Minutes

Meeting of the National Measles Elimination Verification Committee, 19 July 2019

Date:	19 July 2019
Time:	2:00 pm- 4:20 pm
Location:	Room GN.7, Ministry of Health building, 133 Molesworth Street Wellington
Attendees:	NVC: Don Bandaranayake, Timothy Blackmore, Richard Hoskins (on phone line), Nikki Turner (chair), Tony Walls (on phone line). Ministry of Health: Laurence Holding, Caroline McElnay, s 9(2)(g)(ii) [redacted]

Papers tabled

Corresponding Agenda item number	description
1	Minutes from previous meeting, Fourth Face-to-Face Meeting of the National Measles Elimination Verification Committee, 17 May 2018
3	Slides prepared by s 9(2)(g)(ii) [redacted]
3	Community and Public Health (CPH) Debrief Report of the Response to the Measles Outbreak in Canterbury February to March 2019
3	Auckland Regional Public Health Service, Auckland Measles Update 5 July 2019
3	Northland Situation Report number 5, 10/7/2019
3	Regional Public Health Situation Report number 12, 12/7/2019
3	Genotyping information: attachment 1: Measles and Rubella Genotypes SUMMAR 2014-2019 Excel sheet
3	Genotyping information: attachment 2: Comparison of outbreaks 2018-2019
3	Genotyping information: attachment 3: Measles Alignment comparison 2018-2019
3	Genotyping information: attachment 4: New Zealand Measles Phylogenic Tree 2018-2019
5	Draft 2, Measles and Rubella Elimination in New Zealand, 2019, Report to the 8th Meeting of Western Pacific Regional Verification Commission for Measles and Rubella Elimination, 2019.

<table>
<tr><th>Item</th><th>Notes</th></tr>
<tr><td>1</td><td>Declarations of conflict of interest

No conflicts of interest were declared.</td></tr>
<tr><td>2</td><td>Previous meeting minutes and action points

Tabled: Minutes- NVC- 20180517

Discussion of action points from the previous meeting
<table>
<tr><th>Item</th><th>Follow-up, outcome</th></tr>
<tr><td>s to ask the New Zealand Microbiology Network for serology in pregnancy data.</td><td>Not yet completed. This action point is to be carried forward.</td></tr>
<tr><td>s /Laurence to incorporate suggested edits and circulate the amended report</td><td>completed</td></tr>
<tr><td>s /Laurence/s 9(2)(g) to post the completed report on the WHO website by 15 June 2018</td><td>completed</td></tr>
<tr><td>s 9(2)(g) to circulate draft Minutes in the week beginning May 21st 2018</td><td>completed</td></tr>
<tr><td>s 9(2) to circulate to the NVC the draft review of the vaccination-preventable disease strategy</td><td>The vaccination-preventable disease strategy is still under consideration, and the Ministry is seeking clarity on the way forward.</td></tr>
</table></td></tr>
<tr><td>3</td><td>Current situation

Tabled:
• Slides prepared by s 9(2)(g)(ii)
• Community and Public Health (CPH) Debrief Report of the Response to the Measles Outbreak in Canterbury February to March 2019
• Auckland Regional Public Health Service, Auckland Measles Update 5 July 2019
• Northland Situation Report number 5, 10/7/2019
• Regional Public Health Situation Report number 12, 12/7/2019</td></tr>
</table>

The following were discussed:

- The epidemiology of measles in New Zealand, with particular emphasis on the outbreaks in the Auckland region.

- The current situation in New Zealand: multiple outbreaks linked via importations from measles outbreaks overseas, and an increasing incidence of measles worldwide. This year, this has led to the highest cumulative number of measles cases from the beginning of the year to week 29 in New Zealand since 1997.

  https://www.who.int/immunization/newsroom/measles-data-2019/en/

- The epi curve shows the locations of measles notifications with the different outbreaks in 2019: an outbreak in Waikato first, followed by Canterbury then outbreaks in the Auckland region, affecting particularly and more recently Counties Manukau where case numbers are still increasing. There were also smaller outbreaks in Bay of Plenty/Lakes DHBs and in Wellington region (page 1 of the report linked below).

  https://surv.esr.cri.nz/PDF_surveillance/MeaslesRpt/2019/WeeklyMeasles22072019.pdf

- Data shows that approximately 1 case in 3 has been hospitalised. Māori and Pacific people have the highest proportions of cases hospitalised, together with the very young and those over the age of 50.

