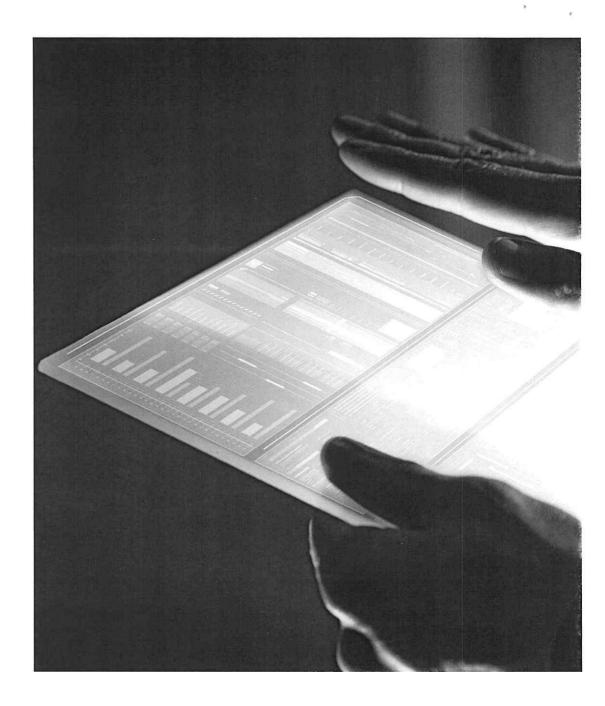
Agenda





- County and outbreak analysis
- Payments data
- Data update
- Project updates

County and outbreak analysis



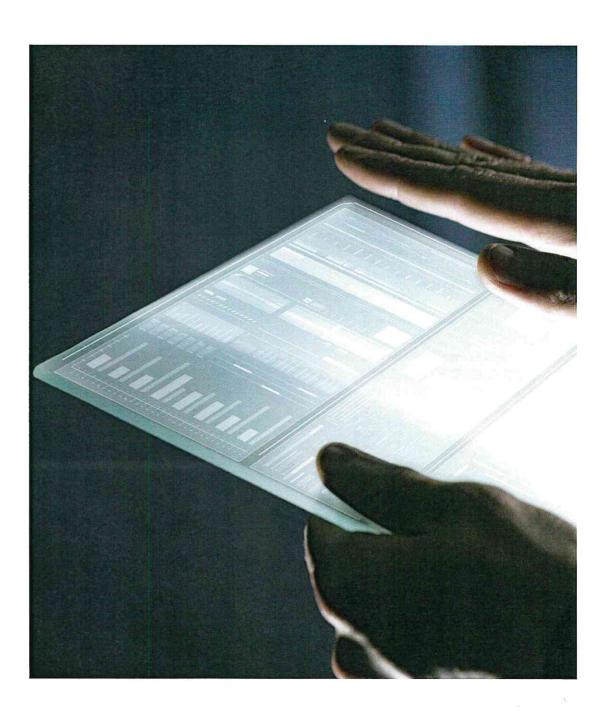
Increase for half of the 26 counties in 14-day incidence rates (the last 5 days) Relatively stable national 14-day incidence rate

Two Weekly Incidence Rate Per 100k	Population	10-0ct 11-0ct 12-0ct	13-Oct	14-0ct	19-Oct	17-0ct	18-Oct	19-Oct	20-0ct	21-0ct	23-Oct	24-Oct	25-Oct		2/-Oct	29-0ct	30-Oct	% % %	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	10 Nov	NON-OI	NON-LL	12-Nov	14-Nov	15-Nov	16-Nov	17-Nov	10-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	VON-CZ	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec	03-Dec	04-Dec	06-Dec	07-Dec	Change Last 5 Days
Carlow	56,932	61 74 77	7 83	24	119 1	16 14	9 167	19\$	204	242 2	42 27	0 292	306	311	327 37	27 29	3 29	99 2	70 27	\$ 249	9 242	214	213	177	160	137	126 1	105	95	98 9	1 88	72	77	81	86 8	* *	4 76	72	70	70	76 1	70 6	5 7	6 76	79	93	93	88	95 1	07 116	121	30%
Cavan	76,176	339 386 41	2 571	641 1	735 7	60 21	1 324	910	1012	1058 1	58 98	966	967	964	F10 75	52 661	64	15 5	19 56	2 474	4 365	295	263	232	206	159	143 1	133	119	112 10	2 108	98	\$7	95	97 9	5 10	1 100	98	92	97	91 7	76 7	4 6	7 66	67	58	51	56	56 9	is 59	58	13%
Clare	118,817	261 262 30	4 310	306	309 3	22 32	6 327	322	313	304	11 27	2 264	281	252 2	248 25	53 25	5 23	35 2	29 20	9 189	186	121	173	171	160	139	132 1	122	109	104 10	4 93	109	111	112 1	04 4	3 9	1 89	16	#3	80	79 1	74 6	9 7	51	52	46	42	39	35	5 35	32	-24%
Cork	542,868	159 181 191	9 209	232	237 2	56 27	5 308	322	336	340	27 33	4 347	337	335	333 3	31 33	1 31	18 3	05 27	6 251	8 242	233	239	216	195	179	150 1	143	119	108 10	2 89	83	26	\$2	81 7	7 7	7 78	\$1	81	84	82 1	77 7	6 7	68	63	59	92	49	43	18 35	35	-33%
Donegal	159,192	345 355 35	9 354	367	365 3	56 34	4 347	329	320	320	12 32	4 322	329	318	313 31	17 32	31	10 3	20 30	9 309	5 286	300	297	290	293	275	285 2	273	281 :	271 27	72 275	269	281	293 2	63 2	66 25	4 231	227	239	248	217 2	15 21	15 22	0 222	211	212	213	210	217 2	24 232	220	3%
Dublin	1,347,359	174 177 181	0 184	193 1	197 2	01 22	3 231	238	241	252 2	57 25	3 255	255	258	255 25	52 25	2 23	7 2	20 22	6 217	209	200	199	191	105	172	161 1	151 1	142	134 13	9 136	119	110	115	119 1	14 11	s 114	114	113	114	113 1	08 10	4 10	2 102	102	90	90	08	93 9	92	93	3%
Galway	258,058	153 155 161	5 173	203	228 2	62 27	3 280	314	326	355	72 36	373	385	384	370 35	54 34	31	13 2	96 28	2 255	5 243	211	187	171	144	126	109 1	100	97	86 8	3 96	80	84	78	71 6	6 6	2 62	63	65	62	54 1	51 4	6 4	4 50	50	45	46	50	51	51 55	56	21%
Kerry	147,707	110 113 14	4 153	177	174 1	97 21	5 240	246	263	269 2	57 26	9 291	299	279	281 20	69 27	23	36 23	20 194	8 183	178	194	190	177	162	153	139 1	39 1	129	128 12	8 127	123	122	115	26 2	3 7	60	60	60	51	51	4# 5	0 4	4 41	43	38	36	34	30 2	2 28	29	-19%
Kildare	222,504	146 154 16	# 188	198	204 2	0# 24	4 257	278	293	305	03 29	\$ 301	306	29# 2	289 29	90 29	2 27	70 2	42 23	1 210	186	177	169	156	143	121	110 1	103	94	85 9	3 89	**	45	86	87 8	6 8	7 84	87	82	*1	79 1	72 6	5 6	62	61	58	49	49	51	18 49	52	6%
Kilkenny	99,232	73 87 98	8 105	109 1	123 1	42 14	6 154	165	165	177 1	74 180	175	176	173	171 16	8 150	13	3 1	31 139	9 134	136	134	134	141	141	133	12# 1	30 1	125	126 12	9 126	118	116	116	113 1	10 9:	92	106	107	101	130 1	25 12	25 13	2 134	148	146	148	151	162 1	73 172	2 179	2196
Laois	84,697	133 135 131	9 136	161 1	169 1	51 17	4 135	201	214	222 2	20 22	0 233	242	251	256 2	31 23!	5 22	27 20	0\$ 20	4 197	179	170	174	175	174	163	157 1	155 1	149	136 13	6 137	116	107	104	99 8	6 8	63	59	53	53	53 5	58 5	5 5	54	55	58	54	60	65 (6 66	67	24%
Leitrim	32,044	97 125 13	7 147	162	210 2	12 22	5 240	253	262	272 2	78 25	9 247	222	209	200 17	78 125	12	2 10	9 97	# #4	69	56	31	28	34	37	37	47	56	21 0	1 97	94	94	100 1	06 10	96 9	7 84	78	7\$	69	59 7	34 3	4 2	5 16	19	16		12 -	16	19 19	19	100%
Limerick	194,899	160 167 183	2 189	207	208 2	31 24	6 248	277	280	290	01 28	\$ 293	306	299	310 30	06 312	27	77 21	69 26	2 221	227	229	221	216	218	211	207 1	198 1	195	195 2	11 201	222	238	236 2	21 2	16 21	7 209	194	192	189	187 1	80 17	10 16	6 143	134	129	128	136	143 1	35 134	1 134	496
Longford		202 193 190	6 191	193 1	176 2	13 24	0 254	279	291	281	0# 29	6 281	289	291	306 27	79 29	1 25	59 2	45 22	3 193	191	193	166	164	157	152	142 1	132	127	115 11	15 103	103	100	100	83 8		8 81	#3	\$3	93	91 1	91 8	1 #	1 16	**	91	95	91	**	91 88	91	-5%
Louth	128,884	109 116 11	5 152	161	181 1	\$5 18	8 178	221	261	293 2	\$3 27	2 286	299	311	289 2	96 29:	20	5 2	97 29	7 257	7 219	193	202	109	177	159	155 1	157	156	147 15	51 151	160	157	168 1	74 11	86 20	2 206	213	213	204	199 1	96 18	9 18	2 177	182	160	163	162	158 1	55 154	4 155	-5%
Mayo	130,507	67 75 80	90	107	123 1	31 15	0 167	185	208	228 2	43 25	0 246	256	266	259 2	48 24	2 26	1 2	46 23	2 216	198	183	184	105	176	162	147 1	151 1	145	141 11	18 113	110	110	109 1	03 4	3 7	7 79	87	88	86	93 1	14 7	9 8	84	45	97	90	93	83 7	74	75	-1796
Meath	45.55	183 199 21	3 306	357	403 4	152 49	0 488	591	629	657 (56 64	8 649	661	651	590 5	58 53	41	11 41	50 44	\$ 352	2 314	282	272	249	232	204	201 1	172	154	141 14	10 133	139	128	134 1	27 1	31 13	1 126	124	111	118	108 1	03 9	* 10	2 85	\$0	64	62	48	49	15 44	46	-26%
Monaghan	61,386	319 331 31	3 342	350	368 3	50 37	5 365	402	389	406	09 38	4 375	349	363	323 3	10 30	5 30	03 2	** 26	9 218	205	171	176	166	142	137	121 1	122	116	117 12	4 112	114	104	104	112 4	4 10	1 101	106	10#	99	103 1	13 7	* *	1 9\$	103	103	109	116	124 1	27 119	117	796
Offaly	77,961	136 140 14	5 141	151	140 1	77 20	1 195	210	224	222 2	24 214	4 224	217	222	227 2	18 231	5 19	91 16	2 153	3 130	112	106	100	96	97	99	85	99	94	87 9	5 114	112	117	122 1	26 1	19 12	3 103	100	99	78	81 7	72 6	5 4	9 49	45	42	35	37	51 5	9 67	67	93%
Roscommon	64,544	184 200 18	1 187	201	198 2	01 22	3 232	228	239	260 2	71 26	0 276	263	263	259 2	31 24	0 22	29 21	03 22	5 229	9 218	195	189	174	153	152	175 1	70	175	163 16	16 169	141	169	161 1	67 1	61 16	0 166	161	133	130	122 1	118 1	21 10	5 96	64	60	57	53	54 5	60 43	50	-1496
Sligo	65,535	163 175 181	6 20\$	241	291 3	04 29	4 325	356	366	395	06 40	9 423	438	478	123 31	97 35	9 35	54 31	56 33:	3 304	4 285	259	220	211	189	159	154 1	154	154	140 12	28 114	104	95	93	76 8	5 \$	4 73	76	70	64	56 6	61 5	8 6	56	55	52	52	44	40 3	32	32	-38%
Tipperary	159,553	70 71 71	1 13	79	88	93 11	0 113	115	118	120 1	26 124	4 134	139	133	139 14	45 133	13	9 1	31 130	0 130	130	132	130	12\$	122	117	123 1	118	113	117 11	14 101	105	110	107 1	06 10	90 9	7 92	#6	90	\$5	93 1	92 \$	0 \$	7 79	79	72	75	79	26 1	16 98	*0	8%
Waterford	116,176	64 61 66	6 70	\$3	109 1	131 13	2 143	155	160	173	76 194	4 205	215	226	225 2	28 210	20	05 2	01 20	1 195	194	197	176	163	146	136	128 1	34	114	142 14	41 156	163	163	164 1	55 1	61 15	7 156	154	149	140	150 1	118 1	14 10	2 #5	75	72	71	65	62	61 71	71	096
Westmeath	88,770	115 148 16	7 171	217	211 2	51 29	4 324	337	425	435	53 45	5 460	453	461	165 4	15 44	0 40	02 30	69 37	2 354	4 266	255	229	216	208	184	150 1	151	162	133 15	50 150	113	117	110 1	06 10	03 10	0 92		87	80	71 7	72 5	1 3	41	28	26	23	25	25 2	26	23	096
Wexford	149,722	112 130 16	0 173	188	202 2	50 27	1 272	297	298	301	22 31	8 313	301	26# 3	257 2	58 24	2 19	2 17	74 177	2 141	1 124	126	96	89	83	74	67 (67	48	49 4	9 49	47	45	46	37 4	12 3	37	36	36	34	36	32 3	0 2	5 23	28	27	22	18	19	19 19	19	-15%
Wicklow	142,425	84 88 91	1 87	\$9	91 1	03 11	9 120	124	124	129	45 14	5 149	149	145	147 14	49 14	1 13	0 1	17 116	6 107	104	106	91	28	29	\$2	77	29	26	84 8	5 85	82	26	83	78 4	\$ 9	1 80	84	90	77	79 1	73 7	4 8	93	91	110	109	107	116 1	21 121	1113	8%
National	4,761,865	158 167 17	7 190	207	217 2	31 25	1 261	279	290	302	05 30	2 307	309	307	298 2	91 28	24	18 2	53 24	7 22	6 211	201	195	124	173	159	150 1	142	133	127 12	28 124	117	118	117	114 1	11 11	1 106	107	106	104	102	97 9	3 9	1 11	24	24	79	77	20 1	19 79	79	096

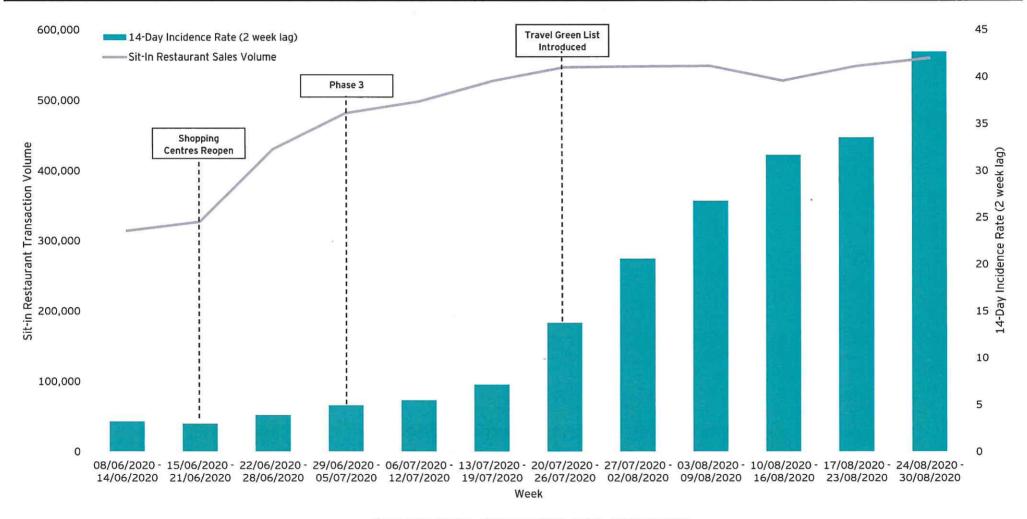
No identifiable impact on incidence rate between winning and losing team, with both showing a decrease 10 days after the event took place

			1			
Past events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10	Losing county	% change of County incidence rate between day of event and T + 10
FAI Cup Quarter Finals	20/11/2020	Louth (Dundalk) v Dublin (Bohemians)	Louth (Dundalk)	County change: -10% LEA change* (Dundalk South): -35%	Dublin (Bohemians)	County change: -14% LEA change* (Cabra-Glasnevin): -11%
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Waterford v Clare	Waterford	-54%	Clare I	-48%
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Galway v Tipperary	Galway	-28%	Tipperary	-15%
Ulster GAA Football Senior Championship Final	22/11/2020	Cavan v Donegal	Cavan	-48%	Donegal I	-6%
Munster GAA Football Senior Championship Final	22/11/2020	Cork v Tipperary	Tipperary	14%	Cork	-36%
GAA Hurling All-Ireland Senior Championship Semi Final	28/11/2020	Kilkenny v Waterford	- Waterford	 To-be-updated-once data becomes — - available 	-Kilkenny	To be updated once data becomes available
GAA Hurling All-Ireland Senior Championship Semi Final	29/11/2020	Limerick v Galway	Limerick	To be updated once data becomes available	Galway	To be updated once data becomes available
GAA Football All-Ireland Senior Championship Semi-Final	05/12/2020	Cavan v Dublin	Dublin	To be updated once data becomes available	Cavan	To be updated once data becomes available
GAA Football All-Ireland Senior Championship Semi-Final	06/12/2020	Mayo v Tipperary	Мауо	To be updated once data becomes available	Tipperary	To be updated once data becomes available
Upcoming events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10	Losing county	% change of County incidence rate between day of event and T + 10
GAA Hurling All-Ireland Senior Championship Final	13/12/2020	Waterford v Limerick	TBC	To be updated once data becomes available	TBC	To be updated once data becomes available
GAA Football All-Ireland Senior Championship	19/12/2020	Mayo v Dublin	TBC	To be updated once data becomes available	TBC	To be updated once data becomes available

Payments data

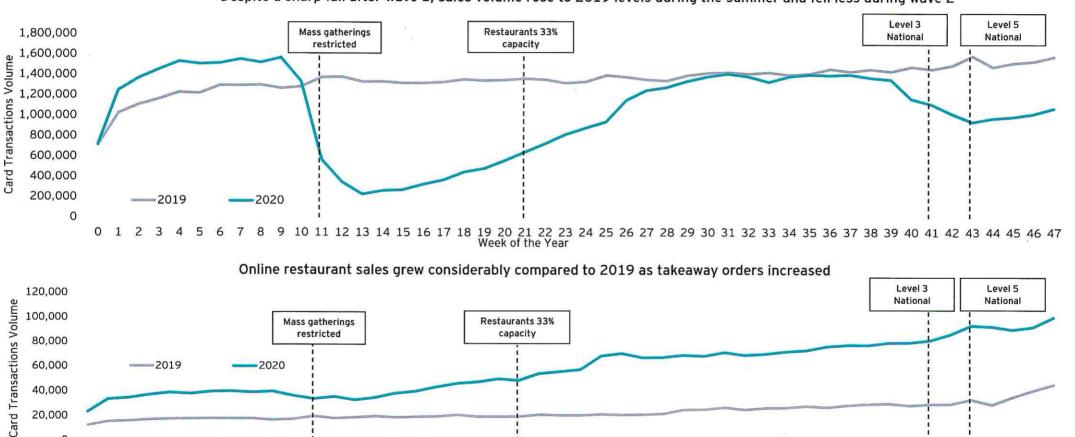


Sit-in restaurant transactions rose in early summer, while incidence rates remained low until after other restriction changes had occurred



Sit-in restaurant transactions returned to 2019 levels during the summer months. Online sales rose, showing a shift towards online ordering





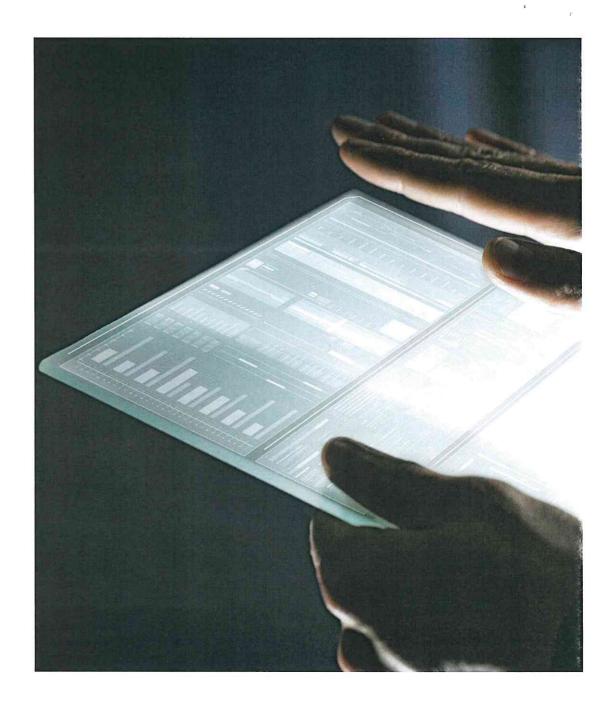
Week of the Year

40,000 20,000

Data analytics briefing - 10 December 2020 - DRAFT - Not for circulation

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47

Data update



Specific assets and insights informing how we are performing and identifying future risks

Indicator	Summary	Frequency	Source	Status
Where and how is the disease spreading?				
County incidence rates	Disease incidence rates (County)	Daily	Openhive	多类似的情感的
LEA incidence rates	Disease incidence rates (LEA)	Weekly	CSO	
Testing and tracing output	Disease transmission sources and settings	Daily	HSE	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	
What restrictions are in place?				
Current restriction level	Current Government restrictions on place	As relevant	Govt guidelines	Kirtikaliki,
Events tracker	Upcoming and past events	Daily	Online events database	
Are people complying?				
Stay at home index	Trips within and outside counties	Daily	3mobile	
Fraffic data	Traffic counter data by vehicle type and road	Daily	ТІІ	
Dublin footfall	Pedestrian counters for Dublin City Centre	Daily	DCC	
Mobility	Measure of mobility by purpose	Daily	Google, Apple	
Adherence self reporting	Survey responses on mask compliance, close contacts	Daily	Facebook survey	智、结果的
Garda enforcement	Fixed fine notices for C-19 breaches	TBC	Gardaí	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	
_eap card usage	Leap card user data	Daily	NTA	
What impact are the restrictions having?				
Restrictions analysis	Analysis of restrictions on disease incidence	Daily	Openhive	

Christmas update schedule

				PRESS SUBMI	TEAM			PRES	S TEAM IISSION					PRES:	S TEAM ISSION				1	PRESS SUBM	is
	М	Т	W	Ţ	F	М	Т	W	Т	F		М	Т	W	T	F	М	Т	W	T	C WALLES
ASSET	14	15	16	17	18	21	22	23	24	25		28	29	30	31	1	4	5	6	7	THE WAY
County incidence 3 day lag	√	V	√	V	V	√	V	V	V	ET.		√	V	√	√		V	V	√	√	
.EA incidence B- day lag				√					√						√						
Restrictions B-day lag	\	V	√	√	V	√	V	V	V	uTF		V	V	V	V		V	V	V	√	
ransport lo lag	V	√	√	√	√	√	V	V	√			√	V	√	√		V	V	√	√	
rublin footfall lo lag	V	√	√	√	V	√	V	√	V			√	V	√	√		√	√	V	√	
tay at home index day lag (TBC)				√	√	√	V	V	V			V	V	V	√		V	√	V	V	
acebook survey day lag	V	√	V	V	V	V	V	V	√			V	V	V	V		V	V	V	√	
lobility -5 day lag	V	√	V	√	V	V	V	V	V			V	V	V	V		√	V	V	V	
TA (TBC)	V	√	V	√	V	V	V	V	V			√	V	V	√	į	V	V	V	V	
					<u> </u>	Data	analytic	s briefing	- 10 Dece	mber 202	20 - DRA	AFT - Not f	or circula	ation		j					

Press Briefing Key Statistics 10 Dec 2020

DISEASE INCIDENCE RATES

- Incidence rates nationally are broadly stable over the last five days
- Half of the 26 counties had increases in the 14-day incidence rates over the last 5 days
- 10 counties are above the national incidence rate level
- The largest increases over the last five days were seen in Leitrim, Offaly, Carlow, Laois and Kilkenny
- Clare, Kerry, Longford, Louth, Mayo, Roscommon, Wexford, Sligo, Cork and Meath are all seeing their cases decline

Source: Openhive, Data to 7 Dec

SHOPPING AND NIGHTLIFE

- Dublin City Centre had its busiest weekend since March (Total footfall)
- 2-3pm is the busiest shopping period with 9-10am still relatively quiet (Henry St and Grafton St)
- Traffic around four tracked shopping centres was c.40% busier this weekend. 8am-11am was the quietest period, but traffic volumes appeared well spread out throughout the weekend
- Nearly 80% increase in people out in Dublin City on Saturday night compared to last Saturday (8pm -12am)

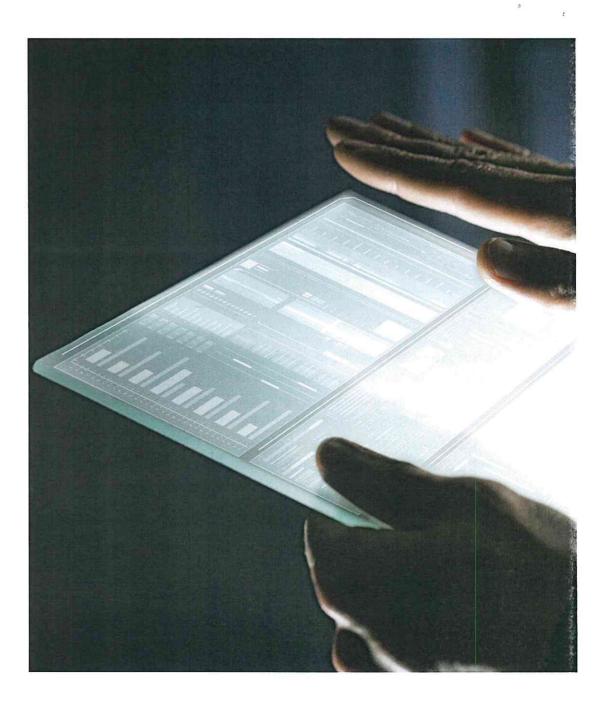
Shopping centres tracked: Kildare Village, Mahon Point, Liffey Valley, Blanchardstown for week (30/11-6/12) from 8am - 9pm;

COMPLIANCE

- Small increase in citizens meeting with contacts outside of their household this week (37%) versus last week (34%)
- Mask wearing compliance remains constant with 4 out of 5 people nationally reporting adherence

Source: Facebook Survey to 7 Dec 20

Project updates



Progress update

GOVERNANCE AND SET UP

- Delivered weekly Progress Report,
 Progress Update meeting today and daily HSE progress meetings
- ► Awaiting HSE to sign second SOW
- ➤ Series of HSE workshops to finalise and confirm detailed Azure design
- Issued draft Data Protection Impact Assessment to HSE and awaiting feedback
- ▶ Updated 1GC HSE Insight Governance approach for initial HSE feedback and now awaiting final feedback
- ► HSE 1GC Dev environment completing and now moving to Test environment
- ► Agreed interim data update approach with HSE while awaiting 1GC platform
- Awaiting DOH confirmation for Stay at Home Index detailed data

USE CASE DESIGN

- Session with DOT Press Team to confirm how we can input to them on an ongoing basis
- ► Issuing first set of information today
- Agreed NTA submission and awaiting first data to be issued
- Confirming HSE App data as well as available data captured for arrivals at airports
- ► Expanded analysis for each of the various activity dashboards. Refreshed for most recent data

INSIGHT DEVELOPMENT

- Received Banking Payments Data and with initial insights presented today
- ► Completed initial analysis for events last weekend and to be presented today
- ► Updating International Research Coffee Table to be published early next week

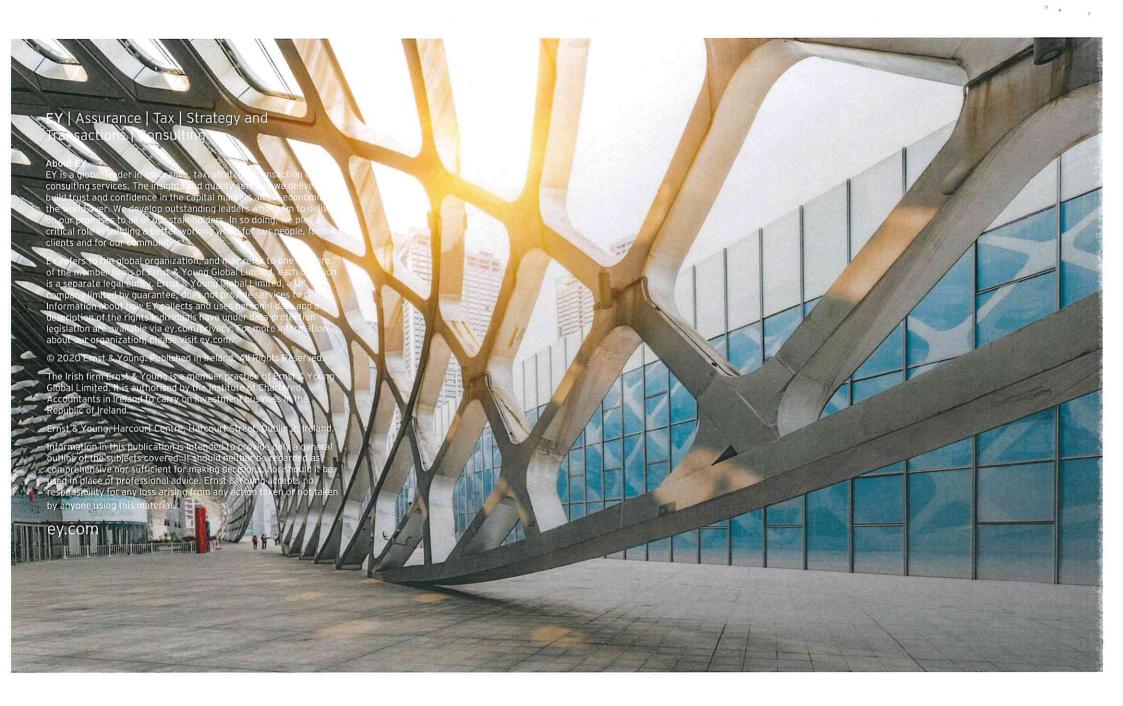
Data analytics briefing - 10 December 2020 - DRAFT - Not for circulation