- Among the cases of 'European or Other' ethnicities, the 15-29 age group is the most affected. For Pacific and Māori ethnic groups, the most affected age groups are the 'under five' age group (both ethnic groups), particularly the under one, and the 20-29 and the 15-19 age groups, respectively.

- Genotyping and import data shows that all outbreaks except one were either linked with an identified index case, or with a genotype not seen before in New Zealand (or both). Of the nine outbreaks, in 2019 so far, 4 had the D8 genotype and 5 had the B3 genotype.

It was noted that most of the relevant information is available at the link below with the data presented by ESR on the Tableau dashboard system. Tableau provides information on all outbreaks, individual cases and genotypes by DHB.

s 9(2)(a) [redacted]

Discussion

- Cases reportedly fully immunised with 2 MMR doses should be further investigated with the PHUs. It was suggested that dates of cases and immunisation records could be extracted from EpiSurv and the NIR, to check whether there had been any potential recording issue.

- There was discussion on the availability of epidemiological surveillance information in the Pacific Island region.

	• There was discussion on the flow of measles infection from young adults who have travelled overseas, to under-immunised, disadvantaged populations. This issue is addressed in the recommendations below. • There is a risk that New Zealand could be exporting measles to the Pacific Islands. There was discussion on vaccinations for travellers to the Pacific Islands, and making Pacific Island border control people aware that New Zealand is a measles risk country so that information is provided to incoming travellers to report measles symptoms promptly if they come from New Zealand. It was AGREED that: • it would be desirable to have a regional map of cases that illustrates the movement of measles cases between the countries, and to ensure monitoring to verify that New Zealand is not exporting measles. • steps should be taken, via the appropriate international channels (such as PacNet), to ensure that Pacific nations are aware of the New Zealand outbreaks, and make sure people are immunised. It was NOTED that the *Report* needs to state that, according to the current international information available, no measles outbreaks have been reported by Pacific Island countries in 2019. Therefore it is currently assumed that they didn't have measles importations from NZ. While acknowledging that surveillance systems may not be adequate in some of these countries it is assumed that there have been no importations of measles from New Zealand to Pacific Island countries.
3 (a)	**Rubella** There were two cases noted in the *Report*; one was probable only. **Discussion** The utility of antenatal screening for rubella was discussed. **Action:** **Ministry of Health** to discuss with the Technical Advisory Committee updating the rubella strategy pertaining to antenatal testing.
3 (b)	**Measles surveillance** There was discussion on the utility of recording in the *Report* the number of discarded cases. It is understood that this metric is to indicate the quality of the surveillance system. It was AGREED that there was no need to break down discarded case reporting by DHBs in the report as some of the DHBs have small populations, and that there may be a local pre-reporting ascertainment of some fever and rash cases.

	Actions s [redacted] to follow up with WPRO regarding the intended utility of discarded cases reported by DHBs. s [redacted] **to ask ESR** to create for the *Report* a table that illustrates how cases enter New Zealand and spreads through vulnerable populations, in particular Māori and Pacific. s [redacted] **to discuss this information with Richard. (COMPLETED)**
4	**PHUs and Ministry: Discussion on measles current situation** **Public health responses** There was discussion on: • the transition from the 'stamp it out' to 'manage it' phases, and the need to ensure that all stakeholders, in particular primary care and District Health Boards, are up to speed and engaged on the phasing of the response. • decision making on vaccination efforts, which may have misaligned with supply chain arrangements, particularly with increased community demand in outbreak situations. It was noted that DHBs needed to be aware of supply chain difficulties on the ground. • variances in outbreak management. The Auckland response is primarily led by the DHBs; the Canterbury situation had momentum from primary care. It was NOTED that elimination status would be lost following one year of circulation of the same genotype; it was discussed that this date would possibly fall in March or April of 2020 given the current ongoing outbreaks in Auckland (Counties Manukau in particular). **Next steps** There was discussion on the best approach for a co-designed immunity gap-closure programme, possibly a staged approach that begins with the Auckland region, particularly Counties Manukau. • Rather than a national roll-out all at the same time, it may be preferable to ensure that each DHB and PHO has a coordinated, systematic plan. • It was suggested that GP databases could be used to send out reminders for vaccinations for all on databases without current up to date records on the PMS, via GP mechanisms, particularly via text. • The need for easily accessed vaccination sites was noted; the programme would need to move beyond schools. Other options need to be considered such as pharmacy vaccination, afterhours and weekend clinics. • It would be necessary to follow up with PHARMAC on vaccine supply.

	It was AGREED that • In outbreak areas such as the Auckland region, the age for the first and second dose of MMR vaccine should be systematically brought down to 12 months and 15 months, respectively, as per current Ministry guidance in outbreak situations and as per the future schedule.
5	**2018/2019 NVC Report to WPRO** Tabled: *Draft 2, Measles and Rubella Elimination in New Zealand, 2019, Report to the 8th Meeting of Western Pacific Regional Verification Commission for Measles and Rubella Elimination, 2019 (the Report).* The amended report will include: • Titles of NVC members • A note on the current meeting (at page 6) • Labels for DHB areas (i.e. Toi Te Ora, non-locals will not know that this is located in the Bay of Plenty). • In the Conclusions, NVC's recommendations and a brief update on the measles situation before the report is sent. **Actions** **Richard** to send s a bulletin that provides an audit on the number of cases notified on suspicion, for reference at page 29 (Section 3, "Line of evidence 2, quality of measles, rubella, and CRS Surveillance"). (**COMPLETED**). s to revise the *Report* text and recirculate to the Committee.
6.	**RVC Recommendations for next steps** The conclusions of the Committee were as follows: 1. Measles and rubella elimination has been sustained in 2018 but sustained measles elimination status is threatened in 2019 given the lack of progress with closing immunity gaps, multiple measles importations, and outbreaks in many parts of New Zealand, in particular in the Auckland region. 2. There is a need to ensure that existing significant pockets of susceptible individuals are immunised to avoid or minimise further measles outbreaks. 3. If measles is not controlled, the current situation in New Zealand may become a threat to other less resourced countries in the Pacific region. The Committee made the following recommendations to the Ministry: • Targeted vaccination is required, aimed at closing immunity gaps in the population starting with the most vulnerable areas, in particular the Auckland region (Waitemata and Counties Manukau especially). This should be supported by a strong

	communication campaign, and could make use of the heightened level of public awareness and receptivity to prevention messages owing to the outbreaks. • Steps should be taken to prevent measles spreading to Pacific Island nations from New Zealand, and include communications to Pacific Island governments on vaccination requirements. • Measures to ensure that travellers into and out of New Zealand are vaccinated should be considered, including awareness raising of the risks of measles and the need to be vaccinated for measles.
5	**Other** It was noted that the Ministry intended to pro-actively release materials. It was AGREED that a press release would be drafted. It was NOTED that media requests for interviews must be passed on to the Chair. **Date of next meeting** It was AGREED that the next meeting be in November 2019. No exact date was decided. **Actions** s 9(2)(g) to prepare and circulate draft Minutes. s 9(2)(g)(ii) to prepare a press release. The meeting ended at 4:21 pm.

Item	Action	Lead
1	ask the New Zealand Microbiology Network for serology in pregnancy data. (carried over from previous meeting)	s
2	discuss with the Technical Advisory Committee updating the rubella strategy pertaining to antenatal testing.	**Ministry of Health**
3	follow up with WPRO regarding the intended utility of the question about discarded cases.	s
4	create for the *Report* a table that illustrates how measles cases enter New Zealand and measles spreads through vulnerable populations, in particular Māori and Pacific.	s 9(2) **with Richard and ESR (COMPLETED)**
5	send s a bulletin that provides an audit on the number of cases notified on suspicion, for reference at page 29 (Section 3, “Line of evidence 2, quality of measles, rubella, and CRS Surveillance”).	**Richard (COMPLETED)**

6	revise the text in the *Report* and recirculate to the Committee.	s
7	prepare and circulate draft Minutes.	s 9(2)(g)
8	prepare a press release.	s 9(2)(g)(ii)

MINISTRY OF HEALTH
MANATŪ HAUORA

newzealand.govt.nz

Measles and Rubella Elimination in New Zealand, 2019

Report to the 8th Meeting of the Western Pacific Regional Verification Commission for Measles and Rubella Elimination, 2019

August 2019
Ministry of Health
PO Box 5013, Wellington 6145, New Zealand

MINISTRY OF HEALTH
MANATŪ HAUORA

Acknowledgements

This report was compiled by the Communicable Disease Team of the New Zealand Ministry of Health.