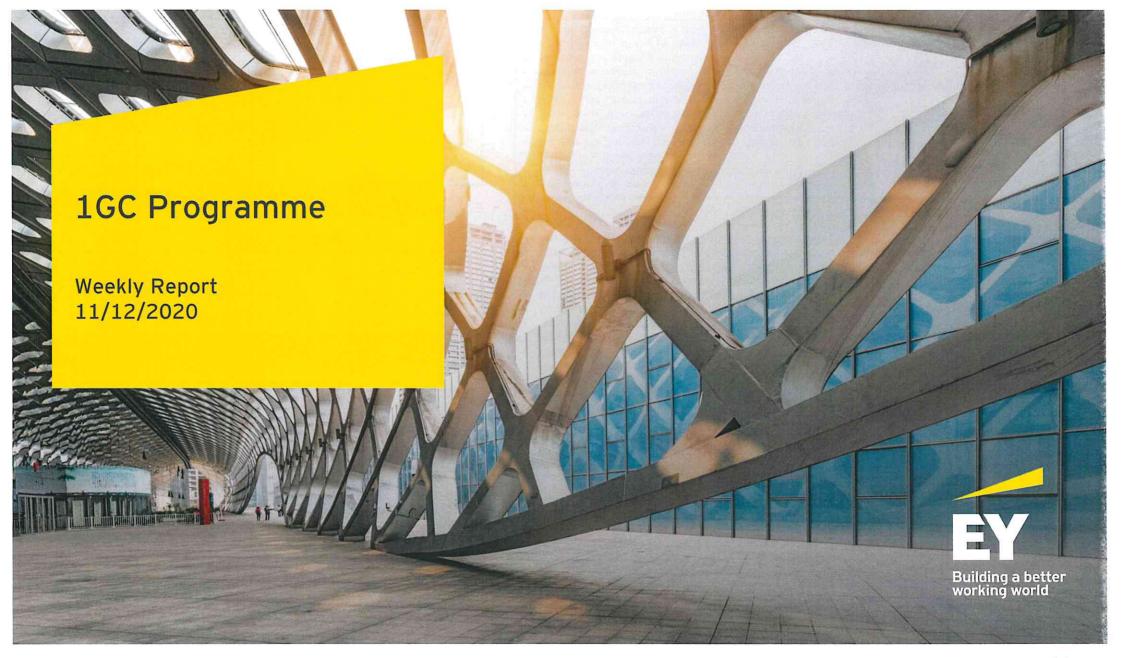
Where we are with the key DoT and Government dependencies

REQUIREMENT	USE CASES	STATUS	DESCRIPTION
1GC Data Owner and Data Protection Impact Assessment	Many	DOT Action	 Clarity required on 1GC data owner organisation and responsible individual We have also created an initial Data Protection Impact Assessment and ask for guidance on whether and how to engage with the Data Protection Commissioner Note this does not include any personal identifiable data, which means it is excluded from data protection. Need to o rely on existing data sharing agreements to meet timeframe
Align with NPHET	All Health Related	For Discussion	 Request to get NPHET forecasts of future disease spread to incorporate into Christmas briefings
Access to appropriate mobility data	 Social Distance Index Stay at Home Index 	Continue Monitoring	 Stood down SDI team for now Awaiting DOH confirmation for access to detailed data decision on SHI
Stand Up Appropriate Analytics Environment within HSE	Many	Team Priority to Resolve	 Detailed design now published and working though specific comments from HSE Technology. Progressing well Needs continued prioritisation and leveraging existing infrastructure to deliver within required timeframe
Government Departments to create and share specific Use Cases	Many	Team Progressing	 Already have access to GeoHive and CSO Confirming specific approach with various government departments, including any data governance and sharing

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- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





1GC Status Report (11/12/2020)



Reason for Status (if not GREEN)

- DPIA: Awaiting HSE feedback and sign off
- · Azure: Pending agreement on finalised deployment dates

Milestone	Status	Date Last Period	Due Date
Use Case Prioritisation (Weekly)		25/12	25/12
1GC Briefing Pack (as required)		25/12	25/12
Social Distancing Index decision		TBC	04/12
Deploy 1GC Azure Environment		11/12	TBC
Complete 1GC DPIA		11/12	11/12

Items for Attention

Highlights / Risks / Issues / Decisions

- Decision and sign off on proposed insight governance
- DPIA sign off (including Data & Platform Owner decisions)
- HSE to sign phase 2 SOW
- ► Dept of Health sign off required for Stay at Home data, awaiting confirmation from Miuris O'Connor
- Azure Production environment to be deployed in January 2021 pending final sign off

Key Achievements

- Presented briefing material to the DoT (07/12)
- Presented briefing material to the DoT (10/12)
- Presented Press briefing insights to the DoT press team (10/12)
- Delivered an updated briefing material deck to DoT (11/12)
- Presented health insights to the HSE before sharing with the DoT (10/12)
- Received payment/banking data
- Received outbreak and Track & Trace data from HSE
- Received Dublin footfall data from 'Smart Dublin'
- · Created new economic dashboard using payment/banking data
- · Monitored impact of recent events using Dublin footfall/Google/Apple/TII mobility data
- · Drafted updated International research to be delivered next week
- Completed updated county analysis
- · Drafted wireframe for 'measure your impact' website
- HSE Presentation: How non-health data will be used
- Agreed schedule with HSE to receive data (twice weekly until platform is completed)
- Deployment of the Development environment is complete (Sign off in progress)
- Review of data flow patterns by HSE technology team

Planned Activities / Forward Look

- Complete twice weekly briefings and associated Press briefing insights
- Deliver updated international research deck to DoT
- HSE to sign phase 2 SOW
- · Incorporate 3 mobile data into exiting data insights such as County Dashboard
- Continue to monitor the impact of events/activities
- Incorporate NTA leap card data into existing mobility insights
- · Incorporate carpark data into existing mobility insights
- Receive banking branch footfall data and incorporate into existing mobility insights
- · Commence build of 'measure your impact' if given go ahead
- · Receive Stay at Home Index data
- · Complete sign off the Development environment
- Commence deployment of the Test environment

1GC Detailed Update

Area	Achievements	Forward Look
Governance	Achievements Presented briefing material to the DoT (07/12) Presented briefing material to the DoT (10/12) Presented Press briefing insights to the DoT press team (10/12) Delivered an updated briefing material deck to DoT (11/12) Presented health insights to the HSE before sharing with the DoT (10/12)	Forward Look Complete twice weekly briefings and associated Press briefing insights Deliver updated international research deck to DoT HSE to sign phase 2 SOW
1GC Azure Build	Achievements Deployment of the Development environment is complete (Sign off in progress) Review of data flow patterns by HSE technology team	Forward Look Complete sign off the Development environment Commence deployment of the Test environment
Data & Insights	Achievements Received payment/banking data Received outbreak and Track & Trace data from HSE Received Dublin footfall data from 'Smart Dublin' Created new economic dashboard using payment/banking data Monitored impact of recent events using Dublin footfall/Google/Apple/TII mobility data Drafted updated International research to be delivered next week Completed updated county analysis Drafted wireframe for 'measure your impact' website HSE Presentation: How non-health data will be used Agreed schedule with HSE to receive data (twice weekly until platform is completed)	Forward Look Incorporate 3 mobile data into exiting data insights such as County Dashboard Continue to monitor the impact of events/activities Incorporate NTA leap card data into existing mobility insights Incorporate carpark data into existing mobility insights Receive banking branch footfall data and incorporate into existing mobility insights Commence build of 'measure your impact' if given go ahead Receive Stay at Home Index data

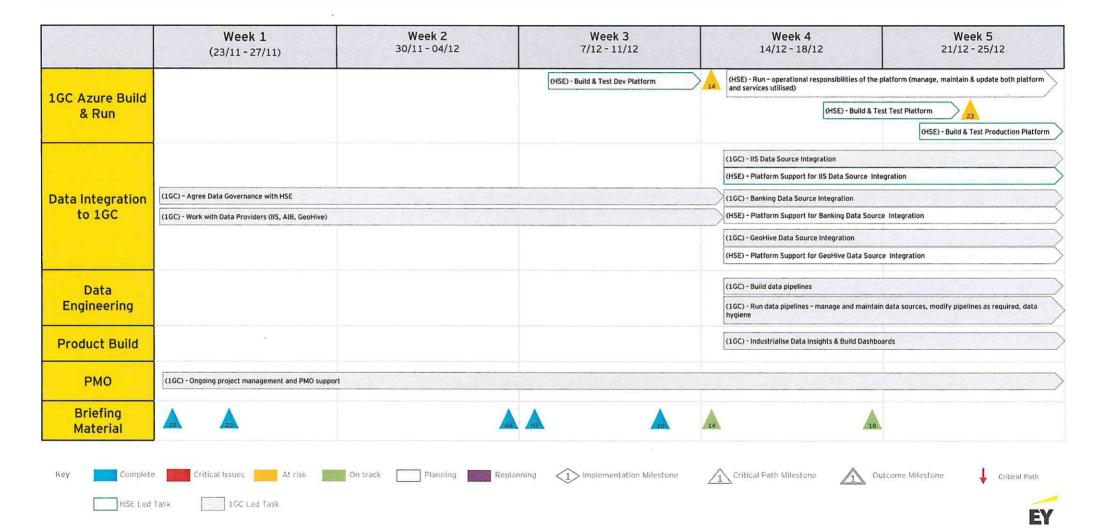
1GC Resource Tracker

rea	Team Member	Role	Last Week (Days)	Next Week Forecast (Days)
	Paul Pierotti	Responsible Executive	5	5
Governance	Emmanuel Adeleke	Programme Manager and Stakeholder Engagement Lead	3	5
	Emma O' Sullivan	Programme Office	5	5
	Nigel Foley	Delivery Lead	5	4
1GC Azure Build	Paul Browne	Cloud Engineer	5	5
/IZai e Daila	Szabolcs Bencsik	Data Engineer	0	5
	Cillian Leonowicz	Insight Design Lead	5	3
	Nikunj Maheshwari	Data Scientist	5	5
	Graham Catchpole	Senior Data Analyst	2.5	2.5
	Ross Morrison	Data Engineer	3*	0
	Rory Murphy	Data Analyst	5	5
	Fiona Murphy	Data Scientist	All Street Street	5
Data & Insights	Eve Bannon	Senior Data Analyst	5	5
	John Hallahan	Op Model Design Manager	5	5
	Cillian Bisset	Data Analyst	5	5
	Nitin Goutham	Data Engineer	3.5*	4
	Kenny Hazlett	Data Engineer	5	5
	Jamie McIlveen	Data Analyst	5	5
	Jason Guy	Data Protection	1	1



1GC Plan on a Page - Phase 2

Draft Pending Key Planning Decisions



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Update - Week 8

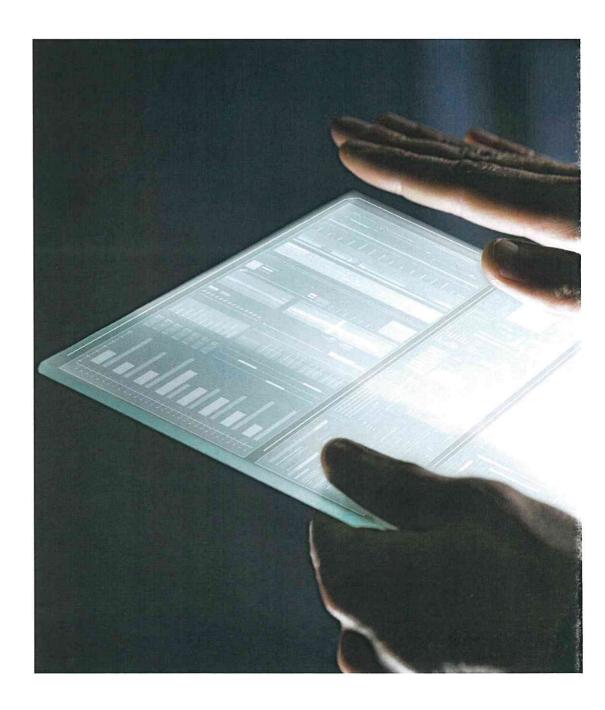
Agenda





- County and outbreak analysis
- Close contact analysis
- Payments data
- Data update
- Project updates

County and outbreak analysis



Increase for half of the 26 counties in 14-day incidence rates (the last 5 days) Relatively stable national 14-day incidence rate

Two Weekly Incidence Rate Per 100k	Population	17-0et 13-0et 13-0et	14-0ct	15-Oct	17.04	18-Oct	19-Oct	20-0ct	21-0ct	22-Oct	24-Oct	25-Oct	26-Oct	27-Oct	20-00-00-00-00-00-00-00-00-00-00-00-00-0	30-Oct	31-0ct	01-No.	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	24 Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	CHO CH	hange .ast 5 Days
Carlow	56,932	74 77 03	84	119 1	16 16	19 167	19\$	204	242	242 7	70 29	2 306	311	327	327 24	3 29	9 27	70 2	78 24	9 242	2 214	213	177	160	137	126	105	95	98	-91	88	72	7 #1	- 86	88	84	76	72	70 7	0 7	6 70	65	76	74	79	93 9	3 40	95	107	116	121 1	25	42%
Cavan	76,176	386 412 57	641	735 7	60 3	11 824	4 910	1012	1051	1056	103 96	4 967	964	810	752 66	10 64	5 51	9 5	62 47	4 365	5 295	263	232	206	159	143	133	119	112	102	103	98 1	7 95	97	95	101	100	98	92 9	7 9	1 76	74	67	66	67	58 5	1 56	56	58	54	54 5	9	5%
Clare	118,817	268 304 310	306	309 3	22 3	26 321	7 322	313	304	311	72 26	4 281	252	248	253 25	5 23	5 22	29 21	9 189	186	181	173	171	160	139	132	122	109	104	104	93	109 1	11 112	104	93	91	89	86	13 8	0 7	9 74	69	71	51	53	46 4	2 39	35	35	35	32 3	2	-1796
Cork	542,868	181 199 20	9 232	237 2	56 2	75 301	\$ 322	336	340	327	34 34	7 337	335	333	331 33	14 319	30	5 2	76 25	8 242	2 233	239	216	195	179	158	143	119	10\$	102	89	83 4	6 82	81	73	77	78	#1	H 4	4 8	2 77	76	73	68	63	59 5	2 49	42	31	35	35 2		-43%
Donegal	159,192	355 355 35	4 367	365 3	56 3	44 341	7 329	320	320	312	24 32	2 329	31#	313	317 32	2 310	32	20 3	9 305	5 286	6 300	297	290	293	275	285	273	281	271	272	275	269 2	21 29	263	266	254	231	227 2	39 2	48 21	7 215	215	220	222	211	12 2	3 21	217	224	232	220 2	26	796
Dublin	1,347,359	177 180 184	4 193	197 2	01 2	23 231	1 238	241	252	257	53 25	5 255	258	255	252 25	2 23	7 22	20 2	26 217	209	9 200	199	191	185	172	161	151	142	134	139	136	119 1	18 115	119	114	112	114	114	13 1	14 11	3 108	104	102	102	102	98 9	0 28	43	93	92	93 9	13	696
Galway	258,058	155 165 173	203	22# 2	62 2	73 281	314	326	355	372	68 37	3 382	384	370	354 34	11 313	29	e 5	2 25!	5 243	3 211	187	171	144	126	109	108	97	86	#3	26	80 1	4 78	71	66	62	62	63	65 6	2 5	4 51	46	44	50	50	45 4	6 50	51	51	55	56 5	,	18%
Kerry	147,707	113 144 153	177	174 1	97 2	15 240	0 246	263	269	257	69 29	1 299	279	281	269 27	11 23	6 22	20 19	1 123	178	194	190	177	162	153	139	139	129	123	128	127	123 1	2 115	86	83	71	60	60	60 5	1 5	1 48	50	44	41	43	38 3	34	30	32	28	29 2		-2256
Kildare	222,504	154 168 181	198	204 2	0 2	44 257	7 278	293	305	303	98 30	1 306	298	289	290 29	2 27	0 24	12 2	31 210	186	177	169	156	143	121	118	103	94	25	93	29	22 1	5 26	87	86	\$7	84	\$7	82 8	1 7	9 72	65	65	62	61	58 4	9 49	51	48	49	52 9	51	496
Kilkenny	99,232	27 95 105	5 109	123 1	42 1	16 154	165	165	177	174	80 17	5 176	173	171	16# 15	0 133	13	31 13	9 134	136	134	134	141	141	133	128	130	125	126	129	126	11# 1	16 116	113	110	92	92	106 1	07 1	01 13	0 125	125	132	134	148	46 14	\$ 15	162	173	172	179 1	92	27%
Laois	84,697	135 139 136	161	169 1	151 17	74 185	201	214	222	220	20 23	3 242	251	256	231 23	5 22	7 20	* 2	04 197	179	170	174	175	174	163	157	155	149	134	136	137	116 1	7 104	99	86	83	63	59	53 5	3 5:	3 58	55	51	54	55	58 5	4 60	45	66	66	67 6	4	696
Leitrim	32,044	125 137 147	7 162	218 2	18 2	25 240	0 253	262	272	27# 2	59 24	7 222	209	200	17# 12	5 122	10	9 9	7 #4	69	56	31	2#	34	37	37	47	54	81	*1	87	94	4 100	106	106	97	84	78	78 6	9 5	9 34	34	25	16	19	16 4	12	16	19	19	19 1	9	50%
Limerick	194,899	167 182 181	9 207	20# 2	31 2	46 241	277	280	290	301 ;	298 29	3 306	299	310	306 31	2 27	7 26	9 2	12 22	8 227	7 229	221	216	210	211	207	19#	195	195	211	201	222 2	30 23	6 221	216	217	205	194 1	92 11	19 18	7 180	170	166	143	134	29 12	* 13	143	135	134	134 1	31	-496
Longford	40,873	193 196 18	1 193	176 2	13 2	40 254	4 279	291	281	308	96 28	1 289	291	306	279 29	4 25	9 24	15 2	23 193	181	1 193	166	164	157	152	142	132	127	115	115	103	103 1	0 100	83	88		81	#3	13 9	3 91	1 91	*1	91	86	88	91 9	5 91	**	91	80	91 7	16 -	-16%
Louth	128,884	116 115 152	2 161	181 1	85 1 :	s 178	221	261	293	283	72 28	6 299	311	289	296 29	3 28	5 29	7 2	97 25	7 219	193	202	189	177	159	155	157	156	147	151	151	160 1	7 168	174	186	202	206	213 2	13 2	04 19	9 196	189	182	177	182	63 16	3 162	151	155	154	155 1	ALC:	-696
Mayo	130,507	75 80 90	107	123 1	31 1	50 167	105	208	228	243	50 24	6 256	266	259	248 24	15 56	1 24	16 2	32 216	190	183	184	185	176	162	147	151	145	141	118	113	110 1	10 109	103	93	77	79	\$7	* *	6 93	3 #4	79	80	84	85	97 9	0 #3	#3	79	74	75 7	16	-8%
Meath	195,044	199 213 30	6 357	403 4	152 4	90 4#1	2 591	629	657	656	48 64	9 661	651	590	558 53	1 45	1 45	50 4	48 350	2 314	4 282	272	249	232	204	201	172	154	141	140	133	139 1	8 134	127	131	131	126	124 1	118 1	18 10	\$ 103	98	102	85	80	68 6	2 48	49	45	44	46 4	14	-996
Monaghan	61,386	331 313 36	2 350	36# 3	50 3	75 369	5 402	389	406	409	84 37	5 349	363	323	310 30	5 30	3 28	s 2	69 218	205	5 171	176	166	142	137	121	122	116	117	124	112	114 1	104	112	94	101	101	106 1	0\$ 4	9 10	3 #3	78	81	48	103	03 10	9 116	124	127	119	117 1	22	5%
Offaly	77,961	140 145 14	1 151	140 1	77 2	01 195	210	224	222	224	14 22	4 217	222	227	210 21	16 19	1 16	2 15	3 130	112	2 106	100	96	97	99	85	99	94	\$7	45	114	112 1	17 122	126	119	123	103	100	99 7	18 81	1 72	65	49	49	45	42 3	5 37	51	54	67	67 1	71	90%
Roscommon	64,544	200 181 18	7 201	198 2	01 2	23 232	2 228	239	260	271 :	60 27	6 263	263	259	231 24	10 22	9 20	3 2	25 22	9 213	195	189	174	153	152	175	170	175	163	166	169	141 1	9 161	1 167	161	160	166	161 1	33 13	30 12	2 118	121	105	96	64	60 5	7 53	54	50	43	50 5	51	-396
Sligo	65,535	175 186 20	\$ 241	291 3	04 2	94 329	5 356	364	395	406	109 42	3 438	434	423	397 39	9 35	4 35	56 3	33 30-	4 205	5 259	220	211	189	159	154	154	154	140	12#	114	104	5 93	76	15	84	73	76	70 6	4 5	6 61	58	61	54	55	52 5	2 44	40	31	32	32 3	2 -	-28%
Tipperary	159,553	71 7# 83	79	**	93 1	10 113	115	118	120	126	24 13	4 139	133	139	145 13	3 139	9 13	31 13	0 130	130	132	130	128	122	117	123	112	113	117	114	101	105 1	10 107	106	100	97	92	26	90 8	5 9	3 42	= =0	87	79	79	78 7	5 79	26	86	11	80 7	9	096
Waterford	116,176	61 66 70	13	109 1	31 1	2 143	155	160	173	176	194 20	5 215	226	225	228 21	0 20	5 20	01 2	01 195	5 194	4 187	176	163	146	136	128	134	114	142	141	156	163 1	3 164	155	161	157	156	154 1	49 14	40 15	0 113	114	102	45	75	72 7	1 65	62	61	71	71 7	17	18%
Westmeath	88,770	148 167 17	1 217	211 2	51 2	94 32	4 337	425	435	453	155 44	0 453	461	465	415 4	10 40	2 36	69 3	72 35	4 266	6 255	229	216	208	184	158	151	162	133	150	150	113 1	17 113	106	103	100	92	**	87 1	10 7	1 72	51	39	41	28	26 2	3 25	25	23	26	23 7	21	-1496
Wexford	149,722	130 160 17:	3 144	202 2	50 2	71 277	2 297	298	301	322	16 31	3 301	260	257	25\$ 2	12 192	2 17	4 1	2 14	1 124	1 126	96	89	83	74	67	67	48	49	49	49	47	5 46	37	42	39	37	36	36 3	4 3	6 32	30	25	23	28	27 2	2 10	19	19	19	19 2	103	30%
Wicklow	142,425	as 91 87	89	91 1	03 1	19 120	124	124	129	145	145 14	9 149	145	147	149 1	11 130	11	17 1	16 107	7 104	4 106	91	**	89	82	77	89	26	34	85	\$5	\$2	6 #3	7#	**	91	to	24	90 7	77	9 74	74	45	93	91	110 10	9 10	7 116	121	121	112 1	12	596
National	4,761,865	88 91 87	2 89	91 1	03 1	19 120	124	124	124	145	45 14	9 189	THE.	107	100 1	H (2)		0 1	16 107	7 104	4 406	41	**	- 00	+2	177	**	64		•=	45	**	£ 43	10100	-		40		00 2										424	424	400 4	_	596

Previous larger games have show a link with incident rates spikes. However, there was no statistically significant impact on incidence rate between winning and losing team from the weekend of 20 November, with both showing a decrease 10 days after the event took place. We will continue to monitor for future games

Past events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10*	Losing county	% change of County incidence rate between day of event and T + 10*	% Change in close contacts between day of event + 7 days**
FAI Cup Quarter Finals	20/11/2020	Louth (Dundalk) v Dublin (Bohemians)	Louth (Dundalk)	County change: -10% LEA change* (Dundalk South): -35%	Dublin (Bohemians)	County change: -14% LEA change* (Cabra-Glasnevin): -11%	Louth: -37% Dublin: -32%
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Waterford v Clare	Waterford	-54%	Clare	-48%	Waterford: +90% Clare: no data for 28th
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Galway v Tipperary	Galway	-28%	Tipperary	-15%	Galway: -72% Tipperary: -77%
Ulster GAA Football Senior Championship Final	22/11/2020	Cavan v Donegal	Cavan	-48%	Donegal	-6%	Cavan: +82% Donegal: -55%
Munster GAA Football Senior Championship Final	22/11/2020	Cork v Tipperary	Tipperary	-14%	Cork	-36%	Tipperary: -46% Cork: -12%
GAA Hurling All-Ireland Senior Championship Semi Final	28/11/2020	Kilkenny v Waterford	Waterford	To be updated once data becomes available	Kilkenny	To be updated once data becomes available	Kilkenny: -54% Waterford: +13%
GAA Hurling All-Ireland Senior Championship Semi Final	29/11/2020	Limerick v Galway	Limerick	To be updated once data becomes available	Galway	To be updated once data becomes available	Limerick: +93% Galway: +110%
GAA Football All-Ireland Senior Championship Semi-Final	05/12/2020	Cavan v Dublin	Dublin	To be updated once data becomes available	Cavan	To be updated once data becomes available	To be updated once data becomes available
GAA Football All-Ireland Senior Championship Semi-Final	06/12/2020	Mayo v Tipperary	Mayo	To be updated once data becomes available	Tipperary	To be updated once data becomes available	To be updated once data becomes available
Upcoming events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10	Losing county	% change of County incidence rate between day of event and T + 10	Change in close contacts
GAA Hurling All-Ireland Senior Championship Final	13/12/2020	Waterford v Limerick	TBC	To be updated once data becomes available	ТВС	To be updated once data becomes available	To be updated once data becomes available
GAA Football All-Ireland Senior Championship	19/12/2020	Mayo v Dublin	TBC	To be updated once data becomes available	TBC	To be updated once data becomes available	To be updated once data becomes available

Source: LEA data collected weekly and published from HSPC on GeoHive. Change calculated between 23/11 and 30/11 for the respective stadium's LEA

Data analytics briefing - 11 December 2020 - DRAFT - Not for circulation

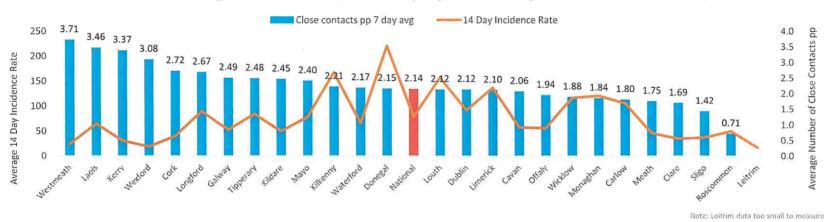
Source: HSE Test and Trace shared via HSE IIS as of 10 Dec 2020

Close contact analysis

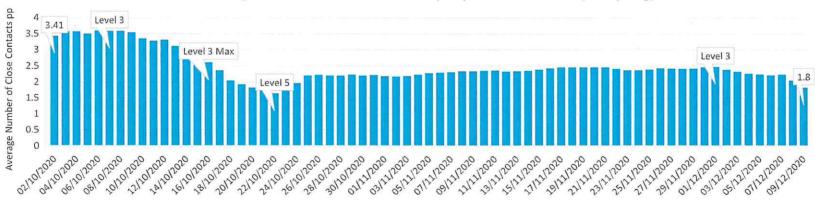


Trend in Close Contacts

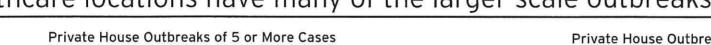
Average Number of Close Contacts per person in the period from 3rd to 9th Dec

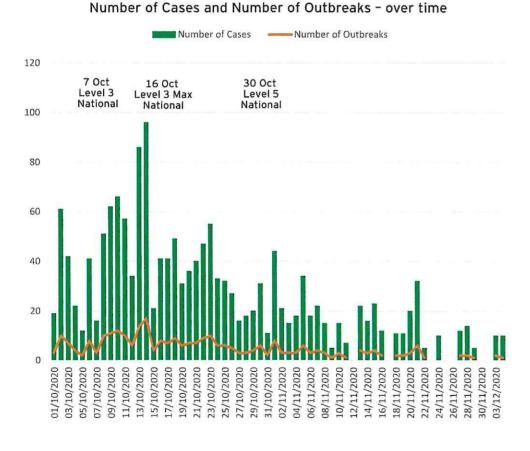


Average Number of Close Contacts per person over time (7 Day Avg)

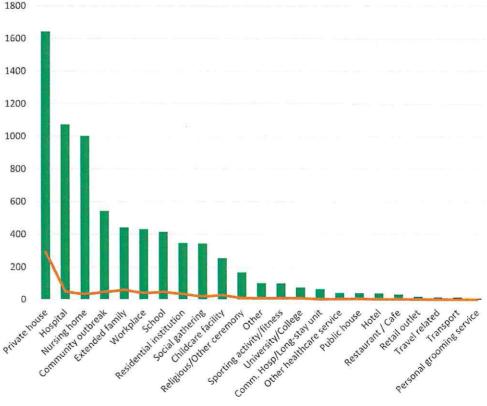


Private Household outbreaks make up 40% of outbreaks of 5+ cases. Healthcare locations have many of the larger scale outbreaks.

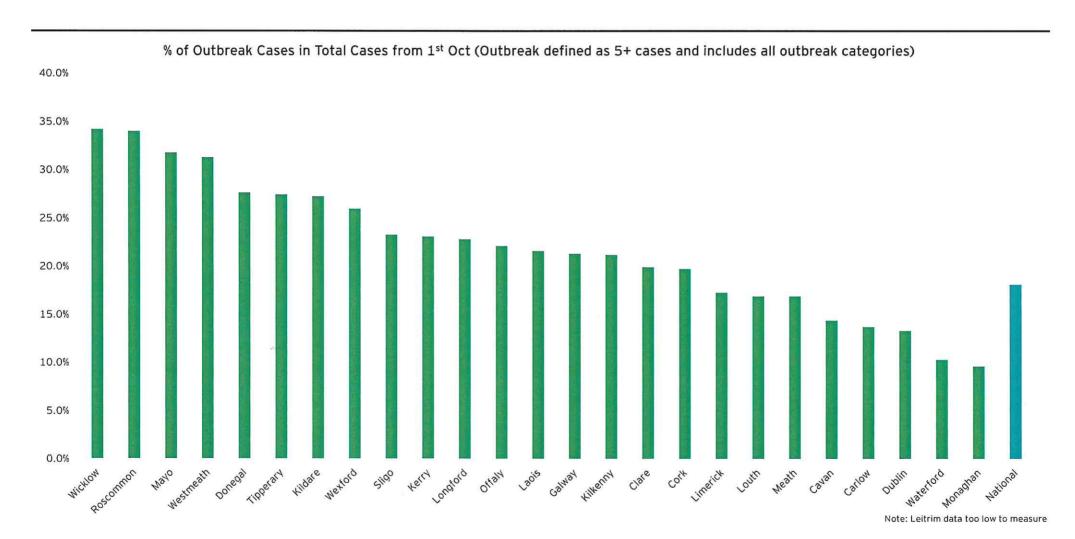




Private House Outbreaks of 5 or More Cases Number of Cases and Number of Outbreaks - by location Number of Cases Number of Outbreaks 1800

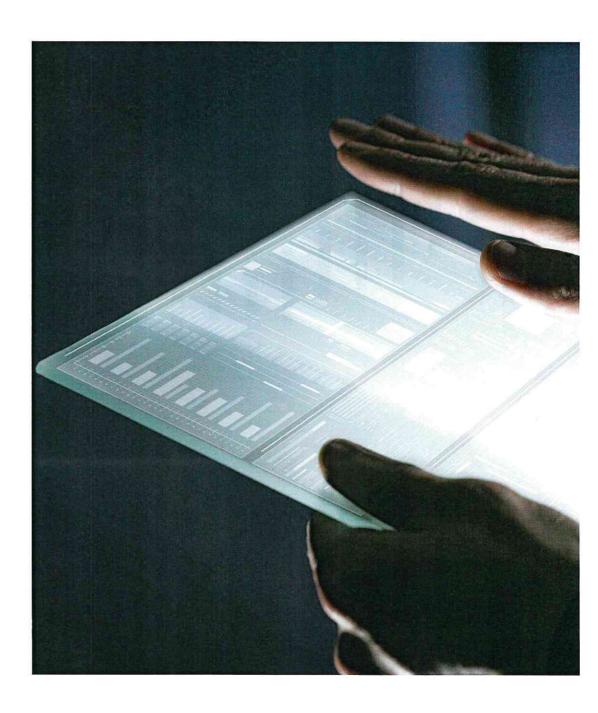


Outbreaks of 5+ cases account for 18% of all cases nationally

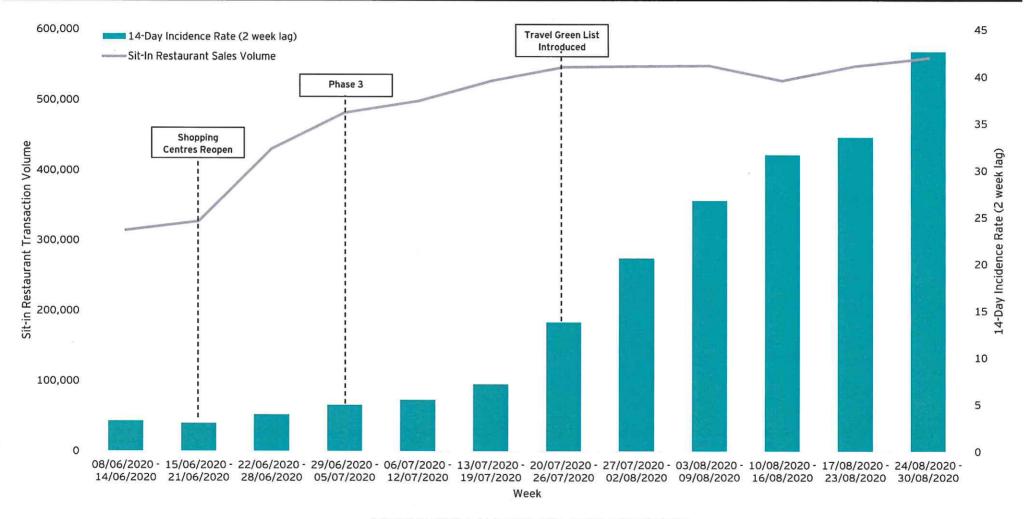


Source: HSE CIDR and Test Trace shared via HSE IIS on 10 Dec 2020

Payments data

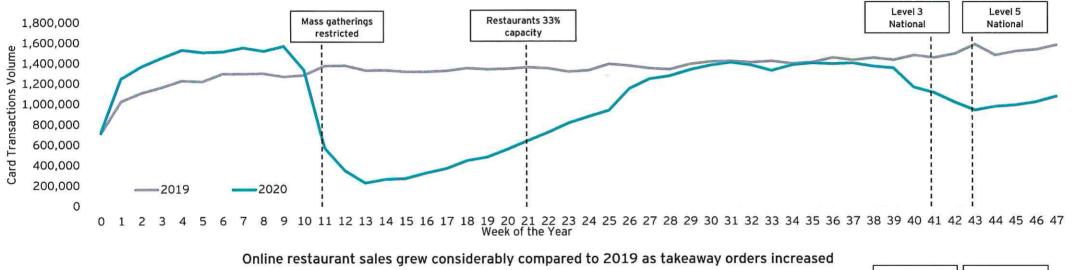


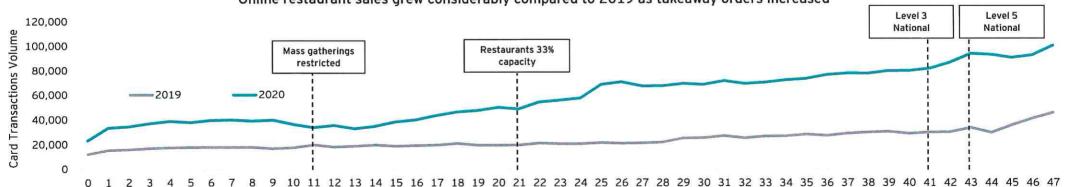
Sit-in restaurant transactions rose in early summer, while incidence rates remained low until after other restriction changes had occurred



Sit-in restaurant transactions returned to 2019 levels during the summer months. Online sales rose, showing a shift towards online ordering



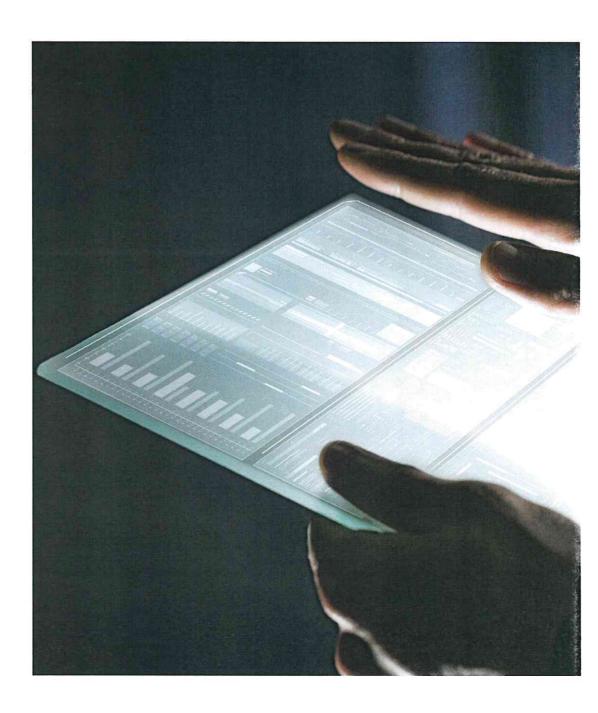




Week of the Year

Data analytics briefing - 11 December 2020 - DRAFT - Not for circulation

Data update



Specific assets and insights informing how we are performing and identifying future risks

Indicator	Summary	Frequency	Source	Status
Where and how is the disease spreading?				
County incidence rates	Disease incidence rates (County)	Daily	Openhive	
LEA incidence rates	Disease incidence rates (LEA)	Weekly	CSO	
Testing and tracing output	Disease transmission sources and settings	Daily	HSE	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	
What restrictions are in place?	大型外的企业 (1995年)。			
Current restriction level	Current Government restrictions on place	As relevant	Govt guidelines	经工作的 数据
Events tracker	Upcoming and past events	Daily	Online events database	
Are people complying?				
Stay at home index	Trips within and outside counties	Daily	3mobile	
Traffic data	Traffic counter data by vehicle type and road	Daily	ТІІ	计标识例数据
Dublin footfall	Pedestrian counters for Dublin City Centre	Daily	DCC	14 6 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16
Mobility	Measure of mobility by purpose	Daily	Google, Apple	
Adherence self reporting	Survey responses on mask compliance, close contacts	Daily	Facebook survey	
Garda enforcement	Fixed fine notices for C-19 breaches	TBC	Gardaí	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	的思想到了
Leap card usage	Leap card user data	Daily	NTA	
What impact are the restrictions having?				
Restrictions analysis	Analysis of restrictions on disease incidence	Daily	Openhive	

Christmas update schedule

				PRESS SUBMI	TEAM SSION			PRES	S TEAM IISSION				PRES: SUBM	S TEAM ISSION					PRESS SUBM	ST
	М	T	W	Т	F	М	Т	w	Т	F	М	Т	W	T	F	М	Т	W	Т	Section of the second
ASSET	14	15	16	17	18	21	22	23	24	25	28	29	30	31	1	4	5	6	7	- Constant
County incidence 3 day lag	V	V	V	V	√	V	V	V	V		V	V	√	V		V	√	√	V	
EA incidence 3- day lag				V				71 27	V					√					ed) i	
Restrictions 3-day lag	V	V	V	V	V	√	V	V	V		√	V	V	V		V	V	√	√	
Fransport No lag	√	√	V	V	√	V	V	V	V		V	V	V	V		V	V	√	√	
Dublin footfall No lag	√	V	V	V	V	√	V	V	V		√	V	V	V		√	V	V	V	
Stay at home index 4 day lag (TBC)				V	V	√	V	V	√		V	V	V	√		√	V	V	V	
acebook survey 3 day lag	V	V	V	V	V	V	V	V	V		1	V	V	V		V	V	V	V	
Mobility 2-5 day lag	√	√	V	V	V	V	V	1	V		V	V	V	V		V	V	V	V	
NTA (TBC)	√	√	V	V	V	√	V	V	V		√	V	V	V		√	V	V	V	
					j	Data	a analytic	s briefina	- 11 Dece	mber 2020 -	DRAFT - Not	for circul	ation		j					

Press Briefing Key Statistics 10 Dec 2020

DISEASE INCIDENCE RATES

- Incidence rates nationally have been broadly stable over the last five days
- Half of the 26 counties had increases in the 14-day incidence rates over the last 5 days
- 10 counties are above the national incidence rate level
- The largest increases over the last five days were seen in Leitrim, Offaly, Carlow, Laois and Kilkenny
- Clare, Kerry, Longford, Louth, Mayo, Roscommon, Wexford, Sligo, Cork and Meath are all seeing their cases decline

Source: Openhive, Data to 7 Dec

SHOPPING AND NIGHTLIFE

- Dublin City Centre had its busiest weekend since March (Total footfall)
- 2-3pm is the busiest shopping period with 9-10am still relatively quiet (Henry St and Grafton St)
- Nearly 80% increase in people out in Dublin City on Saturday night compared to last Saturday (8pm - 12am total footfall)
- Traffic around four tracked shopping centres was c.40% busier this weekend. 8am-11am was the quietest period, but traffic volumes appeared well spread out throughout the weekend

Shopping centres traffic counters tracked: Kildare Village, Mahon Point, Liffey Valley, Blanchardstown for week (30/11-6/12) from 8am - 9pm; Source TII Traffic Volumes

COMPLIANCE

- Small increase in citizens meeting with contacts outside of their household this week (37%) versus last week (34%)
- Mask wearing compliance remains constant with 4 out of 5 people nationally reporting adherence

Source: Facebook Survey to 7 Dec 20

Project updates



Progress update

GOVERNANCE AND SET UP

- Delivered weekly Progress Report, Progress Update meeting today and daily HSE progress meetings
- ► Awaiting HSE to sign second SOW
- Series of HSE workshops to finalise and confirm detailed Azure design
- ► Issued draft Data Protection Impact Assessment to HSE and awaiting feedback
- ▶ Updated 1GC HSE Insight Governance approach for initial HSE feedback and now awaiting final feedback
- ► HSE 1GC Dev environment completing and now moving to Test environment
- Agreed interim data update approach with HSE while awaiting 1GC platform
- Awaiting DOH confirmation for Stay at Home Index detailed data

USE CASE DESIGN

- Session with DOT Press Team to confirm how we can input to them on an ongoing basis
- ▶ Issuing first set of information today
- Agreed NTA submission and awaiting first data to be issued
- Confirming HSE App data as well as available data captured for arrivals at airports
- ► Expanded analysis for each of the various activity dashboards. Refreshed for most recent data

INSIGHT DEVELOPMENT

- Received Banking Payments Data and with initial insights presented today
- ► Completed initial analysis for events last weekend and to be presented today
- ► Updating International Research Coffee Table to be published early next week

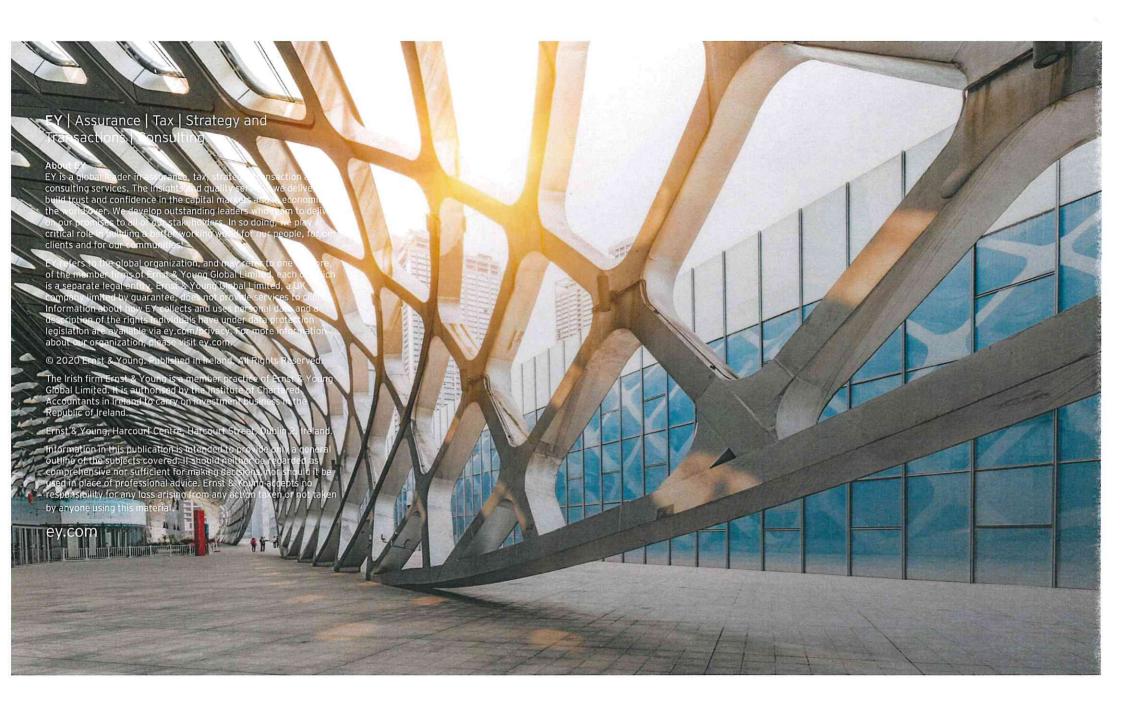
Data analytics briefing - 11 December 2020 - DRAFT - Not for circulation

Where we are with the key DoT and Government dependencies

REQUIREMENT	USE CASES	STATUS	DESCRIPTION
1GC Data Owner and Data Protection Impact Assessment	Many	DOT Action	 Clarity required on 1GC data owner organisation and responsible individual We have also created an initial Data Protection Impact Assessment and ask for guidance on whether and how to engage with the Data Protection Commissioner Note this does not include any personal identifiable data, which means it is excluded from data protection. Need to o rely on existing data sharing agreements to meet timeframe
Align with NPHET	All Health Related	For Discussion	 Request to get NPHET forecasts of future disease spread to incorporate into Christmas briefings
Access to appropriate mobility data	Social Distance IndexStay at Home Index	Continue Monitoring	 Stood down SDI team for now Awaiting DOH confirmation for access to detailed data decision on SHI
Stand Up Appropriate Analytics Environment within HSE	Many	Team Priority to Resolve	 Detailed design now published and working though specific comments from HSE Technology. Progressing well Needs continued prioritisation and leveraging existing infrastructure to deliver within required timeframe
Government Departments to create and share specific Use Cases	Many	Team Progressing	 Already have access to GeoHive and CSO Confirming specific approach with various government departments, including any data governance and sharing

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information



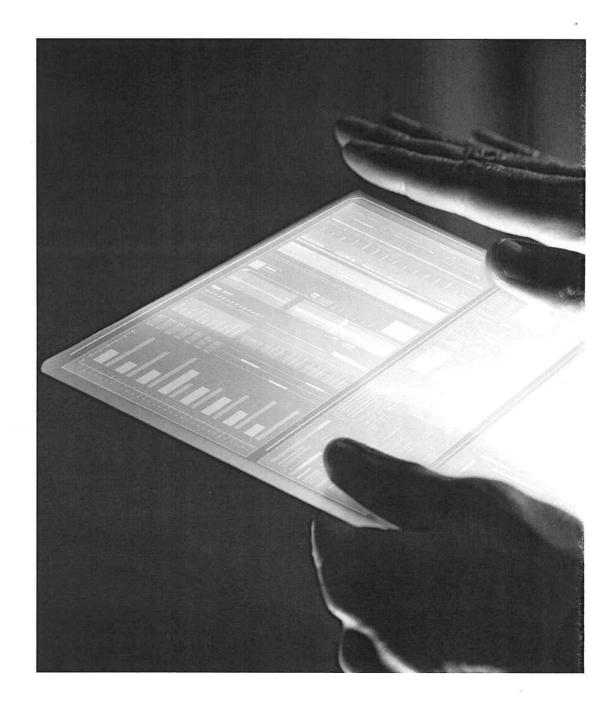


Update - Week 9

Agenda

- 1. Early warning indicators and updates
- 2. County and outbreak analysis
- 3. Christmas requirements
- 4. Detailed county view
- 5. Press briefing stats
- 6. Additional analysis

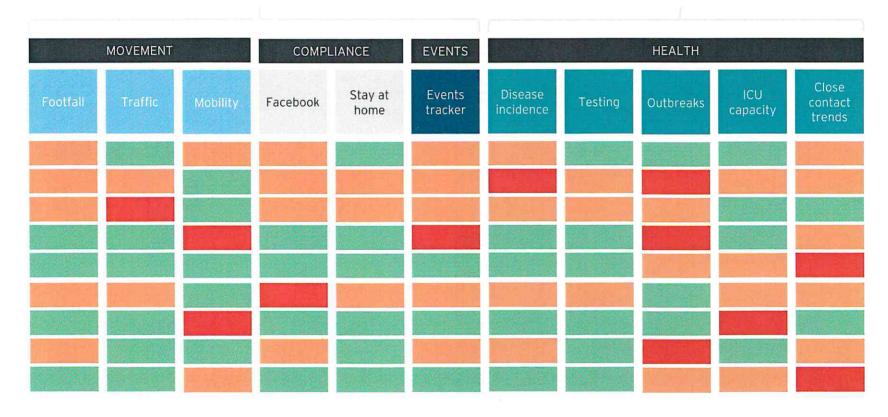
Early warning indicators and Updates



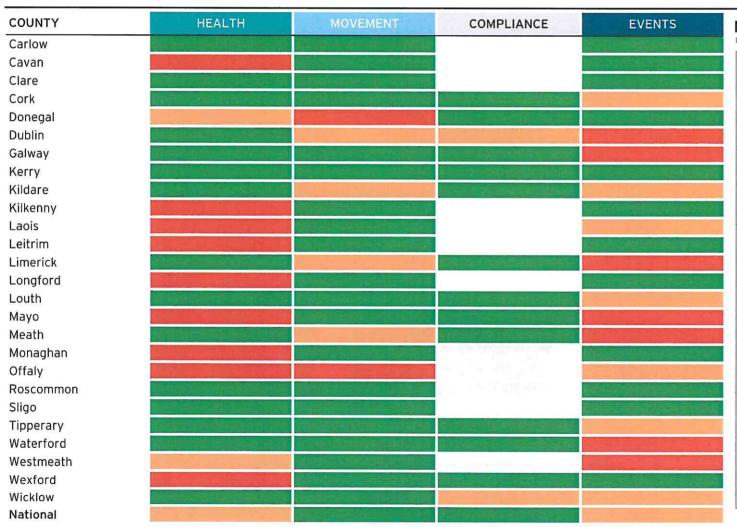
Early warning indicators - overview of approach

EARLY WARNING INDICATORS

OUTCOMES



County early warning summary - initial results



Note

Prototype analysis uses the prevalent metric in each category for RAG colour:

Health - change in 14-day incidence rate Movement - change in traffic volumes Compliance - Facebook survey mask wearing

Events - # events

National - most prevalent colour for each metric

We intend to improve this by:

- 1. Expanding the Health metrics to include 5 day incidence rates
- 2. Adding new Restriction analysis as we approach enough days to quantify impact of changes
- 3. Assessing whether a weighting per metric can be applied to provide a summary RAG
- 4. Incorporating the impact of the vaccine rollout over time

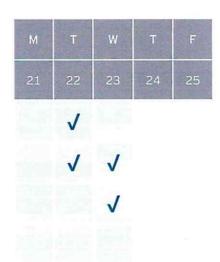
Data analytics briefing - 18 December 2020 - DRAFT - Not for circulation

Christmas update schedule requirements

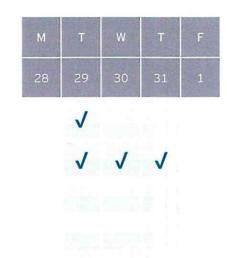
	М	Т	W	Т	F
ASSET	14	15	16	17	18
GIS stats for press briefing	11	V		V	
Early Warning Indicator Summary					1
1GC Room 350 briefing					V
Ad-hoc analysis (as required)					



1GC Friday briefing



Updated county analysis and early warning summary



М	T	W	Т	F
4	5	6	7	8
	ТВС		ТВС	
V	V	V	V	V
				V

- GIS press briefing stats as required
- Early warning summary
- ▶ 1GC Friday briefing

The Government must decide on the 'tipping point' for restrictions and reopening

Impact on economy

- How is the economy doing
- What supports are in place and how much are they costing
- How are segments performing



How are people feeling?

- 'How long can people hold out'
- Mental health
- Outlook to ongoing restrictions



Level of compliance

- Are people complying
- Are the restrictions having and impact
- Is compliance slipping with vaccine



The Government must decide on the 'tipping point' for restrictions and re-opening

When is the right time to re-open segments of the economy and to slow down Government support schemes by sector?

What insights are need to help with this decision making process



Vaccine operational roll-out

- What is the pace of rollout
- Are people taking the vaccine?
- Do we have particular "problem" areas or cohorts



Disease incidence and hospital

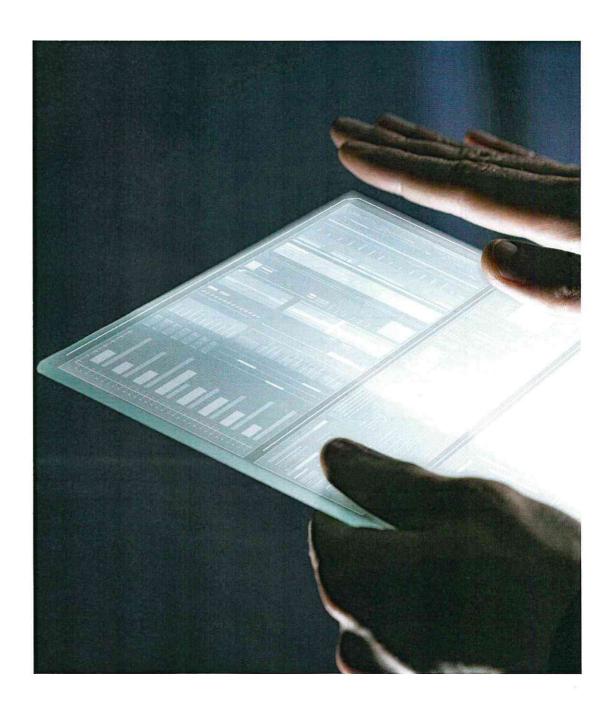
- How is the disease spreading
- What is causing the disease spread
- What setting are causing continued outbreaks
- Is hospital capacity sufficient



Vaccine efficacy and coverage

- Is the vaccine effective
- When are 'vulnerable groups' covered
- When we will have a sufficient proportion of the population

County and outbreak analysis



National 14-day incidence rate beginning to rise at a slow pace

Two Weekly Incidence Rate Per 100k	Population	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	voN-60	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	30-Nov	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	Change Last 5 Days
Carlow	56,932	214	213	177	160	137	126	105	95	98	91	88	72	77	81	86	88	84	76	72	70	70	76	70	65	76	6 7	9 93	93	88	95	107	116	121	125	137	160	162	162	167	165	21%
Cavan	76,176	295	263	232	206	159	143	133	119	112	102	108	98	87	95	97	95	101	100	98	92	97	91	76	74	67	6 6	7 58	51	56	56	58	59	58	59	67	75	92	104	106	114	71%
Clare	118,817	181	173	171	160	139	132	122	109	104	104	93	109	111	112	104	93	91	89	86	83	80	79	74	69	71	1 5	3 46	42	39	35	35	35	32	32	32	35	34	31	27	23	-29%
Cork	542,868	233	239	216	195	179	158	143	119	108	102	89	83	86	82	81	73	77	78	81	81	84	82	77	76	73	8 6	3 59	52	49	43	38	35	35	28	27	25	23	26	25	25	-4%
Donegal	159,192	300	297	290	293	275	285	273	281	271	272	275	269	281	293	263	266	254	231	227	239	248	217	215	215	220 2	22 21	1 21	2 21	3 210	217	224	232	220	226	230	229	216	219	225	236	2%
Dublin	1,347,359	200	199	191	185	172	161	151	142	134	139	136	119	118	115	119	114	118	114	114	113	114	113	108	104	102 1	02 10	2 98	90	88	93	93	92	93	93	90	90	91	93	91	91	2%
Galway	258,058	211	187	171	144	126	109	108	97	86	83	86	80	84	78	71	66	62	62	63	65	62	54	51	46	44	0 5	0 45	46	50	51	51	55	56	59	60	65	61	61	54	49	-19%
Kerry	147,707	194	190	177	162	153	139	139	129	128	128	127	123	122	115	86	83	71	60	60	60	51	51	48	50	44	1 4	3 38	3 36	34	30	32	28	29	26	24	21	20	21	31	32	33%
Kildare	222,504	177	169	156	143	121	118	103	94	85	93	89	88	85	86	87	86	87	84	87	82	81	79	72	65	65	2 6	1 58	3 49	49	51	48	49	52	51	53	54	55	56	59	64	20%
Kilkenny	99,232	134	134	141	141	133	128	130	125	126	129	126	118	116	116	113	110	98	92	106	107	101	130	125	125	132 1	34 14	18 14	6 14	3 151	162	173	172	179	192	177	198	194	201	200	191	8%
Laois	84,697	170	174	175	174	163	157	155	149	136	136	137	116	107	104	99	86	83	63	59	53	53	53	58	55	51	4 5	5 58	3 54	60	65	66	66	67	64	59	76	81	103	109	112	90%
Leitrim	32,044	56	31	28	34	37	37	47	56	81	81	87	94	94	100	106	106	97	84	78	78	69	59	34	34	25	6 1	9 16	9	12	16	19	19	19	19	22	19	22	28	28	25	14%
Limerick	194,899	229	221	216	218	211	207	198	195	195	211	201	222	238	236	221	216	217	205	194	192	189	187	180	170	166 1	43 13	14 12	9 12	3 136	143	135	134	134	131	122	119	119	126	121	122	0%
Longford	40,873	193	166	164	157	152	142	132	127	115	115	103	103	100	100	83	88	88	81	83	83	93	91	91	81	81	86 8	8 91	95	91	88	91	88	91	76	81	113	120	142	132	130	61%
Louth	128,884	193	202	189	177	159	155	157	156	147	151	151	160	157	168	174	186	202	206	213	213	204	199	196	189	182 1	77 18	12 16	8 16	3 162	158	155	154	155	153	159	159	173	176	175	192	20%
Mayo	130,507	183	184	185	176	162	147	151	145	141	118	113	110	110	109	103	93	77	79	87	88	86	93	84	79	80	4 8	5 97	90	83	83	79	74	75	76	76	100	103	107	109	109	43%
Meath	195,044	282	272	249	232	204	201	172	154	141	140	133	139	128	134	127	131	131	126	124	118	118	108	103	98	102	5 8	0 68	62	48	49	45	44	46	44	49	45	52	54	54	57	16%
Monaghan	61,386	171	176	166	142	137	121	122	116	117	124	112	114	104	104	112	94	101	101	106	108	99	103	83	78	81	8 10	3 10	3 10	116	124	127	119	117	122	129	137	137	135	116	129	0%
Offaly	77,961	106	100	96	97	99	85	99	94	87	95	114	112	117	122	126	119	123	103	100	99	78	81	72	65	49	19 4	5 42	35	37	51	59	67	67	71	67	68	64	72	68	74	12%
Roscommon	64,544	195	189	174	153	152	175	170	175	163	166	169	141	169	161	167	161	160	166	161	133	130	122	118	121	105	6 6	4 60	57	53	54	50	43	50	51	53	56	50	50	50	48	-9%
Sligo	65,535	259	220	211	189	159	154	154	154	140	128	114	104	95	93	76	85	84	73	76	70	64	56	61	58	61	6 5	5 52	2 52	44	40	38	32	32	32	35	41	41	50	49	50	43%
Tipperary	159,553	132	130	128	122	117	123	118	113	117	114	101	105	110	107	106	100	97	92	86	90	85	93	92	80	87	9 7	9 78	75	79	86	86	88	80	79	78	77	78	82	80	71	-10%
Waterford	116,176	187	176	163	146	136	128	134	114	142	141	156	163	163	164	155	161	157	156	154	149	140	150	118	114	102	15 7	5 72	71	65	62	61	71	71	77	80	80	71	71	77	77	-3%
Westmeath	88,770	255	229	216	208	184	158	151	162	133	150	150	113	117	113	106	103	100	92	88	87	80	71	72	51	39	1 2	8 26	23	25	25	23	26	23	21	19	27	25	27	26	34	76%
Wexford	149,722	126	96	89	83	74	67	67	48	49	49	49	47	45	46	37	42	39	37	36	36	34	36	32	30	25	3 2	8 27	22	18	19	19	19	19	23	24	26	30	37	45	47	97%
Wicklow	142,425	106	91	88	89	82	77	89	86	84	85	85	82	86	83	78	88	91	80	84	90	77	79	78	74	85 !	3 9	1 11	0 10	107	116	121	121	118	112	114	112	110	97	93	93	-18%
National	4,761,865	201	195	184	173	159	150	142	133	127	128	124	117	118	117	114	111	111	106	107	106	104	102	97	93	91	8 8	6 84	79	77	80	79	79	79	78	78	80	80	83	82	83	7%