The members of the National Verification Committee, are:

- Dr Don Bandaranayake, Public Health Physician and Epidemiologist
- Dr Tim Blackmore, Microbiologist and Infectious Diseases Physician, Professor, Department of Pathology and Molecular Medicine, University of Otago
- Dr Richard Hoskins, Medical Officer of Health, Clinical Director, Population and Public Health, Waikato
- Dr Nikki Turner (chair), Associate Professor, Department of General Practice and Primary Care, University of Auckland, and Director, The Immunisation Advisory Centre
- Dr Tony Walls, Infectious Diseases Specialist and Paediatrician, Associate Professor, Department of Paediatrics, University of Otago.

They have provided the critical and independent review that has allowed this report to be finalised as presented here.

The report could not have been produced without the continuous commitment of the first-line practitioners who detect and notify the cases and the staff from the Public Health Units in New Zealand who provide the Ministry with information and data from their regions.

The information presented in the report is also available thanks to the work and contributions from the Health Intelligence and Communicable Disease teams of the Health Group at the Institute of Environmental Science and Research Ltd, the National Measles Laboratory at the Canterbury Health Laboratories, the Paediatric Surveillance Unit at the University of Otago and the Immunisation and Communicable Disease teams at the Ministry of Health.

List of abbreviations

ARPHS	Auckland Regional Public Health Service
CHL	Canterbury Health Laboratories
CRS	Congenital rubella syndrome
DHB	District Health Board
DLN	Direct laboratory notification
ESR	The Institute of Environmental Science and Research Ltd
GP	General Practitioner
HPA	Health Promotion Agency
IANZ	International Accreditation New Zealand
ILAC	International Laboratory Accreditation Cooperation
IMAC	The Immunisation Advisory Centre
LMC	Lead maternity carer
MELAA	Middle Eastern/Latin American/African
MMR	Measles, mumps and rubella vaccine
NIR	National Immunisation Register
NMRL	National Measles Reference Laboratory
NVC	National Verification Committee for Measles and Rubella Elimination
NZDep2013	New Zealand Deprivation Index 2013
NZPSU	New Zealand Paediatric Surveillance Unit
PCR	Polymerase chain reaction
PHU	Public Health Unit
PHO	Primary Health Organisation
PMS	Practice Management Systems
QA	Quality assurance
RVC	Regional Verification Commission for Measles (and Rubella) Elimination in the Western Pacific
SIA	Supplementary immunisation activity
WHO	World Health Organization
WPRO	Western Pacific Regional Office of the World Health Organization

Contents

List of Tables

List of Figures

1 Background information

1.1 Response to the Regional Verification Commission (RVC) recommendations

In 2018, at the 7th Annual Meeting of the Regional Verification Commission (RVC) for Measles and Rubella Elimination in the Western Pacific the RVC made the following recommendations to New Zealand:

1. The RVC endorses the excellent recommendations by the New Zealand National Verification Committee (NVC) for Measles and Rubella Elimination, including the recommendation on filling specific immunity gaps to protect against outbreaks of measles and rubella after importation.

   Response: Localised campaigns at a District Health Board (DHB) level have been implemented but there has not yet been a nationwide programme.

2. The RVC recommends that countries that have achieved elimination continue to obtain genotype information from all cases of measles and rubella, even sporadic cases. The genotype information should be supplied to the WHO global sequence databases. Genotype information from imported cases contributes to efforts to monitor regional and global viral transmission patterns.

   Response: This has been implemented by the National Measles and Rubella Reference Laboratory.

3. In post-elimination countries, the RVC encourages classification as 'imported' those cases in residents with any international travel history during the infectious period, without epidemiological or genotype evidence of an identified local source after thorough investigation.

   Response: This has been the standard practice.

4. The RVC further encourages implementation of the recommendations from the Measles and Rubella Symposium to improve immunity among specific under-served and under-immunized ethnic groups and age groups, in particular Maori children, young adults and adolescents.

   Response: The New Zealand Ministry of Health is working to address inequities in childhood immunisation rates with its DHBs. It is also reviewing strategies to target adolescents and young adults who are under immunised with a view to implementation in 2020 subject to funding. However, to date there has been no resource commitment to ensure this happens systematically and effectively throughout the country.

5. The RVC notes New Zealand's success in investigating the infection source of detected cases, and encourages continued commitment to conduct contact tracing.