National 5-day incidence rate is more sensitive to the increases over the last few days

5 Day Incidence Rate Per 100k	Population	21-Oct	22-Oct	23-Oct	24-Oct		26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	Change Last 5 Days
Carlow	56,932	47	44	23	30	33	28	26	21	18	21	19	28	37	33	42	44	35	28	25	12	9	12	12	14	25	33	40	56	70	56	54	56	47	40	46	54	65	60	65	76	69	26%
Cavan	76,176	43	49	35	22	24	26	22	34	45	42	41	41	34	32	38	35	38	35	28	21	25	24	21	17	16	9	11	13	16	25	29	26	29	28	28	34	38	50	62	56	58	69%
Clare	118,817	40	45	45	50	50	44	30	26	26	26	23	42	42	42	40	44	26	28	24	23	18	14	11	9	10	13	16	14	13	12	10	9	12	13	11	11	11	8	9	8	7	-38%
Cork	542,868	51	48	40	42	35	27	19	20	21	24	26	29	30	27	30	33	33	35	34	28	30	25	20	19	18	13	11	9	7	8	8	10	10	10	9	8	8	7	9	10	10	22%
Donegal	159,192	98	90	102	130	133	99	90	107	85	89	97	102	80	89	89	81	88	80	66	75	72	70	70	77	77	77	74	85	86	71	83	92	85	82	87	83	75	62	77	76	80	-4%
Dublin	1,347,359	62	63	44	51	46	43	34	38	34	40	43	45	42	41	42	41	43	46	45	37	34	34	29	29	32	34	31	31	28	27	34	37	39	40	39	30	27	29	32	33	33	7%
Galway	258,058	35	40	36	37	24	17	14	19	22	31	36	36	31	33	24	20	17	15	10	10	9	12	10	14	16	24	27	27	24	26	18	16	20	20	18	22	24	20	21	19	16	-29%
Kerry	147,707	66	65	71	79	69	39	43	31	25	24	30	24	24	24	24	20	19	17	14	13	12	11	14	14	14	14	16	14	10	10	8	6	4	6	5	5	3	5	6	19	24	400%
Kildare	222,504	40	34	28	33	28	25	25	28	25	35	34	37	35	33	34	31	28	32	29	20	20	20	13	13	18	18	18	19	18	15	17	19	19	22	22	22	19	19	22	26	28	31%
Kilkenny	99,232	56	53	57	57	54	49	51	30	28	30	28	30	36	41	40	37	37	33	44	43	42	62	61	49	53	63	54	62	63	56	66	58	71	75	84	78	86	72	75	71	69	-12%
Laois	84,697	52	63	51	63	64	64	51	48	27	28	30	24	18	19	15	12	18	18	19	18	18	19	22	25	27	25	20	19	14	21	28	28	27	31	21	13	32	40	63	70	73	464%
Leitrim	32,044	6	3	9	22	28	28	37	37	53	47	56	56	47	25	31	22	12	12	6	0	0	0	3	3	3	3	6	6	6	9	12	12	9	9	6	6	3	6	12	12	9	50%
Limerick	194,899	76	67	59	81	84	69	74	79	72	74	76	97	103	96	86	82	54	48	42	41	47	49	47	50	50	52	50	45	44	52	54	49	47	46	42	28	30	34	42	42	50	78%
Longford	40,873	49	39	37	46	46	34	34	37	29	37	37	37	32	27	17	24	22	27	29	34	39	39	39	34	34	29	29	27	32	34	24	29	27	29	24	32	61	66	86	86	78	146%
Louth	128,884	50	42	43	36	36	36	49	63	69	74	82	73	64	68	74	78	85	85	81	75	67	60	60	50	50	46	47	39	48	58	66	59	68	68	57	61	64	68	71	68	80	32%
Mayo	130,507	41	54	67	65	60	50	37	18	25	29	30	27	31	28	26	34	34	34	38	35	29	34	29	21	21	25	23	41	38	37	33	28	15	20	22	27	51	50	54	57	56	109%
Meath	195,044	69	70	62	53	46	35	31	38	42	43	39	52	45	50	56	68	53	51	36	26	18	15	18	17	23	18	19	15	19	14	17	15	12	10	14	15	18	26	31	29	27	73%
Monaghan	61,386	34	49	54	49	47	47	31	28	42	46	44	36	34	18	23	31	41	46	49	42	36	29	24	18	18	34	34	37	54	65	67	70	65	51	42	34	34	36	36	28	34	0%
Offaly	77,961	14	21	13	33	37	35	47	49	40	47	68	51	55	49	45	26	24	19	15	8	6	6	9	13	18	22	19	19	14	14	27	33	40	40	40	22	18	10	23	19	27	24%
Roscommon	64,544	85	81	46	37	29	54	46	53	60	54	45	51	79	84	87	73	65	34	29	20	15	15	12	14	17	17	20	26	23	20	23	20	12	12	14	14	19	20	17	15	15	11%
Sligo	65,535	73	61	50	50	46	32	37	40	27	29	23	24	17	24	21	32	31	29	29	26	15	12	15	11	14	17	15	15	15	15	14	12	9	6	3	8	18	20	32	34	31	300%
Tipperary	159,553	46	39	34	37	36	38	38	37	33	41	31	38	46	43	38	38	26	19	16	22	23	33	33	34	29	31	31	30	32	30	34	26	26	28	23	25	24	24	31	33	24	-5%
Waterford	116,176	45	46	49	38	37	32	40	25	59	74	80	89	102	71	59	51	43	31	28	26	19	18	22	34	33	34	28	25	16	15	20	17	26	26	31	36	40	34	33	33	25	-31%
Westmeath	88,770	79	71	37	38	34	27	30	38	28	48	56	48	51	55	35	24	25	14	9	8	8	9	8	11	9	9	8	9	7	9	9	8	9	8	5	3	12	10	14	14	23	567%
Wexford	149,722	27	22	21	22	24	12	14	11	11	11	15	15	16	13	16	15	14	15	14	11	6	7	5	5	4	5	8	9	8	8	10	5	6	7	11	12	13	16	22	27	31	161%
Wicklow	142,425	27	20	18	31	27	19	39	42	34	41	48	27	25	22	20	23	27	25	29	31	27	29	32	30	44	43	38	54	55	46	51	55	40	40	32	27	22	19	22	24	18	-36%
National	4,761,865	54	53	45	49	45	39	35	37	35	40	42	44	43	41	41	40	38	37	35	30	28	28	26	26	28	29	27	28	27	26	30	30	30	30	29	26	27	27	32	33	33	26%

Summary view of priority counties for analysis

County	Change in 14-day incidence rate over last five days (10 - 14 Dec) ¹	New cases (1 Nov - 16 Dec) ²	Current 14-day incidence rate (14 Dec) ³	Commentary
Cavan	+71%	+256	114	Incidence rate fell back in line with national average following large spike in October. Incidence rising again across all LEAs in recent days but average close contacts appear to be falling.
Donegal	+2%	+1,232	236	Persistently high incidence rates, with one third of cases resulting from outbreaks of 5+ cases and five hospital outbreaks. Carndonagh's incidence rate is nearly x10 the national average.
Sligo	+43%	+211	50	Responded well to Level 5 restrictions. Low incidence rates overall but rising in recent days. Donegal's higher rates does not appear to be impacting Sligo. Low numbers of outbreaks of 5+ cases.
Dublin	+2%	+4,901	91	Dublin has remained relatively stable over the last fortnight. A number of large outbreaks in hospital settings.
Kilkenny	+8%	+385	191	Trending upwards in all LEAs since end November. Recent large spikes in two LEAs, with high proportion of cases coming from outbreaks of 5+ cases, including a 104 case hospital outbreak.
Louth	+20%	+777	192	Incidence rate more than twice national average, with high rates in four of five LEAs. Three large recent outbreaks in a workplace, nursing home and hospital.
Mayo	+43%	+451	109	Claremorris LEA driving higher incidence rate – it is x8 larger than the next highest LEA. A high proportion of cases (110) coming from workplace outbreaks.

Key terminology used

Incidence rates

14-day disease incidence per 100k population in each county, calculated using daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily.

Outbreak analysis

Takes account of only outbreaks of 5+ cases using HSE Testing and Tracing; Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 14/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details.

Average close contacts

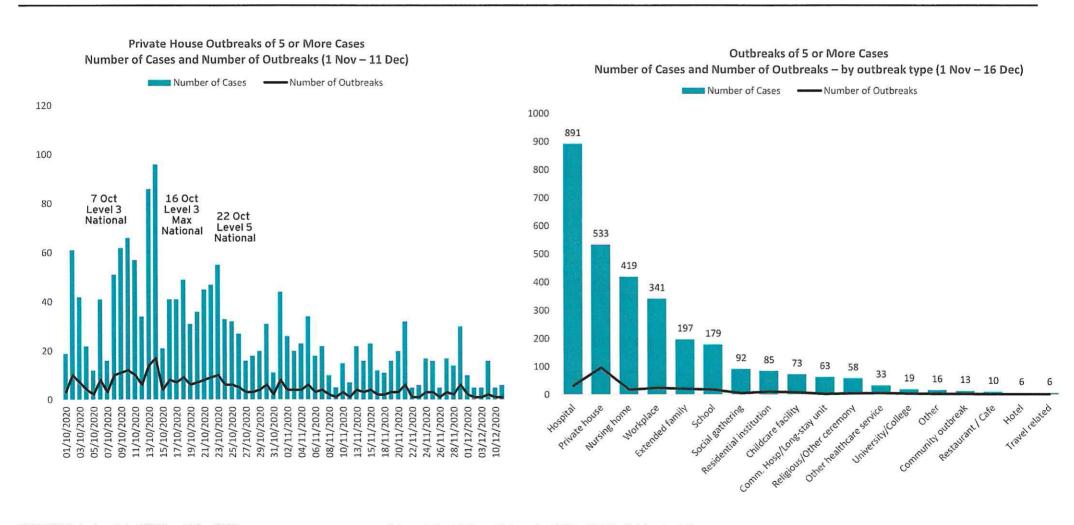
7-day average number of close contacts per person confirmed positive with Covid-19 using HSE Testing and Tracing, data to 14/12/20.

LEA

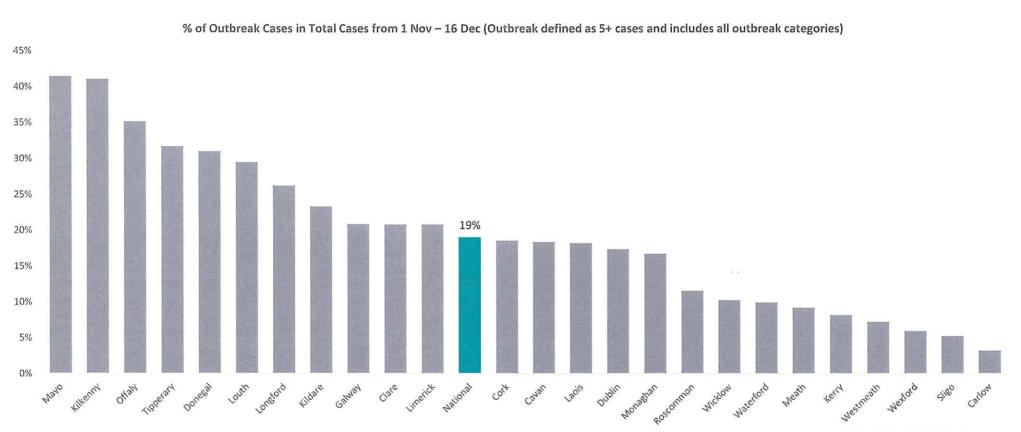
Local Electoral Area

Source: 1 + 3 Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. 2: HSE Testing and Tracing as at 14/12/20

Hospital outbreaks and Private Houses make up 46% of outbreaks of 5+ cases

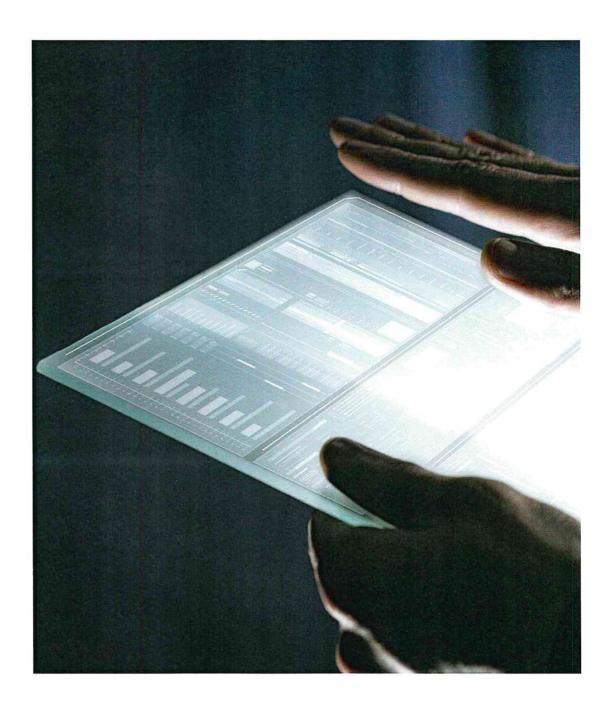


Outbreaks of 5+ cases account for 19% of all cases nationally



Note: Leitrim data too low to measure

Detailed county view



Cavan - the loosening of Level 5 restrictions saw a sharp increase in incidence rate and a brief spike in average close contacts

Summary

Cavan profile

- Having fallen throughout November, Cavan's incidence rate rose sharply from the beginning of December from 58 (1 Dec) to 114 (14 Dec)
- Incidence rates throughout December have been consistent across all three LEAs, indicating no single LEA is driving the increase

Summary analysis

- This early December increase was c.10 days after the Ulster GAA Senior Football Championship Final which Cavan won, however, no outbreaks related to this event have been recorded
- A second, much sharper spike occurred on 8 Dec, 11 days after the announcement that Level 5 was ending on 27 Nov
- Extended family was the primary driver of outbreakrelated cases in early December (outbreaks of 5+)

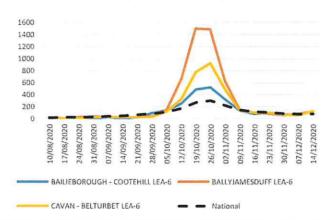
Restriction impact

- Level 5 restrictions were highly effective in Cavan, bringing the incidence rate from over three times the national average (22 Oct) to equal to the national average by 8 Nov
- Cavan's incidence rate is now 37% above the national average (14 Dec), but encouragingly, close contacts have fallen in recent days

Notes

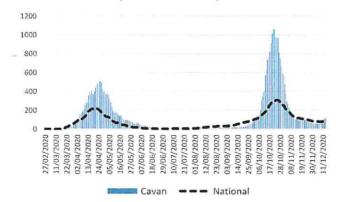
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

LEA 14 Day Incidence Rate per 100k



Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution.

Outbreak analysis: outbreaks with 5 or more cases

		2	56		
% of cases linked to outbreak of 5+	National Av	verage	Avg. cas	es per outbreak of 5+	National Average
18%	19%			9.40	12.33
Settings (outbreaks of 5	+)		breaks aks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)
Extended family		<5	21	45%	
School			2	15	32%
Workplace			1	6	13%
Social gathering			1	5	11%
Top Outbreak Settin	gs (outbreaks	of 10+)		# cases (outbre	eaks of 10+)

Source: Total cases – HSE Testing and Tracing; Outbreaks – HPSC CIDR data aggregated summary report. Data based on CIDR data as at 1.6/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

Donegal's incidence rate persistently above the national average

Summary

Donegal profile

- Donegal has experienced a higher incidence rate during the second wave than the national average
- Donegal's incidence rate has been substantially higher than the national average since the end of October. All but two LEA's are currently above national average levels (14 Dec)
- Northern Ireland (NI) has seen an increase in positive cases since 23 Nov. There have been over 6k positive cases in NI during the last 14 days (to 15 Dec), compared to c.4k in the Republic of Ireland (NI Dept. Health)

Summary analysis

- Carndonagh LEA has the highest incidence since the end of November, currently 9.6 times the national average (14 Dec.) This LEA does not share a border with NI, as was the case with the worst performing LEA's in Oct/Nov, Buncrana and Lifford-Stranorlar
- A number of larger outbreaks of 5+ cases have occurred, accounting for one third of all cases since 1 Nov. There were five hospital outbreaks, including one with 109 cases. Extended family accounts for 18% of outbreaks (of 5+ cases)

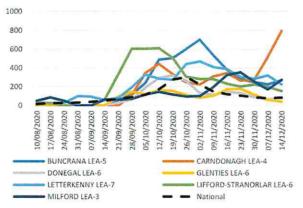
Restriction impact

- Donegal did not see the same benefit from level 5 restrictions as seen at the national level. The incidence rate declined, however, at a slower and less substantial rate than nationally
- The incidence rate has increased in December and Donegal's rate is 2.8 times the national average at 236 (14 Dec)

Notes

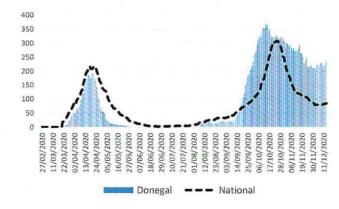
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution.

Outbreak analysis: outbreaks with 5 or more cases CIDR data: 1 NOV to 16 DEC

		1232	ack and Trace)				
% of cases linked to outbreak of 5+	National Averag	je Avg. cas	es per outbreak of 5+	National Average			
31%	19%		11.94	12.33			
Settings (outbreaks of 5+		outbreaks breaks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)			
Hospital		5	177	46%			
Extended family		7	69	18%			
Private house		12	65	17%			
Childcare facility		2	16	4%			
School		2	16	4%			
Top Outbreak Setting	gs (outbreaks of 10)+)	# cases (outbr	eaks of 10+)			
Hospital			10	9			
Hospital			50				
Religious/Other ceremon	V		14				

Source: Total cases – HSE Testing and Tracing; Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

Level 5 was effective in reducing cases in Sligo, while also reducing transmission from Donegal

Summary

Sligo profile

- · Level 5 restrictions appear to have continued to reduced the spread of cases from Donegal to Sligo.
- Sligo's incidence rate rapidly declined during November while Donegal's fell much slower
- Cases in Sligo have remained low since early November, although a small rise has been observed in recent days

Summary analysis

- A small number of outbreaks have occurred in Sligo since 1 November
- FAI cup quarter finals win for Sligo Rovers (25 Nov) does not appear to have influenced incidence rates
- Incidence rates have been broadly consistent across all three LEAs, but a rise in Sligo-Strandhill observed in the second week in December

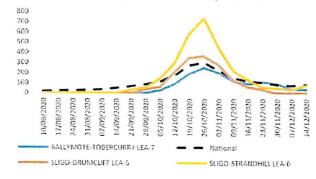
Restriction impact

- Incidence rates were 33% above the national average when Level 5 restrictions were implemented but fell to the national average within 16 days. By the end of November, Sligo's rate was 36% below the national average
- Sligo's incidence rate continued to fall in early until 9 Dec, where it has picked up in recent days. However, Sligo's incidence rate remains at just 50 compared to the national average of 83 (14 Dec)

Notes

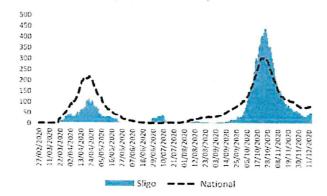
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration

LEA 14 Day Incidence Rate per 100k



Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution

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Outbreak analysis: outbreaks with 5 or more cases CIDR data: 1 NOV to 16 DEC

		21	11		
% of cases linked to outbreak of 5+	National Av	erage	Avg. cas	es per outbreak of 5+	National Average
5%	19%			5.50	12.33
Settings (outbreaks of S	+)		breaks iks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)
			1	6	55%
xtended family			:5	5	45%
Top Outbreak Settin	gs (outbreaks	of 10+)		# cases (outbre	eaks of 10+)

Source: Total cases - HSE Testing and Tracing: Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

Dublin's incidence rate has remained stable since Level 5 restrictions lifted. Hospital settings have resulted in a large numbers of cases

Summary

Dublin profile

 Dublin's incidence rate during the second wave was in line with the national average and continues to track to the national picture

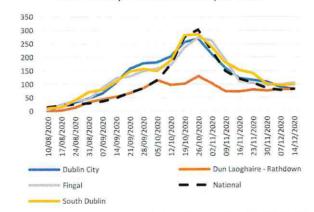
Summary analysis

- The highest incidence rates are in LEAs Balbriggan, Clondalkin, Pembroke, Tallaght South and South East Inner City (24 Nov to 14 Dec)
- Previous Leinster GAA Football Senior Championship Final (Dublin v Meath 21 Nov) and GAA Football All-Ireland Senior Championship Semi-Final (Cavan v Dublin 5 Dec) did not appear to cause a spike in cases. However, the upcoming GAA Football All-Ireland Senior Championship Final (Dublin v Mayo) will be take place on 19 December and will be monitored to see if there is any associated outbreaks
- Outbreaks in hospital and nursing home settings have resulted in 357 and 116 cases respectively.
 There were 39 private house outbreaks between 1 Nov and 16 Dec (25% of total outbreaks of 5+ cases)

Restriction impact

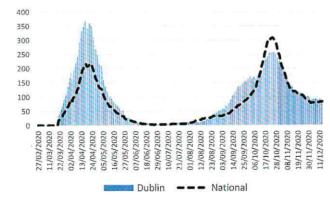
- Dublin's incidence rate has followed the national downward trend following Level 5 restrictions
- At the peak of wave 2 (25 Oct) Dublin's incidence rate was 21% below the national level. This is a contrast to wave 1 in April, where Dublin's incidence rate was far greater than the national level
- Since Level 5 has been lifted, cases have remained in line with the national level

LEA 14 Day Incidence Rate per 100k



Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and

Outbreak analysis: outbreaks with 5 or more cases

100	ui custos z it		01	ick and Trace)	With the Mark				
% of cases linked to outbreak of 5+	National Av	/erage	Avg. cas	es per outbreak of 5+	National Average				
17%	19%			10.91	12.33				
Settings (outbreaks of 5+)	k - "		breaks aks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)				
Hospital			13	357	42%				
Private house		3.	39	212	25%				
Nursing home			5	116	14%				
Workplace			6	39	5%				
School			4	35	4%				
Top Outbreak Setting	s (outbreaks		# cases (outbr	eaks of 10+)					
Hospital	ospital				128				
Nursing home					63				
Hospital			41						

Source: Total cases – HSE Testing and Tracing; Outbreaks – HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

Kilkenny's high incidence rate driven by a significant hospital outbreak, with Castlecomer and Kilkenny LEAs seeing a spike in cases

Summary

Kilkenny profile

- Kilkenny's overall incidence rate has been trending upwards since the end of November and is currently over twice the national average (14 Dec)
- Three of four LEAs are above the national average incidence rate (14 Dec), with Piltown only recently falling back below national levels

Summary analysis

- 41% of Kilkenny's cases were linked to outbreaks of 5+ cases (compared to 19% nationally), with higher average cases per outbreak (17.6), above the national average of 12.33
- This was driven by a large hospital outbreak of 104 cases which occurred from mid-November onwards
- Kilkenny lost in a Leinster hurling semi-final on 28 Nov, but the trend in rising incidence rates appears to have started before this date

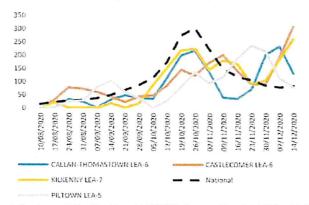
Restriction impact

 Level 5 did not have the same reduction in incidence rates in Kilkenny as in other counties. Kilkenny saw a 39% decrease in incidence rates (from 174 to 106) from 22 Oct to 22 Nov during Level 5 (compared to -65% nationally) in the month following level 5, but has since risen by 81% from 22 Nov to 13 Dec

Notes

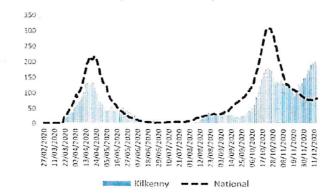
The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration





Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution.

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Outbreak analysis: outbreaks with 5 or more cases CIDR data: 1 NOV to 16 DEC

		38	35		
% of cases linked to outbreak of 5+	National Av	verage	Avg. cas	es per outbreak of 5+	National Average
41%	19%			17.56	12.33
Settings (outbreaks of 5	+)		breaks iks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)
第四部 等			2	113	72%
Private house			3	19	12%
Workplace			2	12	8%
1里11上京艺术			1	9	6%
Extended family			:5	5	3%
Top Outbreak Settin	gs (outbreaks	of 10+)		# cases (outbre	eaks of 10+)
Mary State of the				104	1

Source: Total cases - HSE Testing and Tracing: Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

Louth's current incidence is more than twice the national average

Summary

Louth profile

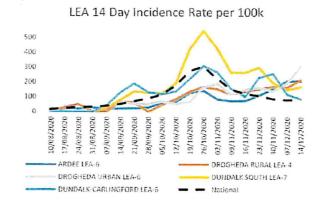
- Louth experienced a similar peak in incidence rates to the national average at the height of the second wave in October
- Louth has seen higher incidence rates since late November, and four of five LEAs are currently above the national levels (as of 14 Dec)
- Louth's northern LEAs that border NI and Louth's southern LEAs have not differed significantly in incidence rates since late November
- Louth's incidence rate is c.2 times the national average (191 vs 83 on 14 Dec)

Summary analysis

- Louth experienced a rise in average close contacts above the national levels at the start of December, while numbers have fallen back in line in recent days (7 day averages to 14 Dec)
- A number of large outbreaks of 5+ cases have occurred since 1 Nov including 70 cases from workplaces, 57 cases from a nursing home, 44 cases from hospitals, and 19 cases each from a school and extended family settings
- Louth's share of cases linked to outbreaks of 5+ cases and average number of cases per outbreak of 5+ cases are higher than the national level
- Several high-profile soccer matches took place throughout November and December, with Dundalk F.C. winning the FAI cup quarter-final, semifinal and final, and playing several European games though there has been no obvious links to recent outbreaks

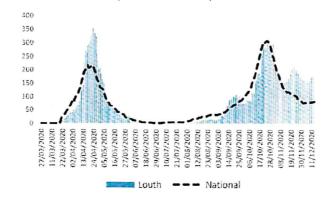
Restriction impact

 Level 5 restrictions appeared effective in reducing incidence rates in October, however cases spiked again in November and are trending upwards since restrictions were relaxed in December



Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Covid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution

Outbreak analysis: outbreaks with 5 or more cases CIDR data: 1 NOV to 16 DEC

			77	ack and Trace)		
K of cases linked to outbreak of 5+	National Av	erage	Avg. cas	es per outbreak of 5+	National Average	
29%	19%			15.27	12.33	
Settings (outbreaks of 5+	,	A 10 (50 To 70)	breaks iks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)	
Workplace			5	70	31%	
MARKET THE STATE OF THE STATE O			1	57	25%	
			3	44	19%	
School			1	19	8%	
Extended family			(5	19	8%	
Top Outbreak Setting	s (outbreaks	of 10+)		# cases (outbre	eaks of 10+)	
and the state of			57			
Workplace		35				
No. 25		33				

Source: Total cases - HSE Testing and Tracing: Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20.1 should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases.

Mayo - cases in Claremorris driving recent rise in incidence rate

Summary

Mayo profile

- Claremorris appears to be the driver of this increase, with an incidence rate of 409 (14 Dec). Incidence rates in the other LEAs are below national levels, with the second highest, Westport, being eight times times lower (14 Dec) than Claremorris
- While cases remained below the national average throughout October and November, cases began to rise during the second weekend in December

Summary analysis

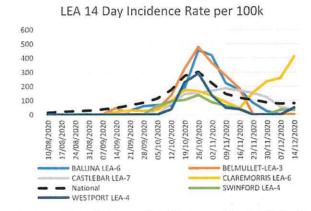
- 41% of Mayo's cases were linked to outbreaks of 5+ cases, over twice as high as the national average 19%). Two large workplace outbreaks in the end of November were responsible for 110 cases (24% of all cases since 1 Nov)
- Mayo's success in the All-Ireland Senior Football Championship, while not appearing to affect cases yet, will need to be monitored over the coming weeks

Restriction impact

- While incidence rates in Mayo rose in the weeks before Level 5 lockdown, they remained below the national average throughout October and November
- Mayo's incidence rate is now 31% above the national average (14 Dec)

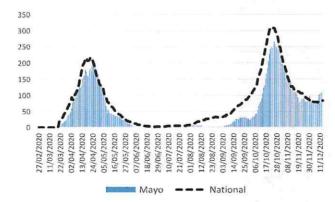
Notes

The restriction impact is based on disease incidence combined with the dates the restrictions are imposed. It is not a measure of compliance or does not take behavioural aspects into consideration



Source: Based on weekly OpenHive data as at 14/12/2020. Government Open Data Initiative. This data is published weekly

14 Day Incidence Rate per 100k



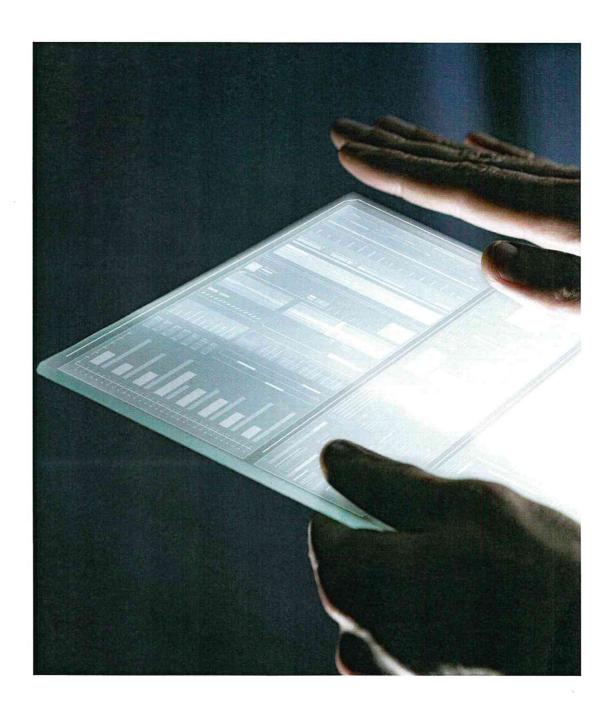
Source: Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily. There have been different levels of Govid-19 testing and testing eligibility between wave 1 and wave 2 and therefore comparisons of incidence rates across both waves should be treated with caution.

Outbreak analysis: outbreaks with 5 or more cases

To	tal Cases 1 N	lov - 16	Dec (Tra	ck and Trace)								
		4	51									
% of cases linked to outbreak of 5+	National A	verage	Avg. case	es per outbreak of 5+	National Average							
41%	19%			14.38	12.33							
Settings (outbreaks of 5-	ь)		breaks aks of 5+)	# cases (outbreaks of 5+)	% of total (outbreaks of 5+)							
Workplace			2	110	59%							
Private house			5	28	15%							
Extended family		- 12	<5	14	7%							
School			2	13	7%							
Community outbreak			2	13	7%							
Top Outbreak Settin	gs (outbreaks	of 10+)		# cases (outbr	eaks of 10+)							
Workplace				65	5							
Workplace				45								

Source: Total cases - HSE Testing and Tracing; Outbreaks - HPSC CIDR data aggregated summary report. Data based on CIDR data as at 16/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases

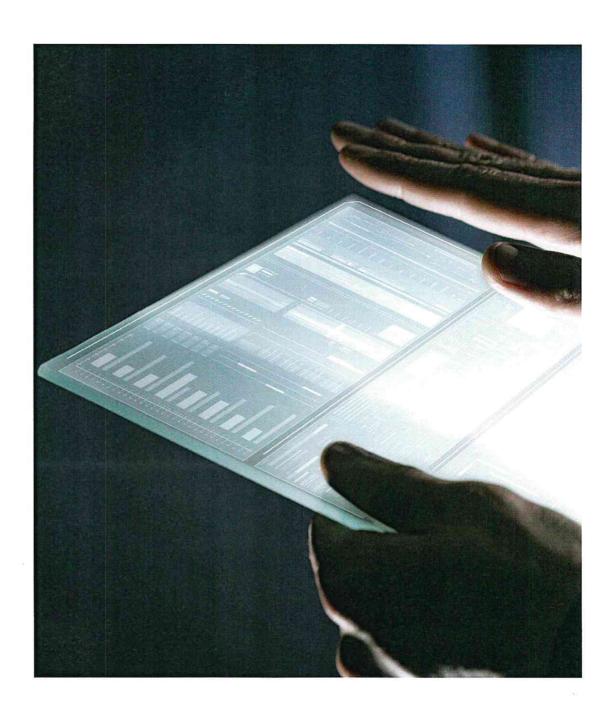
Press briefing stats



Press Briefing Key Statistics 17 Dec 2020

Metric		Key statistic	Notes	Source
Incidence rates and	¥.	The 14-day Incidence rate per 100k population has started to trend upwards, as expected, with the relaxation of Level 5 restrictions (+7% over the five days to 14 Dec)		Based on daily cumulative data from HPSC published on Geohive as at 14/12/2020. This data is published daily.
outbreaks	•	The volume of outbreaks with 5 or more cases has seen a decline over the month of November and early December. The 7-day average in early November was 7 outbreaks per day, in early December this had reduced to 2 outbreaks per day.	Excludes outbreaks of under 5 cases	HSE CIDR and Test Trace shared via HSE IIS on 16 Dec 2020
Dublin City		Mon-Weds morning commuting times were 4% quieter than last week	All city centre counters, 14 - 16 Dec, 6am - 9am	Dublin City Council Dublin City footfall data to 16 Dec
Centre footfall	*	Mon-Weds evenings were 7% busier overall than Mon-Weds last week	All city centre counters, 7pm - 12am, this week: 14 Dec - 16 Dec, last week: 7 Dec - 9 Dec	
rootian	٠	Mon-Weds this week was relatively stable on last week (+2%) all hours	All city centre counters, all day	
Traffic	٠	Traffic volumes so far this week are up c.3% compared to the week prior (Mon - Weds)	All roads; This week 14th-16th Dec; last week 7th-9th Dec)	TII traffic volumes for private cars to 16 Dec
volumes	٠	Between the hours of 8am-8pm traffic volumes around tracked shopping centres rose c.2% compared to the previous week. Year on year the volume is down c.16%. Peak hours for traffic are between 4pm-6pm with the quietest period being 10am - Midday (Mon - Wed)	Shopping centre traffic counters; 8am 8pm; Kildare Village, Mahon Point, Liffey Valley, Blanchardstown; this week 14th-16th Dec; last week 7th - 9th Dec; same week last year 16th- 18th Dec 2019; year on year comparison uses full day volumes	
	٠	Traffic counters near major airports recorded a week on week increase of c.6%; traffic volumes are down c.45% compared to the same week last year (Mon - Wed)	Airport traffic counters; Dublin, Cork, Shannon; This week 14 th -16 th Dec; last week 7 th -9 th Dec; same week last year 16th - 18 th Dec 2019;	
Mobility	٠	Retail and recreation-associated mobility up 8% last week compared to the week before and is now just 17% below baseline, with transit stations increasing 7% in the same time frame, still remaining 38% below baseline.	Average mobility levels for last week: 6 Dec - 13 Dec compared to the week before: 30 Nov - 6 Dec. weekly comparison of average changes relative to baseline.	Google mobility data to 13 Dec. Baseline value is the median value on that day of the week in the 5-week period from 3 Jan - 6 Feb.
Compliance	٠	Mask compliance has remained consistently around 83% since mid November, while the level of close contacts reported (via Facebook survey) has risen from 33% of people reporting one or more close contact on 27 Nov to 40% by 14 Dec, close to levels seen in the days before Level 5 was announced	Facebook survey data as of 17/12	

Additional analysis



We are continuing to monitor recent events to identify any correlation to increases in incidence rates

,								
Past events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10*	Losing county	% change of County incidence rate between day of event and T + 10*	Avg. close contacts in county at T (Day of Event)	% Change in close contacts between day of event + 7 days**
FAI Cup Quarter Finals	20/11/2020	Louth (Dundalk) v Dublin (Bohemians)	Louth (Dundalk)	County change: -10% LEA change* (Dundalk South): - 35%	Dublin (Bohemians)	County change: •14% LEA change* (Cabra-Glasnevin); - 11%	Louth: 2.6 Dublin: 2.1	Louth: -37% Dublin: -32%
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Waterford v Clare	Waterford	-54%	Clare	-48%	Waterford: 1.6 Clare: 0.5	Waterford: +90% Clare: data missing for 29 Nov
GAA Hurling All-Ireland Senior Championship Quarter Final	21/11/2020	Galway v Tipperary	Galway	-28%	Tipperary	-15%	Galway: 7.8 Tipperary: 8.3	Galway: -72% Tipperary: -77%
Ulster GAA Football Senior Championship Final	22/11/2020	Cavan v Donegal	Cavan	-48%	Donegal	16% (1 74° 12° 14° 15° 16° 16° 16° 16° 16° 16° 16° 16° 16° 16	Cavan: 2.8 Donegal: 3.0	Cavan: +82% Donegal: -55%
Munster GAA Football Senior Championship Final	22/11/2020	Cork v Tipperary	Tipperary	-14%	Cork	-36% HERE WITH A	Tipperary: 3.7 Cork: 2.7	Tipperary: -46% Cork: -12%
GAA Hurling All-Ireland Senior Championship Semi Final	28/11/2020	Kilkenny v Waterford	Waterford	-25%	Kilkenny	+45%	Kilkenny: 2.9 Waterford: 3.0	Kilkenny: -54% Waterford: +3%
GAA Hurling All-Ireland Senior Championship Semi Final	29/11/2020	Limerick v Galway	Limerick	-15%	Galway	+20%	Limerick: 1.1 Galway:1.3	Limerick: +92% Galway: +108%
GAA Football All-Ireland Senior Championship Semi-Final	05/12/2020	Cavan v Dublin	Dublin	-2% (T+9 da/s)	Cavan	+98% (T+9 days)	Dublin: 1.76 Cavan: 2.7	Dublin: -1% Cavan: -23%
GAA Football All-Ireland Senior Championship Semi-Final	06/12/2020	Mayo v Tipperary	Мауо	l o be updated once data becomes available	lipperary	l o be updated once data becomes available	Mayo: 4,4 Tipperary: 2	Mayo: -58% Tipperary: 0%
GAA Hurling All-Ireland Senior Championship Final	13/12/2020	Waterford v Limerick	Limerick	To be updated once data becomes available	Waterford	To be updated once data becomes available	Limerick: 4 Waterford: 2.3	To be updated once data becomes available
Upcoming events	Date	Counties involved	Winning county	% change of County incidence rate between day of event and T + 10	Losing county	% change of County incidence rate between day of event and T + 10	Avg. close contacts in county at T (Day of Event)	Change in close contacts
GAA Football All-Ireland Senior Championship	19/12/2020	Mayo v Dublin	твс	To be updated once data becomes available	ТВС	To be updated once data becomes available	To be updated once data becomes available	To be updated once data becomes available

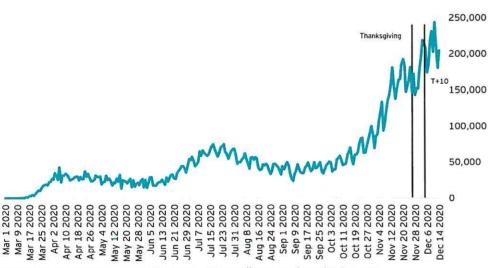
Source: LEA data collected weekly and published from HSPC on GeoHive.
*Change calculated between 23/11 and 30/11 for the respective stadium's LEA **
Source: HSE Testing and Tracing shared via HSE IIS as of 14 Dec 2020

25% increase in hospitalisations since US Thanksgiving

The first signs of a Thanksgiving Covid-19 surge are now being seen across the US with a 7-day moving average of over 200k new cases two weeks after the holiday took place (10 Dec), compared to c.163K the week before Thanksgiving (19 Nov).

The level of new cases in 50% of the 50 states are have increased since the end of November, with a new US peak of 244k new cases reached on 11 December.

US Daily Cases



National: Hospitalization | The COVID Tracking Project

CDC COVID Data Tracker, December 2020.

ttps://www.cdc.gov/coronavirus/2019-ncov/cases-updates/forecasts-cases.html

TSA checkpoint travel numbers for 2020 and 2019. Transportation Security Administration. December 2020

https://www.tsa.gov/coronavirus/passenger-throughput
https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html#al

Kev findings:

- More than 8m Americans flew between 20-28 November (compared to 20m last year) according to the Transportation Security Administration, despite the CDC urging Americans not to travel or spend the holiday with people outside their household
- Almost every state has reported increases in new cases in the first few days of December and there has been a 25% increase in people currently hospitalised since Thanksgiving
- The national ensemble had forecast that the number of new Covid-19 deaths would be 9.5k to 19.5k new deaths and 690k to 1.7m new cases in the week ending 26 December. However, over the last several weeks, there have been more reported cases than predicted, suggesting that the current forecast may be lower than the actual cases that may occur in December
- The worst hit state is currently California where 33.3k new cases were reported on 14 December
- New cases in 25 out of 50 states have increased since 25 November
- Canada also saw an increase of 26.3k cases between 12-22 October following Canadian Thanksgiving on 12 October, compared to an increase of 20.2k cases in the ten days leading up to Thanksgiving

US Covid-19 overview

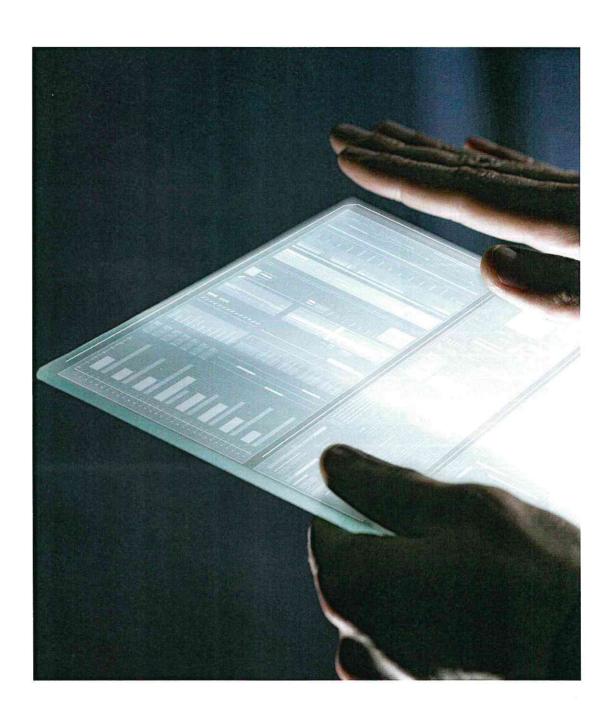
US	New cases	New deaths	Hospitalisations	ICU	Ventilator
26 Nov	128,439	1,387	90,564	18,019	5,986
16 Dec	232,258	3,448	113,090	21,936	7,778

Source: National: Hospitalization | The COVID Tracking Project, 16 December 2020

Specific assets and insights informing how we are performing and identifying future risks

Indicator	Summary	Frequency	Source	Status
Where and how is the disease spreading?				
County incidence rates	Disease incidence rates (County)	Daily	Openhive	
LEA incidence rates	Disease incidence rates (LEA)	Weekly	CSO	
Testing and tracing output	Disease transmission sources and settings	Daily	HSE	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	
What restrictions are in place?				
Current restriction level	Current Government restrictions on place	As relevant	Govt guidelines	
Events tracker	Upcoming and past events	Daily	Online events database	
Are people complying?				
Stay at home index	Trips within and outside counties	Daily	3mobile	
Traffic data	Traffic counter data by vehicle type and road	Daily	TIL	
Dublin footfall	Pedestrian counters for Dublin City Centre	Daily	DCC	
Mobility	Measure of mobility by purpose	Daily	Google, Apple	
Adherence self reporting	Survey responses on mask compliance, close contacts	Daily	Facebook survey	
Garda enforcement	Fixed fine notices for C-19 breaches	TBC	Gardaí	
Outbreaks	Analysis of outbreaks by setting	Daily	CIDR	
Leap card usage	Leap card user data	Daily	NTA	
What impact are the restrictions having?				
Restrictions analysis	Analysis of restrictions on disease incidence	Daily	Openhive	

Appendix



Early warning indicators - overview

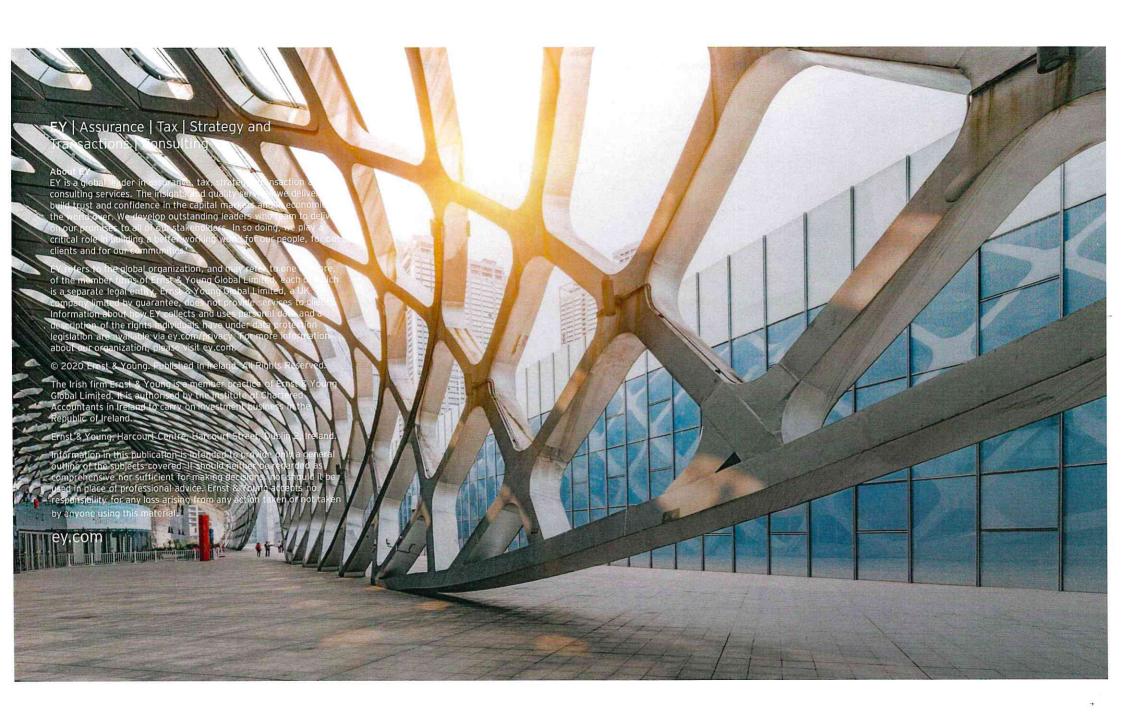
	FINE WELL	Metrics	Notes								
		14 Day Incidence Rate per 100k population	Absolute value - current day								
		Change in 14 Day Incidence Rate per 100k in 14 Days	% change over two weeks								
	INCIDENCE	7 Day Incidence Rate per 100k	Absolute value - current day								
		Change in 7 Day Incidence Rate per 100k in 7 Days	% change over one week								
	TECTING	Testing Positivity Rate	Absolute value on current day								
	TESTING	Change in Testing Positivity Rate in 7 Days	% change over one week								
HEALTH		Number of Outbreaks (5+ Cases)	Absolute value on current day. There are five county buckets based on population size.								
	OUTBREAKS	% of Household Outbreaks	Share of outbreaks of 5+ cases that are occur in households on current day								
		% of Social Outbreaks	Share of outbreaks of 5+ cases that are occur in settings: community outbreaks, Other Recreation Activities, Public House, Religious/Other Ceremonies, Restaurant/Café, Retail Outlet, Social Gathering, Sporting Activity/Fitness								
	ICH CARACITY	ICU Capacity %	Absolute value of currently occupied ICU beds in county hospitals - for counties that do no have hospitals, the nearest county hospital was chosen.								
	ICU CAPACITY	Change in ICU Hospital Occupancy	% change over one week								
	CLOSE CONTACTS	Number of Close Contacts per person last week	Absolute value of close contacts per confirmed Covid-19 case in the week prior								
	CLOSE CONTACTS	Change in Number of Close Contacts per person week before last	% change over one week								
	FOOTFALL	Dublin Footfall - 7 day average	Absolute value of 7-day average on current day								
	FOOTFALL	Change in Dublin Footfall in 7 Days	% change over one week								
MOVEMENT	TRAFFIC	Change in Traffic Volume to bench mark week	% change in county traffic volumes compared to week								
MOVEMENT	TRAFFIC	% Change in Traffic Volumes to Benchmark Week	Measured against a benchmark week and then compared to national average.								
	MODILITY	Google / Apple	Increasing or decreasing mobility relative to baseline								
	MOBILITY	Change in Google / Apple	Change in mobility compared to previous week								
	V.	Facebook Mask Compliance & Social Distancing	Reported compliance last week								
COMPLIANCE	FACEBOOK	Change in Facebook Mask Compliance & Social Distancing in 7 Days	Change in reported compliance on previous week								
	STAY AT HOME	Stay at Home Index	TBC								
	STAT AT HOME	Change in Stay at Home Index	TBC								
EVENTS	EVENTS TRACKER	High Risk Events	Number of high risk events in current month (and two weeks prior)								

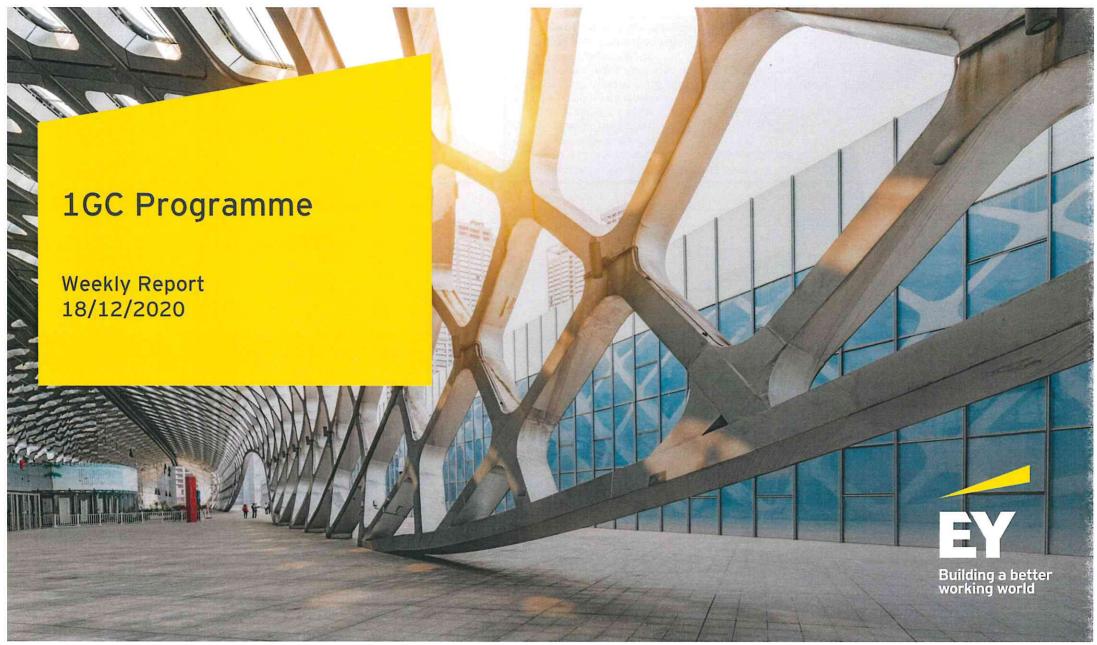
National 7-day incidence rate

		Γ		-																																							
7 Day Incidence Rate Per 100k	Population	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	voN-60	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	Change Last 5 Days
Carlow	56,932	102	123	119	139	116	133	104	79	67	58	61	54	51	47	44	23	30	33	28	26	21	18	21	19	28	37	33	42	44	35	28	25	12	9 -	12	12	14	25	33	40	56	357%
Cavan	76,176	375	365	290	230	179	152	147	139	98	76	75	67	49	43	49	35	22	24	26	22	34	45	42	41	41	34	32	38	35	38	35	28	21	25	24	21	17	16	9	11	13	-38%
Clare	118,817	100	82	78	97	93	82	88	82	61	61	55	40	35	40	45	45	50	50	44	30	26	26	26	23	42	42	42	40	44	26	28	24	23	18	14	11	9	10	13	16	14	31%
Cork	542,868	115	99	105	97	102	114	117	108	102	95	90	64	54	51	48	40	42	35	27	19	20	21	24	26	29	30	27	30	33	33	35	34	28	30	25	20	19	18	13	11	9	-54%
Donegal	159,192	113	122	142	143	114	114	116	107	92	106	107	81	66	98	90	102	130	133	99	90	107	85	89	97	102	80	89	89	81	88	80	66	75	72	70	70	77	77	77	74	85	23%
Dublin	1,347,359	83	80	84	83	82	83	87	85	73	68	77	66	60	62	63	44	51	46	43	34	38	34	40	43	45	42	41	42	41	43	46	45	37	34	34	29	29	32	34	31	31	5%
Galway	258,058	149	147	148	141	119	93	93	79	74	59	63	43	41	35	40	36	37	24	17	14	19	22	31	36	36	31	33	24	20	17	15	10	10	9	12	10	14	16	24	27	27	156%
Kerry	147,707	95	91	101	94	93	93	79	59	49	43	41	31	37	66	65	71	79	69	39	43	31	25	24	30	24	24	24	24	20	19	17	14	13	12	11	14	14	14	14	15	14	5%
Kildare	222,504	107	104	101	92	84	91	90	82	62	63	52	44	33	40	34	28	33	28	25	25	28	25	35	34	37	35	33	34	31	28	32	29	20	20	20	13	13	18	18	18	19	43%
Kilkenny	99,232	50	55	50	57	55	55	46	43	34	30	42	45	51	56	53	57	57	54	49	51	30	28	30	28	30	36	41	40	37	37	33	44	43	42	62	61	49	53	63	54	62	2%
Laois	84,697	97	80	86	80	77	70	74	65	55	50	63	59	51	52	63	51	63	64	64	51	48	27	28	30	24	18	19	15	12	18	18	19	18	18	19	22	25	27	25	20	19	-16%
Leitrim	32,044	81	78	72	59	47	22	9	6	3	6	9	9	6	6	3	9	22	28	28	37	37	53	47	56	56	47	25	31	22	12	12	6	0	0	0	3	3	3	3	6	6	100%
Limerick	194,899	114	105	91	100	92	97	100	94	74	82	74	61	56	76	67	59	81	84	69	74	79	72	74	76	97	103	96	86	82	54	48	42	41	47	49	47	50	50	52	50	45	-4%
Longford	40,873	117	95	83	76	86	69	73	71	73	76	66	59	42	49	39	37	46	46	34	34	37	29	37	37	37	32	27	17	24	22	27	29	34	39	39	39	34	34	29	29	27	-31%
Louth	128,884	137	151	116	96	74	94	96	99	82	87	70	64	47	50	42	43	36	36	36	49	63	69	74	82	73	64	68	74	78	85	85	81	75	67	60	60	50	50	46	47	39	-35%
Mayo	130,507	116	114	105	96	86	70	58	60	73	64	67	65	61	41	54	67	65	60	50	37	18	25	29	30	27	31	28	26	34	34	34	38	35	29	34	29	21	21	25	23	41	42%
Meath	195,044	248	260	173	156	116	130	133	133	107	107	85	72	57	69	70	62	53	46	35	31	38	42	43	39	52	46	50	56	68	53	51	36	26	18	15	18	17	23	18	19	15	-17%
Monaghan	61,386	161	156	125	116	98	85	78	67	59	52	44	46	31	34	49	54	49	47	47	31	28	42	46	44	36	34	18	23	31	41	46	49	42	36	29	24	18	18	34	34	37	53%
Offaly	77,961	82	69	65	50	56	49	51	50	51	38	38	32	14	14	21	13	33	37	35	47	49	40	47	68	51	55	49	45	26	24	19	15	8	6	6	9	13	18	22	19	19	114%
Roscommon	64,544	95	98	113	96	74	65	51	51	40	51	81	85	85	85	81	46	37	29	54	46	53	60	54	45	51	79	84	87	73	65	34	29	20	15	15	12	14	17	17	20	26	113%
Sligo	65,535	197	172	165	172	137	102	96	76	60	63	75	76	72	73	61	50	50	46	32	37	40	27	29	23	24	17	24	21	32	31	29	29	26	15	12	15	11	14	17	15	15	0%
Tipperary	159,553	40	36	45	49	47	50	52	38	43	54	51	49	53	46	39	34	37	36	38	38	37	33	41	31	38	46	43	38	38	26	19	16	22	23	33	33	34	29	31	31	30	-8%
Waterford	116,176	71	87	87	95	90	82	73	64	69	53	60	54	49	45	46	49	38	37	32	40	25	59	74	80	89	102	71	59	51	43	31	28	26	19	18	22	34	33	34	28	25	16%
Westmeath	88,770	212	193	184	116	124	108	92	104	82	64	87	96	75	79	71	37	38	34	27	30	38	28	48	56	48	51	55	35	24	25	14	9	8	8	9	8	11	9	9	8	9	14%
Wexford	149,722	100	104	80	74	70	43	51	44	37	33	35	19	17	27	22	21	22	24	12	14	11	11	11	15	15	16	13	16	15	14	15	14	11	6	7	5	5	4	5	8	9	63%
Wicklow	142,425	46	46	49	49	48	40	44	39	38	40	34	26	24	27	20	18	31	27	19	39	42	34	41	48	27	25	22	20	23	27	25	29	31	27	29	32	30	44	43	38	54	71%
National	4,761,865	79	73	71	71	61	60	58	54	54	56	53	57	59	60	60	57	55	54	50	47	44	42	40	38	37	38	39	39	36	38	42	42	41	39	39	41	42	38	41	42	44	6%

Disclaimer

- In carrying out our work and preparing our presentation, we have worked solely on the instructions of The Department of An Taoiseach and for The Department of An Taoiseach purposes. It should not be provided to any third party without our prior written consent. Our presentation may not have considered issues relevant to any third parties, any use such third parties may choose to make of our presentation is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use
- You have asked us to report to you in a presentation format, which is inevitably briefer than a full written report. Consequently, there will be some information which may have been of interest to you which will not be provided to you, and you accept that we will be using our judgement when determining the content of the presentation
- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information





1GC Status Report (18/12/2020)



Reason for Status (if not GREEN)

- · DPIA: Awaiting HSE feedback and sign off
- · Phase 2 SoW pending signature

Milestone	Status	Date Last Period	Due Date
Use Case Prioritisation (Weekly)		25/12	25/12
1GC Briefing Pack (as required)		25/12	25/12
Social Distancing Index decision		N/A	N/A
Deploy 1GC Azure Environment		11/12	TBC
Complete 1GC DPIA		11/12	11/12

Key Achievements

- Delivered 1GC briefing to DoT (18/12)
- Presented Press briefing insights to the DoT press team (15/12 & 17/12)
- Development environment signed off by 1GC team with HSE (16/12)
- Data pipelines from IIS environment configured (17/12)
- Commenced development of county early indicator analysis (threshold indicator)
- Updated county analysis
- Updated close contact and outbreak analysis
- Held meeting with garda to discuss breach data (16/12)

Items for Attention

Highlights / Risks / Issues / Decisions

- Decision and sign off on proposed insight governance
- DPIA sign off (including Data & Platform Owner decisions)
- HSE to sign phase 2 SOW
- ► Dept of Health sign off required for Stay at Home data, awaiting confirmation from Miuris O'Connor (yet to receive underlying data)

Planned Activities / Forward Look

- Refresh DoT press briefing statistics to DoT press team (22nd Dec)
- Deliver 1GC ad-hoc analysis (21st Dec) and regular briefing content (23rd Dec)
- HSE to sign phase 2 SoW
- · 1GC team to draft phase 3 SoW
- · Receive and commence analysis of spend data
- Industrialise data pipelines
- Assist with deployment & validation of the Test environment (Jan '21)
- Commence industrialisation of early indicator analysis
- Update county analysis
- Update close contact and outbreak analysis
- Receive Stay at Home Index data

1GC Detailed Update

Area	Achievements	Forward Look
Governance	Achievements Delivered 1GC briefing to DoT (18/12) Presented Press briefing insights to the DoT press team (15/12 & 17/12)	Forward Look Refresh DoT press briefing statistics to DoT press team (22nd Dec) Deliver 1GC briefing (23rd Dec) HSE to sign phase 2 SoW 1GC team to draft phase 3 SoW Receive and commence analysis of spend data
1GC Azure Build	Achievements • Development environment signed off by 1GC team with HSE (16/12) • Data pipelines from IIS environment configured (17/12)	Forward Look Industrialise data pipelines Assist with deployment & validation of the Test environment (Jan '21)
Data & Insights	Achievements Developed county early indicator analysis (threshold indicator) Updated county analysis Updated close contact and outbreak analysis Held meeting with garda to discuss breach data (16/12)	Forward Look Commence industrialisation of early indicator analysis Update county analysis Update close contact and outbreak analysis Receive Stay at Home Index data

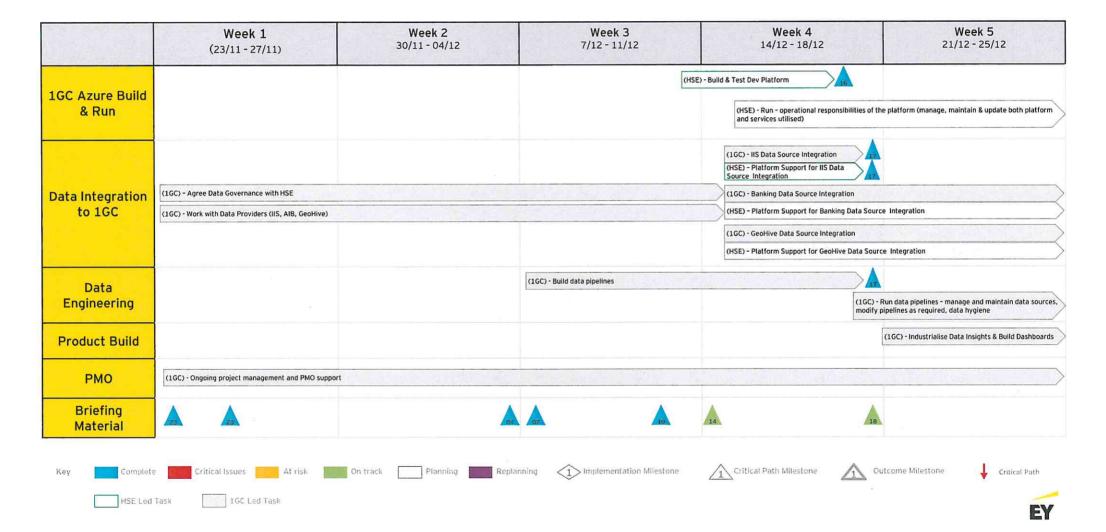
1GC Resource Tracker

ea	Team Member	Role	Last Week (Days)	Next Week Forecast (Days)
	Paul Pierotti	Responsible Executive	5	3
Governance	Emmanuel Adeleke	Programme Manager and Stakeholder Engagement Lead	5	3
	Emma O' Sullivan	Programme Office	5	3
	Nigel Foley	Delivery Lead	4	0
1GC Azure Build	Paul Browne	Cloud Engineer	5	3
Azure Bullu	Szabolcs Bencsik	Data Engineer	5	3
	Cillian Leonowicz	Insight Design Lead	3	0
	Nikunj Maheshwari	Data Scientist	5	0
	Graham Catchpole	Senior Data Analyst	2.5	0
	Ross Morrison	Data Engineer	0	0
	Rory Murphy	Data Analyst	most in 115 minutes	1
	Fiona Murphy	Data Scientist	5	3
Data & Insights	Eve Bannon	Senior Data Analyst	5	2
	John Hallahan	Op Model Design Manager	5	0
	Cillian Bisset	Data Analyst	5	3
	Nitin Goutham	Data Engineer	4	2
	Kenny Hazlett	Data Engineer	5	1
	Jamie McIlveen	Data Analyst	5	3
	Jason Guy	Data Protection	1	1



1GC Plan on a Page - Phase 2

Draft Pending Key Planning Decisions



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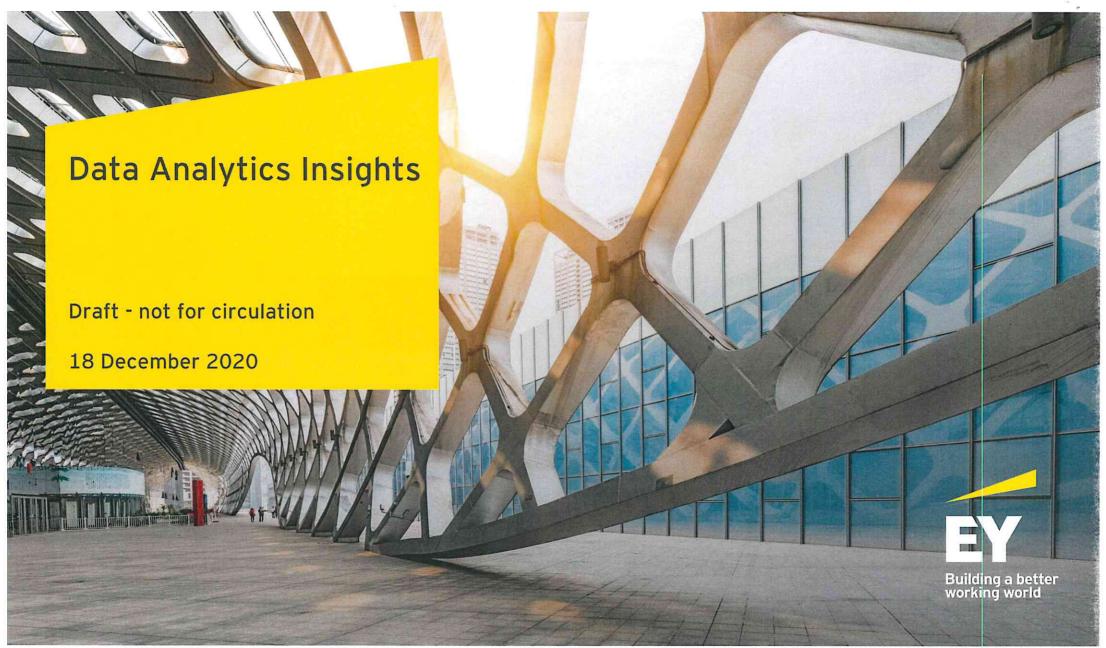
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Health metrics - October and today

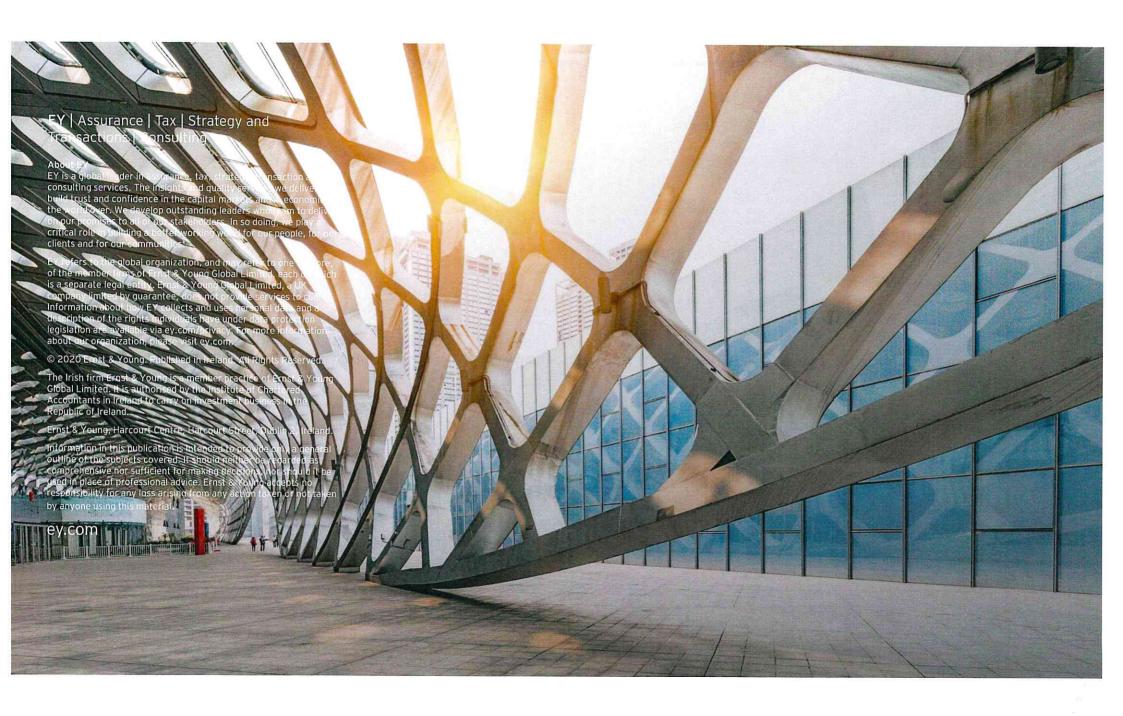
	Level 5 restriction	s implemented - 21 Oct	Today	- 15 Dec
Metric	7-day average rate	% change over previous week	7-day average rate	% change over previous week
New daily cases	1,151	+27%	329	+24%
New daily deaths	5	+75%	4	-32%
New daily ICU cases	3	-17%	2	+7%
14-day Incidence rate*	302	+46%	85	+9%
New daily outbreaks/clusters	105	+56%	37	-31%

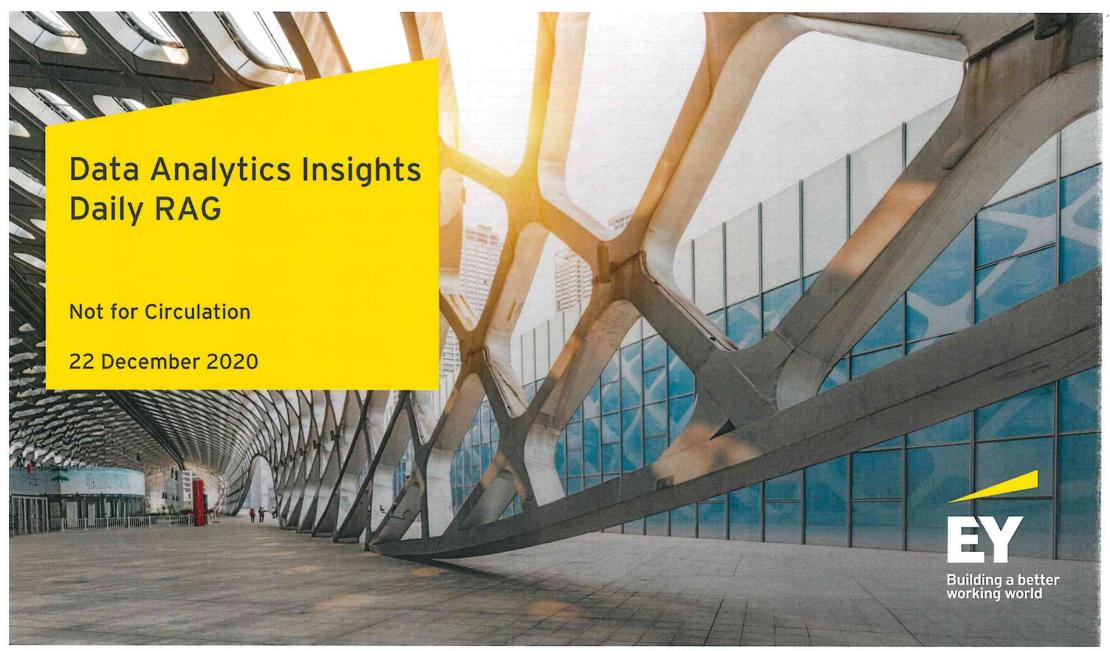
Source: HPSC Epidemiology of COVID-19 in Ireland daily reports, Level 5: 7-day average to 21 Oct; % change between 21 Oct 7-day average and 14 Oct 7-day average Today: 7-day average to 15 Dec; % change between 8 Dec 7-day average and 15 Dec 7-day average

^{*14-}day incidence rate on 21 Oct and 15 Dec based on daily cumulative data from HPSC published on Geohive, % change between 14 Oct rate and 21 Oct rate, and between 8 Dec rate and 15 Dec rate Note: Considers all outbreaks/clusters which may be outbreaks/clusters of one or more cases

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- The information in this presentation pack will have been supplemented by matters arising from any oral presentation by us, and should be considered in the light of this additional information



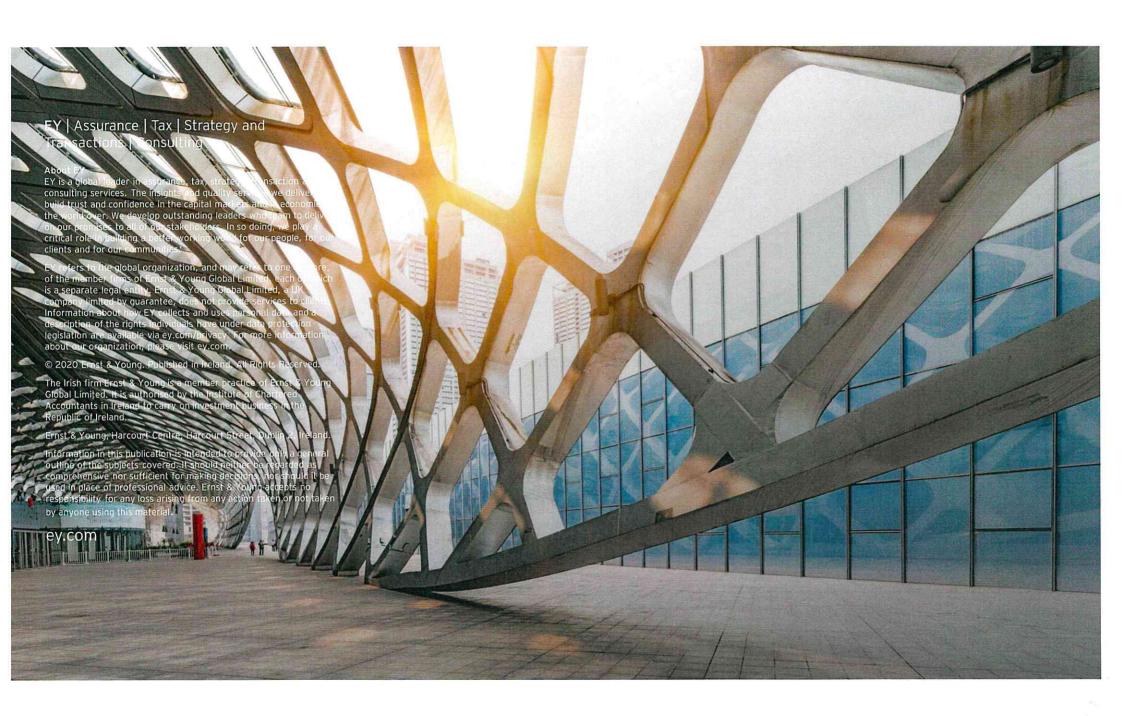


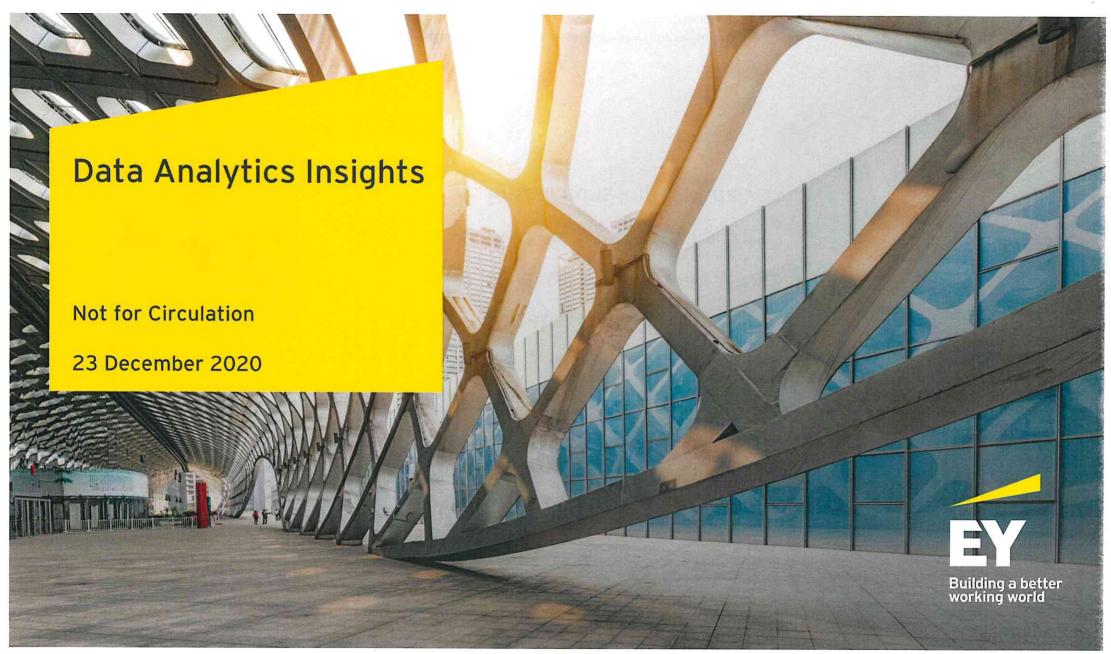
Daily RAG

		HEALTH			RESTRICTIONS	MOVE	MENT	COMPLIANCE	EVENTS
County	14 Day Incidence Rate per 100k	5 Day Incidence Rate per 100k	ICU Capacity %	Graph in a cell for 5 Day Incidence Rate	Change in 5 Day Rate Since most recent change in restrictions	% Change in traffic volume to benchmark Week (28th Sep - 4th Oct)	Change in Google / Apple	Change in Facebook Mask Compliance in last 7 days (30th Nov - 6th Dec)	Number of High Risk Events (Also Weighted by Event Size)
Last Update	22/12/2020	22/12/2020	22/12/2020	From 01/10/2020 to 19/12/2020 (updated 22/10/2020)	15/12/2020	Week Ending 20th Dec	Week Ending 18th Dec vs Week Ending 11th Dec	13/12/2020	December
Carlow	191.46	82.55	66.7%		38%	9.4%	2%	NA	1
Cavan	174.60	86.64	28.6%		74%	8%	4%	NA	1
Clare	26.93	13.47	50.0%	/~~~~	60%	0%	4%	NA	0
Cork	51.03	35.37	72.8%		433%	5%	3%	-3%	4
Donegal	261.95	118.72	62.5%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	93%	22%	1%	4%	0
Dublin	124.47	70.43	70.6%	~~~~	146%	14%	4%	1%	14
Galway	53.09	19.76	55.6%		0%	3%	5%	7%	11
Kerry	108.32	81.92	36.4%		1412%	-5%	2%	-17%	1
Kildare	84.94	40.00	75.0%		112%	20%	5%	-5%	3
Kilkenny	195.50	62.48	66.7%	~~~~~	-13%	8%	4%	NA	2
Laois	174.74	90.91	100.0%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	126%	20%	3%	NA	3
Leitrim	24.97	12.48	50.0%	~~~~~	100%	17%	0%	NA	0
Limerick	150.33	77.48	81.8%	~~~~	125%	14%	4%	NA	3
Longford	141.90	41.59	25.0%	~~~~	-37%	9%	0%	NA	0
Louth	235.87	103.19	88.9%		51%	11%	2%	13%	4
Mayo	118.00	36.78	62.5%	_^~~	-26%	0%	6%	NA	3
Meath	106.64	64.60	60.0%	_~	152%	9%	2%	1%	8
Monaghan	123.81	65.16	28.6%	~~~~~	82%	12%	3%	NA	0
Offaly	66.70	25.65	85.7%	~~~~	150%	33%	6%	NA	5
Roscommon	48.03	20.14	75.0%	-mm-	0%	7%	-7%	NA	0
Sligo	93.08	54.93	50.0%		177%	4%	3%	NA	1
Tipperary	65.81	21.31	60.0%	-mm-m-	-13%	11%	5%	NA	3
Waterford	105.01	44.76	90.0%	_~~~	30%	1%	-1%	1%	4
Westmeath	42.81	16.90	25.0%		67%	13%	6%	NA	6
Wexford	168.98	126.90	60.0%		692%	3%	2%	NA	1
Wicklow	63.89	25.98	70.6%	mm	37%	5%	4%	-3%	4
National	111.57	58.23	69.2%		115%	11%	6%	0%	

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Week 10 Update

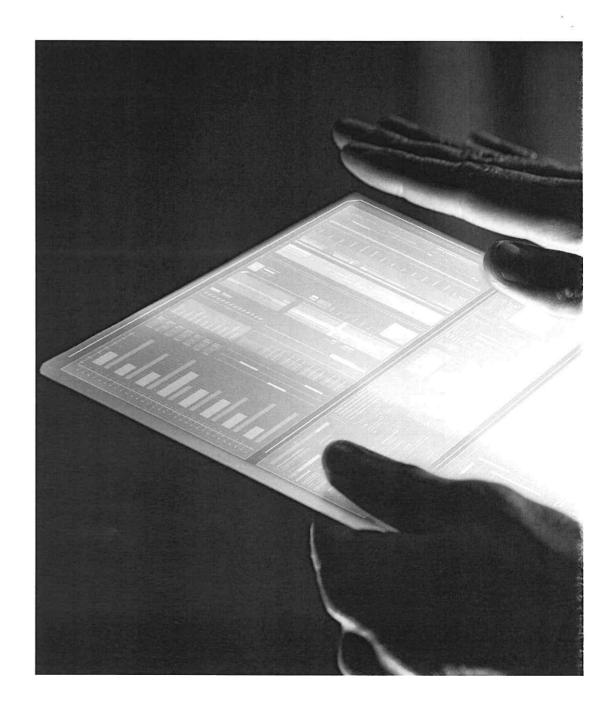
Agenda





- Early warning indicators
- Update since Leaving Level 5
- Analysis of outbreaks with 5 or more cases
- Banking payments insights
- Restrictions Impact Analysis

Early warning indicators

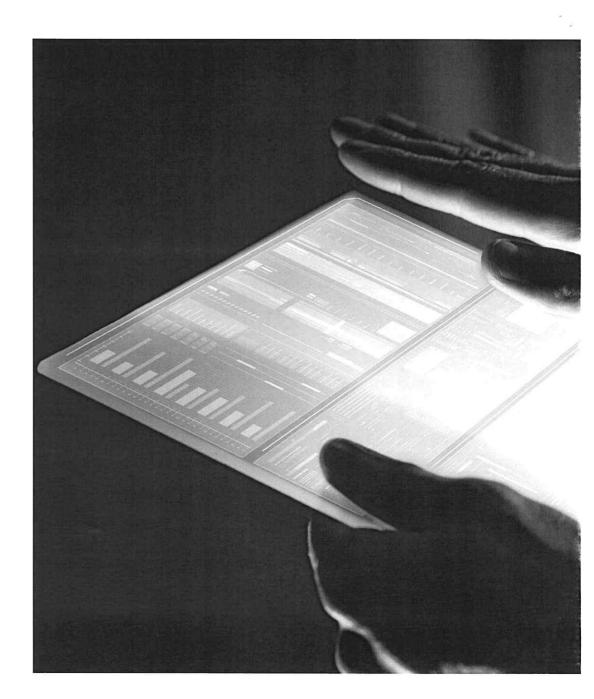


Daily RAG

		HEALTH			RESTRICTIONS	MOVE	MENT	COMPLIANCE	EVENTS
County	14 Day Incidence Rate per 100k	5 Day Incidence Rate per 100k	ICU Capacity %	Graph in a cell for 5 Day Incidence Rate	Change in 5 Day Rate Since most recent change in restrictions	% Change in traffic volume to benchmark Week (28th Sep - 4th Oct)	Change in Google / Apple	Change in Facebook Mask Compliance in last 7 days (30th Nov - 6th Dec)	Number of High Risk Events (Also Weighted by Event Size)
Last Update	23/12/2020	23/12/2020	23/12/2020	From 01/10/2020 to 20/12/2020 (updated 23/10/2020)	23/12/2020	Week Ending 20th Dec	Week Ending 18th Dec vs Week Ending 11th Dec	23/12/2020	December
Carlow	186.19	82.55	66.7%		38%	9.4%	2%	NA	1
Cavan	177.22	59.07	28.6%		18%	8%	4%	NA	1
Clare	31.98	20.20	50.0%		140%	0%	4%	NA	0
Cork	57.66	40.34	81.8%		508%	5%	3%	-4%	4
Donegal	272.63	114.96	50.0%	January Marine	87%	22%	1%	6%	0
Dublin	141.98	83.50	72.1%	~~~~	192%	14%	4%	2%	14
Galway	52.70	22.09	48.3%		12%	3%	5%	9%	11
Kerry	123.89	87.34	27.3%		1512%	-5%	2%	-16%	1
Kildare	90.34	42.25	75.0%		124%	20%	5%	-5%	3
Kilkenny	225.73	97.75	66.7%	- January	37%	8%	4%	NA	2
Laois	174.74	76.74	50.0%	sufference of	91%	20%	3%	NA	3
Leitrim	28.09	9.36	50.0%	~~~	50%	17%	0%	NA	0
Limerick	164.19	88.76	90.9%	~~~~	158%	14%	4%	NA	3
Longford	139.46	31.81	50.0%	~~~~	-52%	9%	0%	NA	0
Louth	241.30	100.87	66.7%	~~~~~	48%	11%	2%	11%	4
Mayo	112.64	21.45	62.5%	~~~	-57%	0%	6%	NA	3
Meath	120.49	72.80	60.0%	_~~	184%	9%	2%	0%	8
Monaghan	149.87	79.82	28.6%	~~	123%	12%	3%	NA	0
Offaly	57.72	15.39	71.4%	-	50%	33%	6%	NA	5
Roscommon	55.78	24.79	62.5%	-mm	23%	7%	-7%	NA	0
Sligo	103.76	61.04	50.0%		208%	4%	3%	NA	1
Tipperary	65.81	21.94	80.0%		-10%	11%	5%	NA	3
Waterford	106.73	57.67	90.0%	_~~~	68%	1%	-1%	0%	4
Westmeath	39.43	15.77	50.0%		56%	13%	6%	NA	6
Wexford	199.70	146.94	60.0%	J~~	817%	3%	2%	NA	1
Wicklow	67.40	30.19	72.1%	~~~~~	59%	5%	4%	-4%	4
National	121.61	64.37	69.7%		138%	11%	6%	0%	

Data analytics briefing - 23 December 2020 - DRAFT - Not for circulation

Update since Leaving Level 5



Summary of county-level 14 day incidence rate per 100k

The heatmap below shows the 14 day incidence rate per 100k population for each county over the last 6 weeks.

Two Weekly Incidence Rate Per 100k	Population	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	Change Last 5 Days
Carlow	56,932	105	95	98	91	88	72	77	81	86	88	84	76	72	70	70	76	70	65	76	76	79	93	93	88	95	107	116	121	125	137	160	162	162	167	165	151	144	167		191	300	23%
Cavan	76,176	133	119	112	102	108	98	87	95	97	95	101	100	98	92	97	91	76	74	67	66	67	58	51	56	56	58	59	58	59	67	75	92	104	106	114	147	152	150	160	175	177	21%
Clare	118,817	122	109	104	104	93	109	111	112	104	93	91	89	86	83	80	79	74	69	71	51	53	46	42	39	35	35	35	32	32	32	35	34	31	27	23	24	25	26	28	27	32	36%
Cork	542,868	143	119	108	102	89	83	86	82	81	73	77	78	81	81	84	82	77	76	73	68	63	59	52	49	43	38	35	35	28	27	25	23	26	25	25	28	34	38	46	51	58	109%
Donegal	159,192	273	281	271	272	275	269	281	293	263	266	254	231	227	239	248	217	215	215	220	222	211	212	213	210	217	224	232	220	226	230	229	216	219	225	236	243	246	244	250	262	273	12%
Dublin	1,347,359	151	142	134	139	136	119	118	115	119	114	118	114	114	113	114	113	108	104	102	102	102	98	90	88	93	93	92	93	93	90	90	91	93	91	91	97	104	113	112	124	142	46%
Galway	258,058	108	97	86	83	86	80	84	78	71	66	62	62	63	65	62	54	51	46	44	50	50	45	46	50	51	51	55	56	59	60	65	61	61	54	49	51	51	48	51	53	53	4%
Kerry	147,707	139	129	128	128	127	123	122	115	86	83	71	60	60	60	51	51	48	50	44	41	43	38	36	34	30	32	28	29	26	24	21	20	21	31	32	41	58	78	91	108	124	205%
Kildare	222,504	103	94	85	93	89	88	85	86	87	86	87	84	87	82	81	79	72	65	65	62	61	58	49	49	51	48	49	52	51	53	54	55	56	59	64	67	70	78	77	85	90	34%
Kilkenny	99,232	130	125	126	129	126	118	116	116	113	110	98	92	106	107	101	130	125	125	132	134	148	146	148	151	162	173	172	179	192	177	198	194	201	200	191	199	190	193	201	196	226	14%
Laois	84,697	155	149	136	136	137	116	107	104	99	86	83	63	59	53	53	53	58	55	51	54	55	58	54	60	65	66	66	67	64	59	76	81	103	109	112	125	152	152	155	175	175	40%
Leitrim	32,044	47	56	81	81	87	94	94	100	106	106	97	84	78	78	69	59	34	34	25	16	19	16	9	12	16	19	19	19	19	22	19	22	28	28	25	28	28	25	25	25	28	0%
Limerick	194,899	198	195	195	211	201	222	238	236	221	216	217	205	194	192	189	187	180	170	166	143	134	129	128	136	143	135	134	134	131	122	119	119	126	121	122	123	129	131	122	150	164	34%
Longford	40,873	132	127	115	115	103	103	100	100	83	88	88	81	83	83	93	91	91	81	81	86	88	91	95	91	88	91	88	91	76	81	113	120	142	132	130	135	147	144	142	142	139	4%
Louth	128,884	157	156	147	151	151	160	157	168	174	186	202	206	213	213	204	199	196	189	182	177	182	168	163	162	158	155	154	155	153	159	159	173	176	175	192	209	207	223	216	236	241	16%
Mayo	130,507	151	145	141	118	113	110	110	109	103	93	77	79	87	88	86	93	84	79	80	84	85	97	90	83	83	79	74	75	76	76	100	103	107	109	109	107	114	115	113	118	113	6%
Meath	195,044	172	154	141	140	133	139	128	134	127	131	131	126	124	118	118	108	103	98	102	85	80	68	62	48	49	45	44	46	44	49	45	52	54	54	57	60	64	85	91	107	120	101%
Monaghan	61,386	122	116	117	124	112	114	104	104	112	94	101	101	106	108	99	103	83	78	81	98	103	103	109	116	124	127	119	117	122	129	137	137	135	116	129	135	134	132	121	124	150	11%
Offaly	77,961	99	94	87	95	114	112	117	122	126	119	123	103	100	99	78	81	72	65	49	49	45	42	35	37	51	59	67	67	71	67	68	64	72	68	74	82	94	90	74	67	58	-30%
Roscommon	64,544	170	175	163	166	169	141	169	161	167	161	160	166	161	133	130	122	118	121	105	96	64	60	57	53	54	50	43	50	51	53	56	50	50	50	48	43	48	50	48	48	56	29%
Sligo	65,535	154	154	140	128	114	104	95	93	76	85	84	73	76	70	64	56	61	58	61	56	55	52	52	44	40	38	32	32	32	35	41	41	50	49	50	52	52	66	72	93	104	100%
Tipperary	159,553	118	113	117	114	101	105	110	107	106	100	97	92	86	90	85	93	92	80	87	79	79	78	75	79	86	86	88	80	79	78	77	78	82	80	71	70	73	70	63	66	66	-5%
Waterford	116,176	134	114	142	141	156	163	163	164	155	161	157	156	154	149	140	150	118	114	102	85	75	72	71	65	62	61	71	71	77	80	80	71	71	77	77	75	79	87	91	105	107	43%
Westmeath	88,770	151	162	133	150	150	113	117	113	106	103	100	92	88	87	80	71	72	51	39	41	28	26	23	25	25	23	26	23	21	19	27	25	27	26	34	33	33	33	34	43	39	21%
Wexford	149,722	67	48	49	49	49	47	45	46	37	42	39	37	36	36	34	36	32	30	25	23	28	27	22	18	19	19	19	19	23	24	26	30	37	45	47	59	89	127	146	169	200	240%
Wicklow	142,425	89	86	84	85	85	82	86	83	78	88	91	80	84	90	77	79	78	74	85	93	91	110	109	107	116	121	121	118	112	114	112	110	97	93	93	77	79	72	64	64	67	-13%
National	4,761,865	142	133	127	128	124	117	118	117	114	111	111	106	107	106	104	102	97	93	91	88	86	84	79	77	80	79	79	79	78	78	80	80	83	82	83	87	93	100	101	112	122	39%

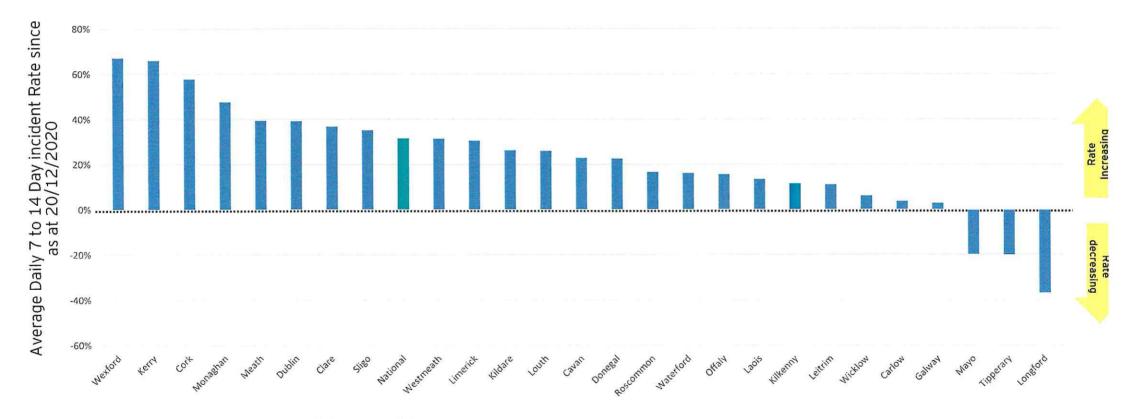
Summary of county-level 7 day incidence rate per 100k

The heatmap below shows the 7 day incidence rate per 100k population for each county over the last 6 weeks.

7 Day Incidence Rate Per 100k	Population	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec	08-Dec	09-Dec	10-Dec		12-Dec	2 .	14-Dec	ים-ני	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	Change Last 5 Days
Carlow	56,932	40	30	33	35	28	35	39	40	56	54	49	47	37	32	30	19	16	16	28	39	47	63	74	72	79	79	77	74	61	63	8 8	3 8	13 9	0	91 9	0	81	79	104	109	97	8%
Cavan	76,176	37	42	49	51	55	54	50	58	55	46	50	45	45	42	39	35	30	24	22	21	25	18	16	26	33	35	38	33	41	51	19 5	9 (8 6	В	81 10	16	101	101	101	106	109	2%
Clare	118,817	60	51	40	39	35	52	50	52	53	52	52	55	34	34	28	26	22	17	16	18	19	19	16	17	19	19	17	13	13	16	18 1	5	3 1	0	10 1	0	9	8	13	14	22	117%
Cork	542,868	41	37	32	33	29	35	41	41	43	41	44	49	46	41	43	38	37	31	24	22	22	16	14	13	12	13	13	13	12	13	13 1	1 :	2 1	2	13 1	5	21	25	34	39	45	198%
Donegal	159,192	147	143	148	138	122	117	7 125	146	119	119	116	108	110	114	102	98	97	99	112	112	97	111	115	113	118	112	119	123	115	115 1	16 9	8 1	07 10	6 1	12 1	28	131	128	152	155	167	30%
Dublin	1,347,359	56	56	53	59	54	55	56	59	63	61	59	59	59	57	54	50	48	45	43	43	44	44	39	40	48	50	48	48	49	51	50 4	3 /	13 4	3	43 4	8	53	63	69	82	99	106%
Galway	258,058	29	31	29	35	38	41	45	48	40	36	26	24	22	19	13	15	14	19	20	27	31	32	31	35	31	31	28	25	27	29	30 3	0 :	10 2	6	24 2	4	22	18	21	23	27	13%
Kerry	147,707	81	53	53	39	35	37	39	34	32	30	32	25	23	22	18	18	18	18	19	18	21	20	18	16	12	13	10	8	6	7	5 7		8 2	1	24 3	5	51	72	83	100	103	198%
Kildare	222,504	39	35	39	46	40	48	45	47	52	47	41	43	39	36	34	27	25	24	22	23	25	24	22	24	27	26	26	27	27	31	30 2	8	10 3	3	37 4	1	39	48	49	55	57	40%
Kilkenny	99,232	69	56	57	46	43	44	43	47	56	52	51	48	61	63	53	74	73	74	84	73	85	93	75	79	89	90	100	95	100	103 1	19 10	6 1	11 10	10	97 9	9	88	75	95	85	126	28%
Laois	84,697	78	77	58	55	44	38	31	26	22	28	27	19	21	22	27	31	30	28	32	33	33	31	24	31	37	34	33	34	33	35	15 4	5 (8 7	6	78 9	2	117	107	110	106	99	8%
Leitrim	32,044	37	47	75	66	62	66	66	62	59	31	31	22	12	12	6	0	3	3	3	3	6	9	9	9	12	16	16	12	9	12	9 9		2 1	2	12 1	9	16	16	16	12	16	-17%
Limerick	194,899	108	99	106	115	101	122	2 133	128	122	110	102	105	72	59	61	65	70	68	61	71	75	68	63	66	74	74	64	59	63	59	53 4	4 !	2 5	7	63 6	.0	70	79	78	99	107	79%
Longford	40,873	59	49	49	54	44	49	46	42	34	39	34	37	34	37	51	56	51	46	44	51	51	39	39	39	42	46	37	39	37	42	73 7	8	5 9	5	91 9	8	105	71	64	46	44	-55%
Louth	128,884	68	77	81	86	97	109	5 106	99	97	106	116	109	108	108	105	102	91	73	73	69	74	63	61	71	85	82	85	81	90	98	88 8	8 !	4 8	9 1	10 1	19	109	135	128	142	152	28%
Mayo	130,507	69	58	48	37	36	36	39	40	44	45	41	43	51	49	46	48	38	38	37	32	36	51	42	44	44	42	41	39	25	34	56 5	8 (5 6	7	70 8	1	80	59	54	53	45	-44%
Meath	195,044	59	54	56	55	49	65	66	75	73	75	75	77	59	52	44	35	28	23	24	26	28	24	27	20	26	21	18	17	19	23	25 2	6	14 3	6	39 4	1	42	60	65	73	84	108%
Monaghan	61,386	62	62	55	55	51	51	49	42	51	39	46	51	55	59	57	52	44	33	31	42	44	46	57	72	91	96	77	73	77	72	55 4	6	19 3	9	55 5	9	62	67	75	85	111	89%
Offaly	77,961	60	58	60	72	73	74	78	62	68	59	51	30	26	21	17	13	13	14	19	23	24	26	22	24	37	40	44	42	45	45	14 2	7	2 2	4	32 3	7	49	46	47	35	33	-10%
Roscommon	64,544	60	67	64	67	85	82	91	101	101	98	93	81	79	42	29	22	20	28	25	17	22	31	36	33	26	25	26	28	20	17	23 2	3 :	25 2	3	20 2	3	31	26	25	23	33	40%
Sligo	65,535	58	49	47	46	34	37	34	35	27	38	38	40	40	37	29	29	23	20	21	17	18	23	23	21	20	17	15	14	9	12	20 2	1	14 3	4	37 4	3	40	46	50	60	70	64%
Tipperary	159,553	53	49	48	56	48	55	56	53	57	53	41	44	31	33	32	36	39	39	43	48	46	46	38	40	47	43	41	34	33	40	37 3	1	19 3	9	36 3	7	33	33	31	27	26	-29%
Waterford	116,176	56	41	77	80	93	108	8 112	108	114	84	77	63	46	37	33	36	34	37	39	39	38	40	35	32	25	22	32	34	38	45	18 4	6	19 4	5	44 3	7	34	39	45	56	62	67%
Westmeath	88,770	46	46	42	63	65	61	70	66	60	61	37	27	27	17	14	11	11	14	12	14	11	12	11	14	11	10	12	11	9	8	14 1	4	7 1	4	23 2	4	25	19	20	26	26	10%
Wexford	149,722	28	15	19	17	19	19	19	18	23	23	22	18	17	17	16	13	9	8	7	7	11	11	9	9	11	12	13	8	12	15	17 1	9	5 3	3	39 4	7	73	110	127	144	167	257%
Wicklow	142,425	51	46	48	54	51	51	53	32	32	40	37	29	34	37	45	47	38	37	55	59	54	65	62	70	79	66	62	64	48	52	12 3	0	11 3	2	29 2	9	27	30	34	33	36	21%
National	4,761,865	58	54	54	56	53	57	59	60	60	57	55	54	50	47	44	42	40	38	37	38	39	39	36	38	42	42	41	39	39	41	12 3	8	1 4	2	44 4	8	52	58	63	70	-	66%

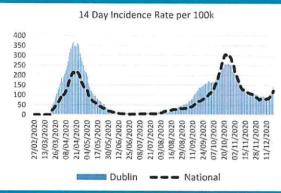
The 7 day incidence rate per 100k is 32% higher than the equivalent 14 Day incidence rate per 100k

The graph below extends the 7 day incidence rate per 100k to compare it against the 14 day incidence rate per 100k. It shows 7 day incidence rate is higher in 23 counties and 32% higher nationally.



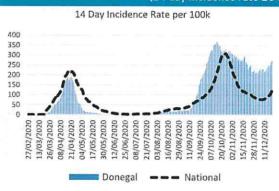
Overview of select counties experiencing increased incidence rates

Dublin's disease incidence rates are increasing rapidly (14 day incidence rate 20 Dec: 142)



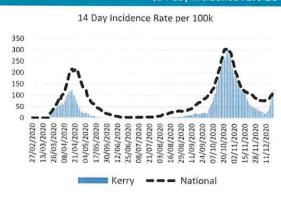
- Dublin's 14 day incidence rate rose 55% in the one-week period between 13/12 - 20/12 from 91.4 to 142, 17% above the national figure on 20/12
- the national figure on 20/12
 Dublin's 7 day incidence rate
 has increased by 124% since
 leaving level 5 (1 Dec)
- The average daily increase in 7 day incidence since leaving level 5 is above national figure (5.6 vs 4.2)

Donegal's disease incidence rates remain stubbornly high and are now increasing (14 day incidence rate 20 Dec: 272.6)



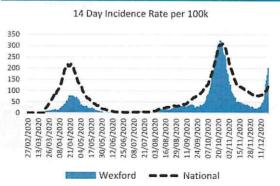
- Donegal's 14 day incidence rate rose 21% from 13/12 to 20/12, from 225 to 272.6, more than double the national figure on 20/12
- Donegal's 7 day incidence rate has experienced the 3rd highest average daily increase since leaving level 5 (6.9 cases per day), and is currently double the national 7 day incidence rate (20 Dec)

Kerry is experiencing the highest national rise in incidence rates after previously having lower case rates (14 day incidence rate 20 Dec: c.123.9)



- Kerry's 14 day incidence rate has almost quadrupled from 13/12 to 20/12, frim 31.1 to 123.9
- This has resulted in a 7 day incidence rate that is 66% higher than the 14-day rate, the 2nd largest increase in any county
- Kerry has also experienced the 2nd highest average daily rise in its 14 day incidence rate since leaving level 5 (10.4 cases/day)

Wexford's disease prevalence rates are accelerating rapidly from a lower base last week to now above the national average (14 day incidence rate 20 Dec: 199.7)

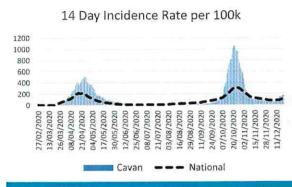


- Cases in Wexford are increasingly rapidly, with the 14 day incidence rate rising from 45% below the national average on 13/12 to 64% above by 20/12
- As a result, the 7 day incidence rate for the county is currently 67% greater than the 14 day rate
- Since leaving level 5, Wexford has experienced the highest average daily rise in its 14 day incidence rate (14.8 per day)

Source: Based on daily cumulative data from HPSC published on Geohive as at 23/12/2020 (data up to 20/12/2020). This data is published daily. Measures the average daily change in the 7 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

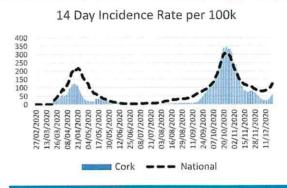
Overview of select counties experiencing increased incidence rates

Cavan was hard hit in Wave 2, seeing further sharp growth in December (14 day incidence rate 20 Dec: 177.2)



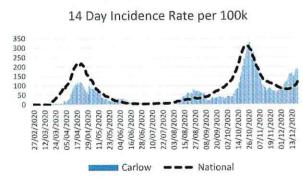
- Cavan's 14 day incidence rate was in line with the national picture from Nov - midper
- It has increased a further 67% in the last week (13-20 Dec), and exceeds the national 14 day incidence rate by 46% (20 Dec)
- Cavan had the 2nd highest growth in 7 day incidence rate since Level 5 was lifted, with a 493% increase (1-20 Dec)
- Cavan's 7 day incidence rate has grown 23% above the 14-day incidence rate, in line with national average (20 Dec)

Cork starting from low point but growing quickly in December (14 day incidence rate 20 Dec: 57.7)



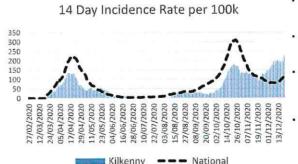
- 14 day incidence rates have climbed quickly during December, increasing 130% in the last week (13 20 Dec); however, this is starting from a low point and is currently 53% below national levels (20 Dec)
- Cork's 7 day incidence rate has grown 58% above the 14-day incidence rate, nearly double the national rate of increase

Carlow has grown steadily to exceed national figures (14 day incidence rate 20 Dec: 186.2)



- Carlow's incidence rates grew quickly in early December, though the rate of increase has slowed in recent days.
- The 14 day incidence rate on 20 Dec is 12% higher than on 13 Dec, and 53% above the national figure (20 Dec)
- The 7 day incidence rate has increased by only 4% above the 14 day incidence rate in recent days (13-20 Dec)

Kilkenny is seeing significantly higher growth than national rate since mid-Nov (14 day incidence rate 20 Dec: 225.7)

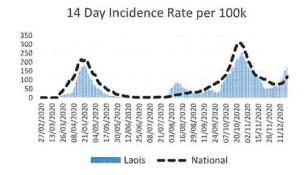


- Kilkenny has shown high growth since mid-Nov which may be linked in part to large outbreaks in hospital settings
- Kilkenny's 14 day incidence rate has increased by 13% from 199.5 on 13 Dec to 225.7 on 20 Dec
- Kilkenny had the 4th highest 14 day incidence rate in the country on 20 Dec at 225.7, which was 86% above the national average
- Kilkenny's 7 day incidence was 12% above the 14 day incidence on 20 Dec

Source: Based on daily cumulative data from HPSC published on Geohive as at 23/12/2020 (data up to 20/12/2020).. This data is published daily. Measures the average daily change in the 7 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Overview of select counties experiencing increased incidence rates

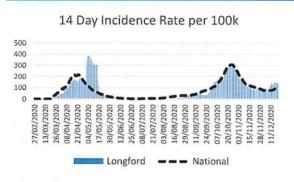
Laois' disease incidence rates are increasing rapidly (14 day incidence rate 20 Dec: 174.7)



- Laois' 14 day incidence rate rose by 61% in the one-week period between 13/12 - 20/12 from 108.6 to 174.7, 44% above the national figure of 121.6 on 20/12
- Laois' 7 day incidence rate has also increased by 223% since leaving level 5, from 30.7 on 1 Dec to 99.2 on 20 Dec

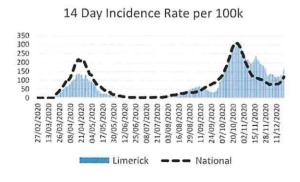
Longford's disease incidence rate has remained relatively stable in the last week after increases post leaving Level 5

(14 day incidence rate 20 Dec: 139.5)



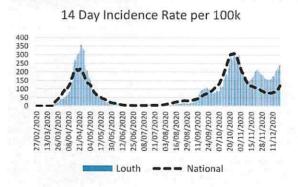
- Longford's 14 day incidence rate remained relatively stable in the one-week period between 13/12 - 20/12 from 132.1 to 139.5
- However, Longford's 14 day incidence rate is still 15% above the national figure on 20/12
- Longford's 7 day incidence rate has increased by 13% since leaving level 5, from 39.1 on 1 Dec to c.44 on 20 Dec

Limerick's disease incidence rates have increased in the last week (14 day incidence rate 20 Dec: 164.2)



- Limerick's 14 day incidence rate increased by 36% in the one-week period between 13/12 - 20/12 from 120.6 to 164.2.
- Limerick's 14 day incidence rate is 35% above the national figure on 20/12
- Limerick's 7 day incidence rate has also increased since leaving level 5, from 68.2 on 1 Dec to 107.2 on 20 Dec

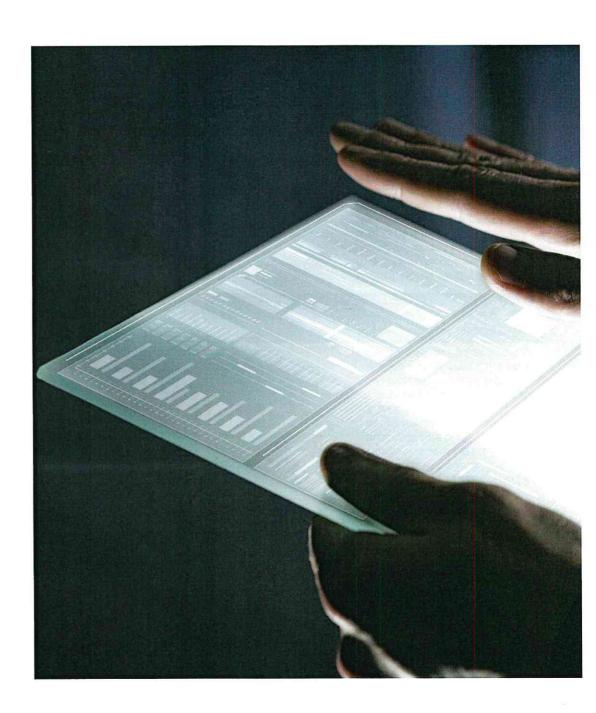
Louth's disease prevalence rates are double the national average (14 day incidence rate 20 Dec: 241.3)



- Louth's 14 day incidence rate rose 38% in the one-week period between 13/12 - 20/12 from 174.6 to 241.3, c.double the national average on 20/12
- Louth's 7 day incidence rate has increased by 142% since leaving level 5, from 62.8 on 1 Dec to 152.1 on 20 Dec

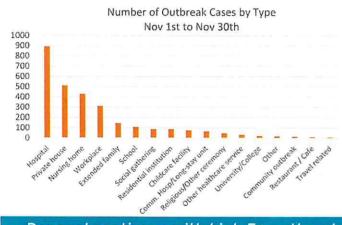
Source: Based on daily cumulative data from HPSC published on Geohive as at 23/12/2020 (data up to 20/12/2020). This data is published daily. Measures the average daily change in the 7 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Analysis of Outbreaks with 5 or more cases



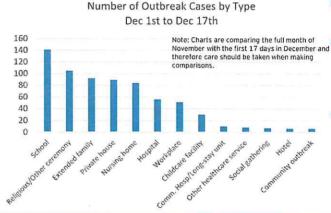
Changes in Outbreaks with 5 or more cases from November to so far in December

The biggest sources of 5+ outbreak cases have changed from Nov (Hospital and Private House) to Dec (School and Religious)



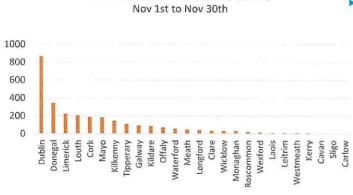
- ▶ In November, the top 3 sources of outbreak cases (outbreaks of 5+ cases) were hospitals, private houses and nursing homes
- There were 219 new outbreaks of 5+ cases in November

Note: Charts are comparing the full month of November with the first 17 days in December and therefore care should be taken when making comparisons.



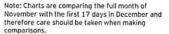
- There have been 63 new outbreaks of 5+ cases to date in Dec (17 Dec).
- Given that overall cases are increasing, this smaller number of large outbreaks may indicate a shift towards smaller outbreaks (under 5 cases), or community transmission
- Schools, religious/other ceremonies and extended family were the larger sources of outbreak cases so far in Dec. Schools have seen a slight increase of outbreak (of 5+) related cases from 106 in Nov to 141 (1-17 Dec)

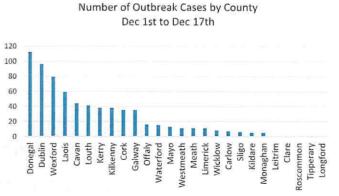
Donegal continues with high 5+ outbreak cases. Wexford, Laois and Cavan have moved into top 5 counties for 5+ outbreak cases



Number of Outbreak Cases by County

In November, the top 5 counties for outbreak cases (outbreaks of 5+ cases) were Dublin, Donegal, Limerick, Louth and Cork





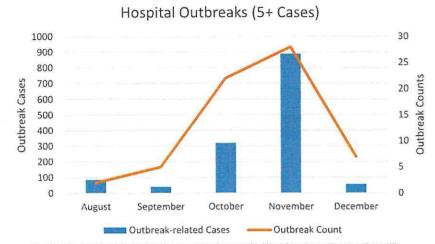
- Since 1 Dec, the top 5 counties for outbreak cases (outbreaks of 5+ cases) are Donegal, Dublin, Wexford, Laois and Cavan
- Wexford had just 15 outbreak cases in November compared to 79 so far in December

Note: Charts are comparing the full month of November with the first 17 days in December and therefore care should be taken when making comparisons.

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 22/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more case and outbreak date associated with first case date.

While hospital outbreaks of 5+ cases spiked in November, they have since fallen, with nursing homes seeing smaller outbreaks month to month

Hospital outbreaks spiked in November, with far more cases per outbreak than had been seen in previous months. However, levels in December to date have fallen substantially

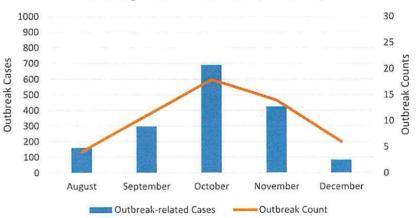


Note: Data for December is for the first 17 days and therefore care should be taken when making comparisons with full months.

- In November, hospitals saw 28 outbreaks of 5+ people leading to 890 outbreak-related cases
- However, both figures have since fallen notably so far in December (1-17 Dec). There have been 7 outbreaks yielding 56 cases up to 17 Dec
- Outbreaks are recorded on the date that the first case occurs. Since there were several large hospital outbreaks in mid/late Nov, it is possible that these outbreaks may have spilled over across both months

The cases and outbreak counts for nursing homes have both declined, meaning lower average cases per outbreak.

Nursing Home Outbreaks (5+ Cases)

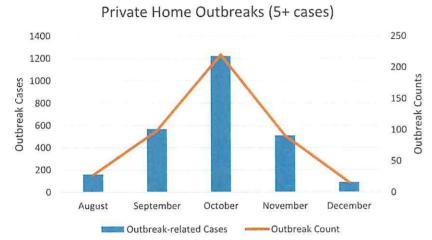


Note: Data for December is for the first 17 days and therefore care should be taken when making comparisons with full months.

- The number of outbreaks has decreased significantly since October
- The number of cases per outbreak has also decreased over time, falling from 38 in October to 27 in November and 9 in the first half of December

Private homes contributing much fewer outbreaks of 5+ cases, with the number of outbreaks in schools persistently low with a slight Dec increase

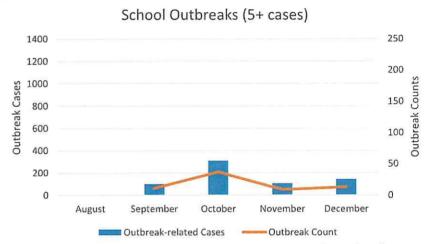
Private Home outbreaks of 5+ cases have declined significantly in Nov and Dec to date vs Oct, in both the number of cases and outbreaks.



Note: Data for December is for the first 17 days and therefore care should be taken when making comparisons with full months.

- In Nov/Dec, private home outbreaks (of 5+ cases) and outbreak-related cases dropped substantially vs Oct:
 - Outbreak cases dropped from 1219 in Oct to 509 in Nov, and have dropped further to 89 cases up to 17 Dec
 - Outbreak counts have done similar, dropping from 220 in Oct, to 91 in Nov, to 16 up to 17 Dec

Although the number of schools outbreaks (of 5+ cases) has generally been quite low, the number of cases and outbreaks in the first half of December has already exceeded November levels.

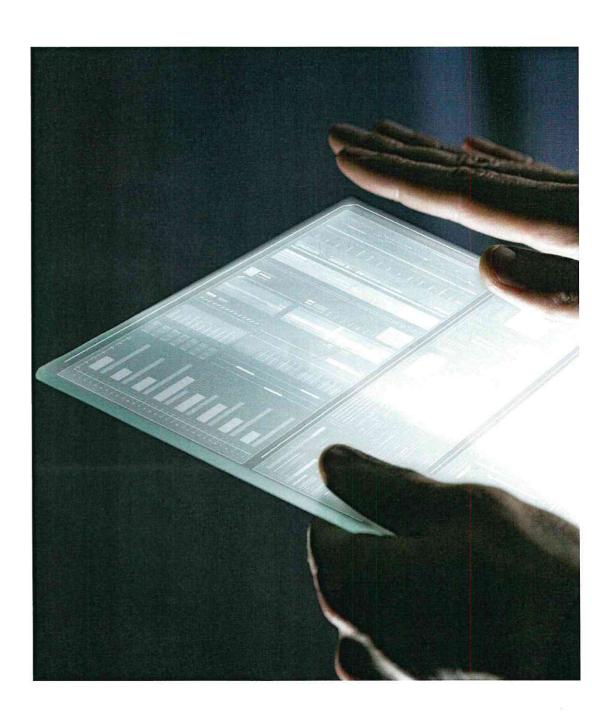


Note: Data for December is for the first 17 days and therefore care should be taken when making comparisons with full months.

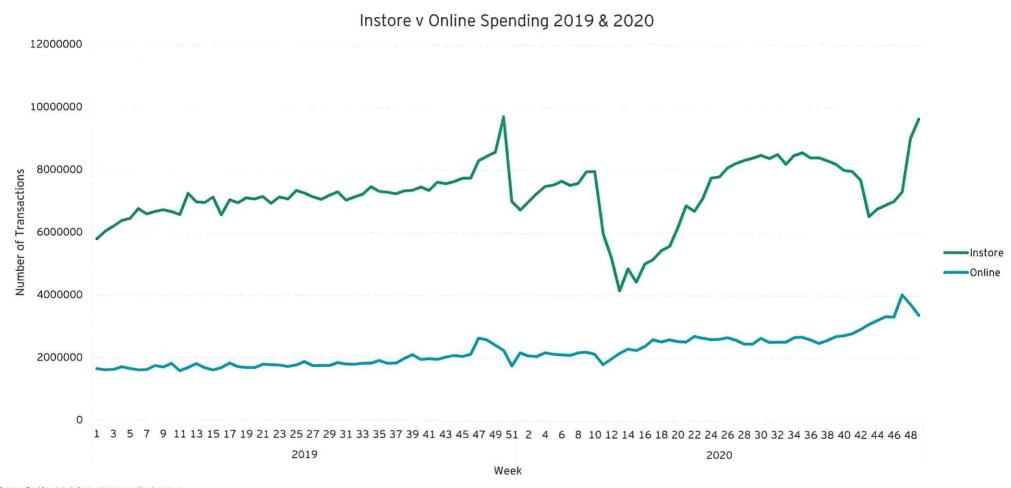
- The number of C19 outbreaks (of 5+ cases) and outbreakrelated cases in schools was generally low to date, but did show a slight increase in Dec:
 - Oct saw 307 outbreak-related cases spread across 37 outbreaks, dropping off to 106 cases in 9 outbreaks during Nov
 - 1 Dec 17 Dec has already exceeded Nov levels, with 141 cases spread across 13 outbreaks

Source: HPSC CIDR data aggregated summary report. Data based on CIDR data as at 22/12/20. It should be noted that there is typically a time lag between initial entry on CIDR and population of all case details. This analysis only considers outbreaks with 5 or more cases and outbreak date associated with first case date.

Banking Payment Insights

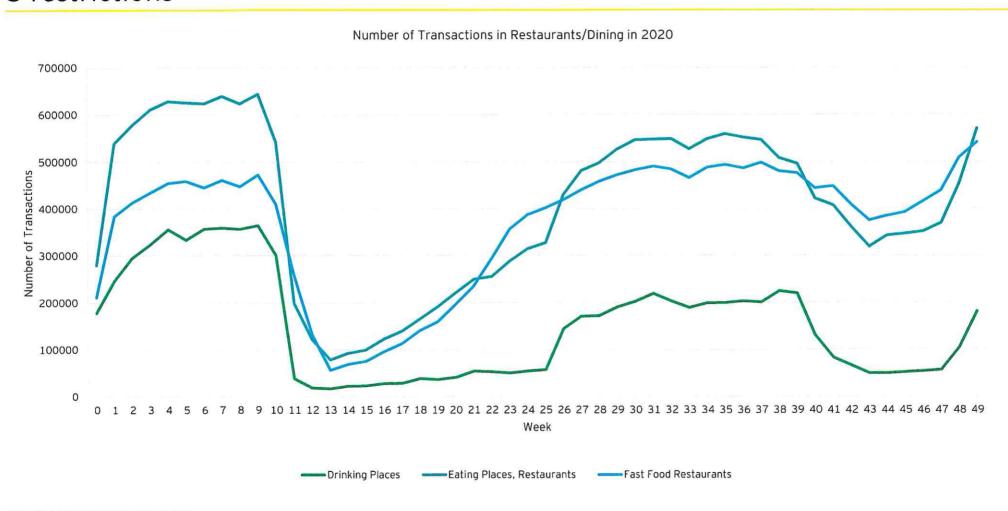


Instore transactions returns to 2019 levels after level 5 restrictions were lifted. Online transactions see steady growth throughout 2020

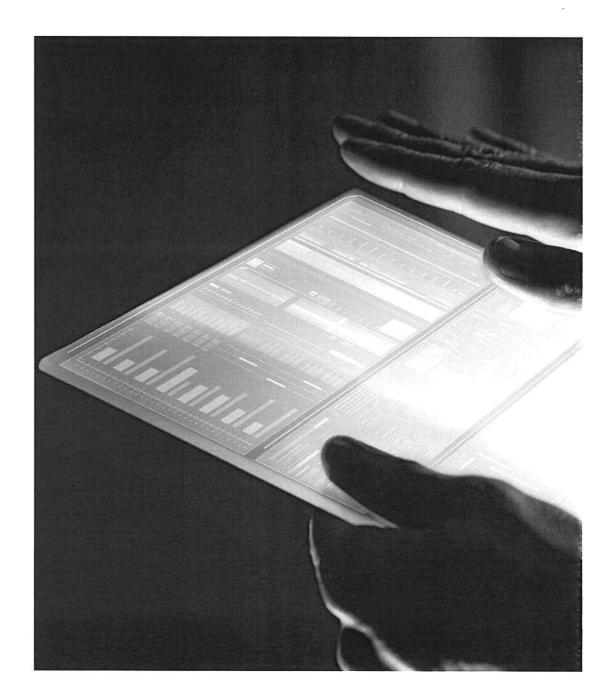


Source: Banking data is from a bank operating in Ireland

Spending in Restaurants/ Dining returns to Summer levels on the lifting of level 5 restrictions



Restrictions Impact Analysis

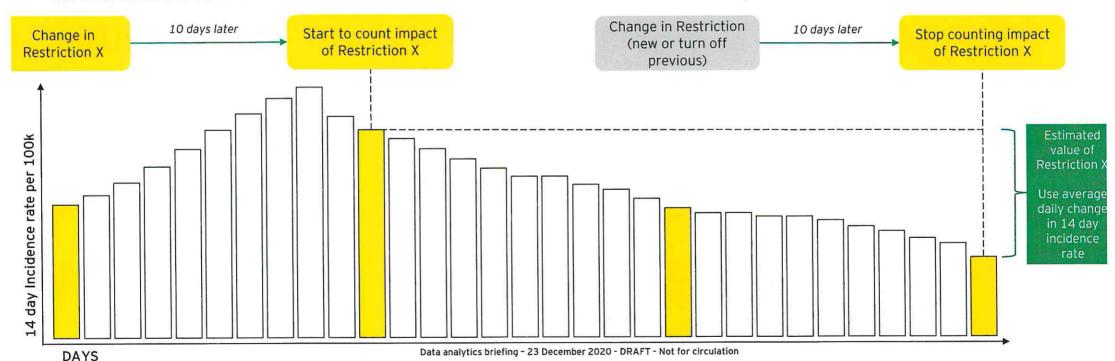


Overview of Restriction Analysis Methodology

It is not easy to quantify the value of restrictions. There have been relatively few changes in restrictions, which generally combine more than one change at a time, therefore hiding the unit value per restriction. There is also a time lag between a restriction change and the impact being seen, and the incidence rate can clearly be impacted by significant outbreaks. We have used the below methodology to initially quantify the impact of changes in restrictions. This calculation has been applied across counties. The outputs should be seen as directionally useful, rather than precise statistical outputs. A sensitivity analysis has also been completed looking at a reduced 7 day and rolling average incidence rate over 3 days per 100k especially for periods where there were more frequent restriction changes.

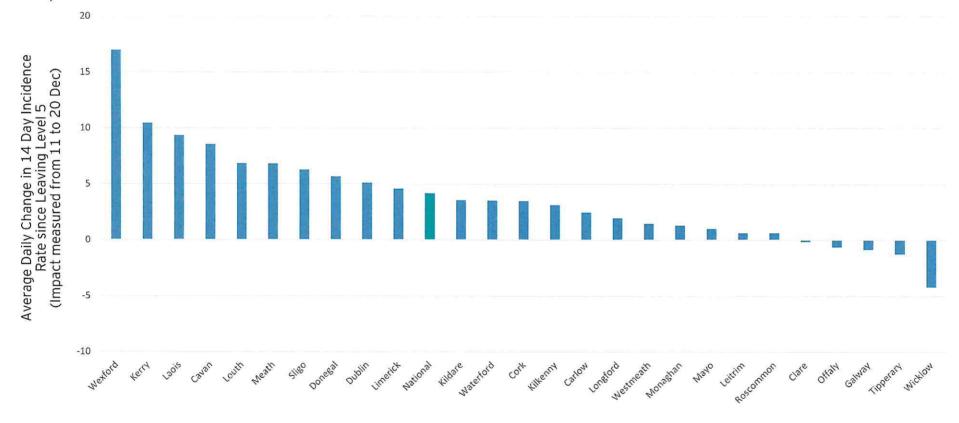
It should be noted that this does not measure compliance or behavioural aspects related to restrictions.

They are also presented alongside international academic research to provide a broad view to support decision-making. Further analysis has commenced to enhance the measurement of correlation between restrictions and their impact.



Summary of Restriction Impact since leaving Level 5 (14 day incidence rate change)

The average daily change in 14 day incidence rate per 100k per day has increased in 21 counties since the most recent change in restrictions. The national 14 day incidence rate is increasing by 4.2 cases per 100k per day during this period.



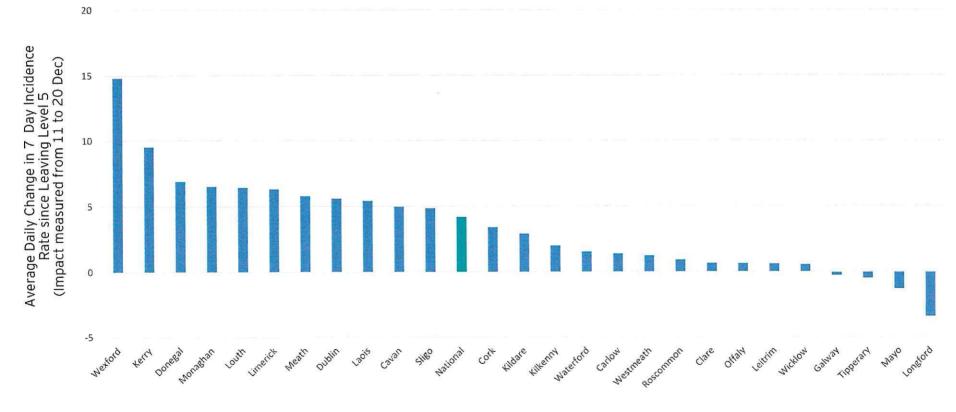
Note:

- The outputs should be seen as directionally useful, rather than precise statistical outputs
- The restriction changes or 1 December allowed the opening of hospitality and non-essential retail as wel as allowing up to six people from a maximum of two households to meet outdoors
- This analysis does not also consider potential behavioural changes beyond the restrictions

Source: Based on daily cumulative data from HPSC published on Geohive as at 23/12/2020 (data up to 20/12/2020). This data is published daily. Measures the average daily change in the 7 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

Summary of Restriction Impact since leaving Level 5 (7 day incidence rate change)

The most recent restriction changes were introduced on 1 December 2020 and therefore are only counted 10 days later from 11 December. This analysis has also therefore been repeated for a 7 day average incidence rate per 100k per day. The average daily change in 7 day incidence rate has increased in 22 counties since the most recent change in restrictions. The national 7 day incidence rate is increasing by 4.2 cases per 100k per day during this period



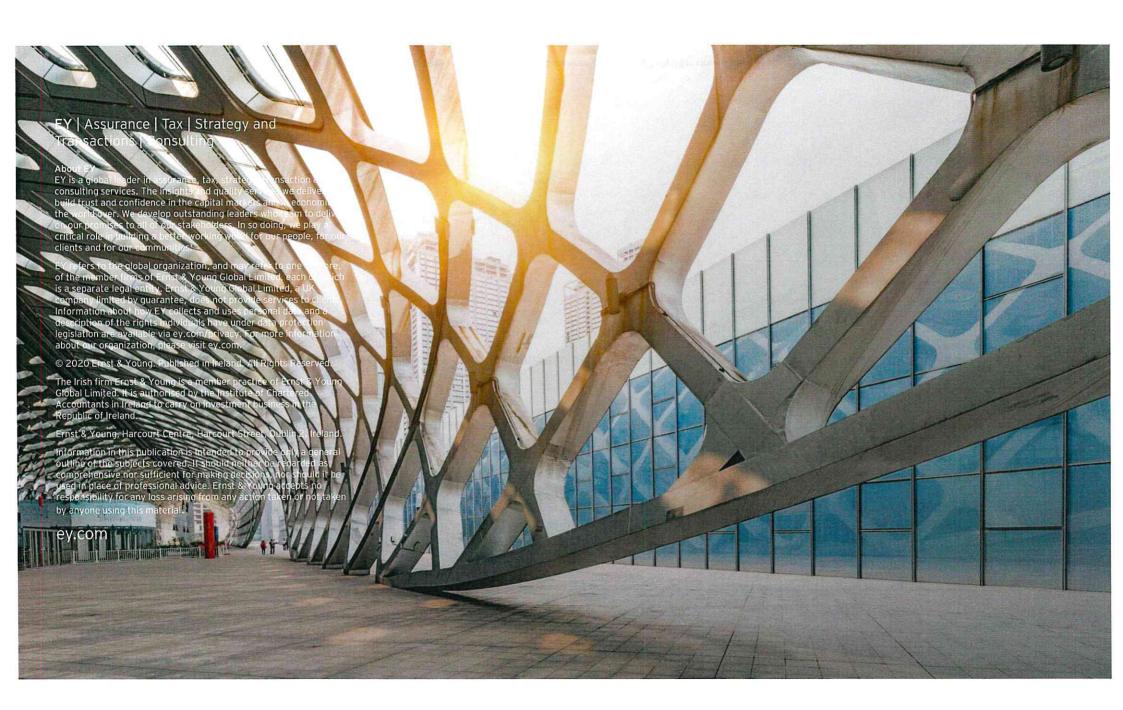
Note:

- The outputs should be seen as directionally useful, rather than precisi statistical outputs
- The restriction changes or 1 December allowed the opening of hospitality and non-essential retail as well as allowing up to six people from a maximum of two households to meet outdoors
 - This analysis does not also consider potential behavioural changes beyond the restrictions

Source: Based on daily cumulative data from HPSC published on Geohive as at 23/12/2020 (data up to 20/12/2020). This data is published daily. Measures the average daily change in the 7 day incidence rate per 100k for the period of time that the restriction was in place for that county. Does not measure compliance with restrictions or other behavioural aspects

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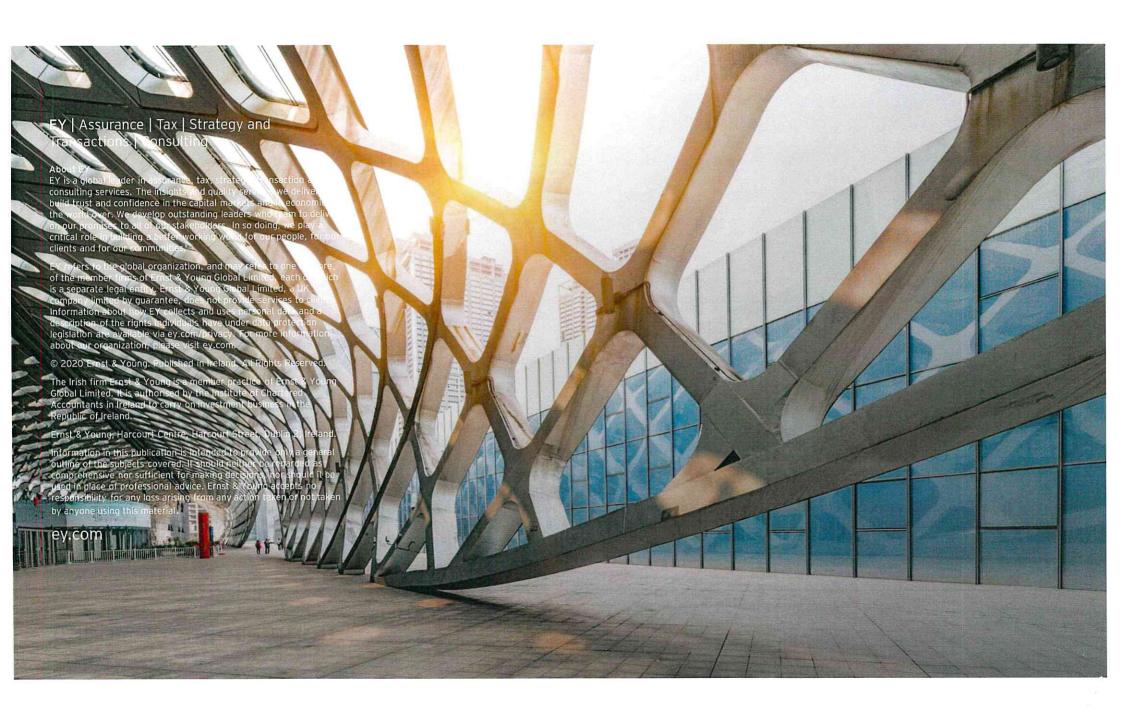


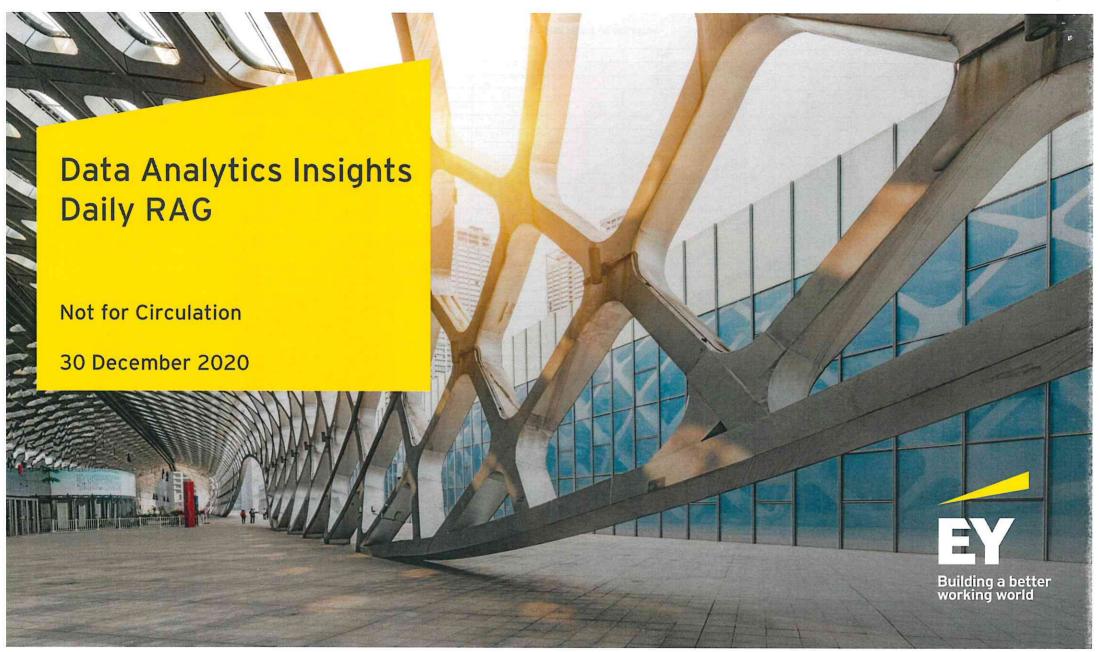
Daily RAG

	THE STATE	HEALTH		THE PERSON NAMED IN	RESTRICTIONS	MOVE	MENT	COMPLIANCE	EVENTS
County	14 Day Incidence Rate per 100k	5 Day Incidence Rate per 100k	ICU Capacity %	Graph in a cell for 5 Day Incidence Rate	Change in 5 Day Rate Since Opening of Restaurants 4th Dec (+10 days)	% Change in traffic volume to benchmark Week (28th Sep - 4th Oct)	Change in Google / Apple	Change in Facebook Mask Compliance in last 7 days (30th Nov - 6th Dec)	Number of High Risk Events (Also Weighted by Event Size)
Last Update	29/12/2020	29/12/2020	29/12/2020	From 01/10/2020 to 26/12/2020 (updated 29/10/2020)	From 14/12/2020 to 26/12/2020 (updated 29/12/2020)	Week Ending 20th Dec	Week Ending 25th Dec vs Week Ending 18th Dec	29/12/2020	December
Carlow	238.88	112.41	66.7%	- Jan - word	64%	9.4%	2%	NA	1
Cavan	225.79	89.27	28.6%		55%	8%	8%	NA	1
Clare	118.67	102.68	37.5%	~~~~	1425%	0%	11%	NA	0
Cork	167.08	123.79	53.0%	_~~	1122%	5%	4%	3%	4
Donegal	457.94	270.74	62.5%		239%	22%	7%	NA	0
Dublin	264.37	166.55	59.0%		412%	14%	-1%	3%	14
Galway	128.65	99.98	43.6%		545%	3%	3%	NA	11
Kerry	255.24	149.62	36.4%	~~~~	531%	-5%	12%	NA	1
Kildare	178.87	113.26	75.0%		300%	20%	5%	NA	3
Kilkenny	293.25	183.41	66.7%	/	168%	8%	4%	NA	2
Laois	227.87	85.01	150.0%	per Manager	16%	20%	6%	NA	3
Leitrim	78.02	56.17	37.5%	~~~~~	500%	17%	NA	NA	0
Limerick	351.98	231.91	81.8%	_~~_/	361%	14%	3%	NA	3
Longford	119.88	39.15	62.5%	~~~~~	-50%	9%	NA	NA	0
Louth	339.84	167.59	66.7%	_~~~~	110%	11%	8%	NA	4
Mayo	146.35	78.92	75.0%	_~~~	41%	0%	10%	NA	3
Meath	193.29	105.10	20.0%	Man	294%	9%	9%	NA NA	8
Monaghan	293.23	203.63	28.6%	~~~	495%	12%	8%	NA	0
Offaly	96.20	47.46	71.4%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	76%	33%	11%	NA	5
Roscommon	94.51	65.07	62.5%		320%	7%	NA	NA	0
Sligo	207.52	132.75	37.5%	لـــــــــــــــــــــــــــــــــــــ	335%	4%	4%	NA	1
Tipperary	110.31	68.32	80.0%	more	187%	11%	11%	NA	3
Waterford	165.27	100.71	90.0%	~~~	303%	1%	11%	NA	4
Westmeath	100.26	69.84	62.5%		210%	13%	9%	NA	6
Wexford	361.34	205.05	71.4%		553%	3%	6%	NA	1
Wicklow	122.87	80.74	59.0%	manum	360%	5%	9%	NA	4
National	223.02	138.39	60.9%		319%	11%	6%	2%	

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Daily RAG

		HEALTH			RESTRICTIONS	MOVE	MENT	COMPLIANCE	EVENTS
County	14 Day Incidence Rate per 100k	5 Day Incidence Rate per 100k	ICU Capacity %	Graph in a cell for 5 Day Incidence Rate	Change in 5 Day Rate Since Opening of Restaurants 4th Dec (+10 days)	% Change in traffic volume to benchmark Week (28th Sep - 4th Oct)	Change in Google / Apple	Change in Facebook Mask Compliance in last 7 days (30th Nov - 6th Dec)	Number of High Risk Events (Also Weighted by Event Size)
Last Update	30/12/2020	30/12/2020	30/12/2020	From 01/10/2020 to 27/12/2020 (updated 30/10/2020)	From 14/12/2020 to 27/12/2020 (updated 30/12/2020)	Week Ending 27th Dec	Week Ending 25th Dec vs Week Ending 18th Dec	30/12/2020	December
Carlow	207.26	87.82	83.3%	~~~~~	28%	-17.4%	2%	NA	1
Cavan	227.11	91.89	42.9%		59%	-15%	8%	NA	1
Clare	131.29	98.47	50.0%	/	1363%	-22%	11%	NA	0
Cork	172.23	95.42	53.0%	_~~	842%	-20%	4%	3%	4
Donegal	424.02	184.05	62.5%	manuel	131%	-2%	7%	NA	0
Dublin	264.22	117.34	62.3%	~~~~	261%	-13%	-1%	2%	14
Galway	128.27	71.30	50.0%	~~~~	360%	-20%	3%	NA	11
Kerry	251.85	106.97	45.5%		351%	-22%	12%	NA	1
Kildare	172.58	73.26	100.0%		159%	-6%	5%	NA	3
Kilkenny	261.00	92.71	83.3%	~~~~	35%	-17%	4%	NA	2
Laois	187.73	61.40	133.3%	my many was	-16%	-1%	6%	NA	3
Leitrim	81.14	59.29	50.0%	~~~	533%	-3%	NA	NA	0
Limerick	336.58	161.62	90.9%		221%	-12%	3%	NA	3
Longford	85.63	29.36	62.5%	~~~~	-63%	-4%	NA	NA	0
Louth	342.94	118.71	88.9%	-w	49%	-16%	8%	NA	4
Mayo	129.49	62.83	75.0%	~~~~	12%	-19%	10%	NA	3
Meath	198.42	76.39	20.0%		187%	-16%	9%	NA	8
Monaghan	384.45	154.76	42.9%	~~~~	352%	-13%	8%	NA	0
Offaly	83.38	37.20	71.4%	-Manual	38%	10%	11%	NA	5
Roscommon	103.81	61.97	75.0%	~~~~~	300%	-9%	NA	NA	0
Sligo	209.05	119.02	50.0%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	290%	-14%	4%	NA	1
Tipperary	96.52	62.68	60.0%	morning	163%	-11%	11%	NA	3
Waterford	153.22	59.39	90.0%	man	138%	-18%	11%	NA	4
Westmeath	109.27	73.22	62.5%		225%	-10%	9%	NA	6
Wexford	343.30	112.21	71.4%		257%	-21%	6%	NA	1
Wicklow	119.36	63.19	62.3%	money	260%	-20%	9%	NA	4
National	219.37	99.58	64.5%		202%	-14%	0%	2%	

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