   Response: This is ongoing however identifying the initial imported case is not always possible as illustrated in a few recent measles importation events documented by genotyping only.

6. The RVC encourages the development of innovative methods for reaching the high-risk group of international travellers, since infection of unvaccinated New Zealand residents travelling abroad is a potential route of measles and rubella importation.

   Response: Despite ongoing messaging and advice regarding immunisation against measles and overseas travel, and specific efforts to reach certain communities (e.g. the Filipino communities given the important outbreak in the Philippines) further effective strategies are needed in this area. To date there has been no successful engagement with the travel booking sector to ensure all bookings are reminded that pre-travel immunisation catch up is recommended and free.

1.2 Summary of National Verification Committee (NVC) activities in 2018-2019 (up to July 2019)

In 2018, there was one NVC meeting held on 18 May, at which it was decided that measles and rubella elimination had been sustained in New Zealand. However, the NVC at that time noted the concern remained around the known age group immunity gaps for adolescents and young adults, as there had been no significant progress in closing the known age group immunity gaps necessary to make measles and rubella elimination more sustainable, except for some increased communication and promotion efforts at DHB levels, particularly in response to outbreaks.

In 2019 so far, one NVC meeting was held on 19 July. The NVC agreed that measles elimination status is threatened in 2019 given: 1) the lack of progress with closing immunity gaps, 2) multiple measles importations, and 3) outbreaks in many parts of New Zealand, in particular in the Auckland region. The NVC reiterated the need to ensure that existing significant pockets of susceptible individuals are immunised to prevent or minimise further measles outbreaks. The NVC also raised the concern that the situation in New Zealand may become a threat to other less resourced countries in the Pacific region.

There was discussion on the best approach for a co-designed immunisation immunity gap-closure programme, possibly a staged approach that begins with the Auckland region, particularly Counties Manukau and rolled out to the rest of Auckland and the rest of the country. Rather than a national roll-out all at the same time, it may be preferable to ensure that each DHB and Primary Health Organisation (PHO) has a coordinated, systematic plan. It was suggested that Practice Management System (PMS) databases could be used to send out vaccination reminders to all the patients registered on the databases without up to date records via GP mechanisms, particularly via text. The need for easily accessed vaccination sites was noted. Options such as pharmacy vaccination, afterhours and weekend clinics need to be considered. It would also be necessary to follow up with PHARMAC on vaccine supply. The conclusion and recommendations from the NVC are below under the heading ‘7 Conclusions’. The NVC has also made an independent and critical review of this report. It was also agreed that the next meeting be in November 2019, to discuss the measles situation and the progress of the Ministry to address immunity gaps.

1.2 Programmatic changes related to measles or rubella since the last report

Broad strategies
The current government has a strong focus on equity, and thus funding for this purpose is included in most of the health initiatives.

Routine immunisation schedule
None

Surveillance and reporting
None

2 Line of evidence 1: epidemiology of measles and rubella in New Zealand

2.1 Analytical methods and interpretation

The surveillance system for measles and rubella is described under section 3.1.

This section includes data for confirmed and probable measles and rubella cases for 2018 and 2019 extracted from New Zealand's national notifiable disease surveillance system (EpiSurv) on 13 June 2019. The cases have been reclassified to match the WHO case classifications as closely as possible (see section 3.1.2 below).

2.1.1 Case classification

The case classification used and how it compares with the WHO definitions is described under 3.1.2.

2.1.2 Dates

Surveillance data in this chapter are presented by the date reported and not by the onset date, except when this is mentioned.

2.1.3 Population rate calculations

Denominator data used to determine population rates, except those used to determine rates for ethnic groups and deprivation index, were derived from the 2018 mid-year population estimates published by Statistics NZ.

All rates are presented as the number of cases per 100,000 population.

2.1.4 Geographic location

Case numbers and population rates of measles are presented by DHB[1], the second level health administrative unit in New Zealand. Cases are allocated to a DHB based on the location of medical practitioner first consulted by the case.

[1] . There are 20 DHBs, 15 in the NI and 5 in the SI, covering the entire country (Appendix 1)

2.1.5 Ethnicity

This report uses a prioritised classification of ethnicity, with the Māori ethnic group at the top of the hierarchy followed in descending order by Pacific Peoples, Asian, Other and the NZ European ethnic group at the bottom of the hierarchy. [2]

2.1.6 Outbreak reporting

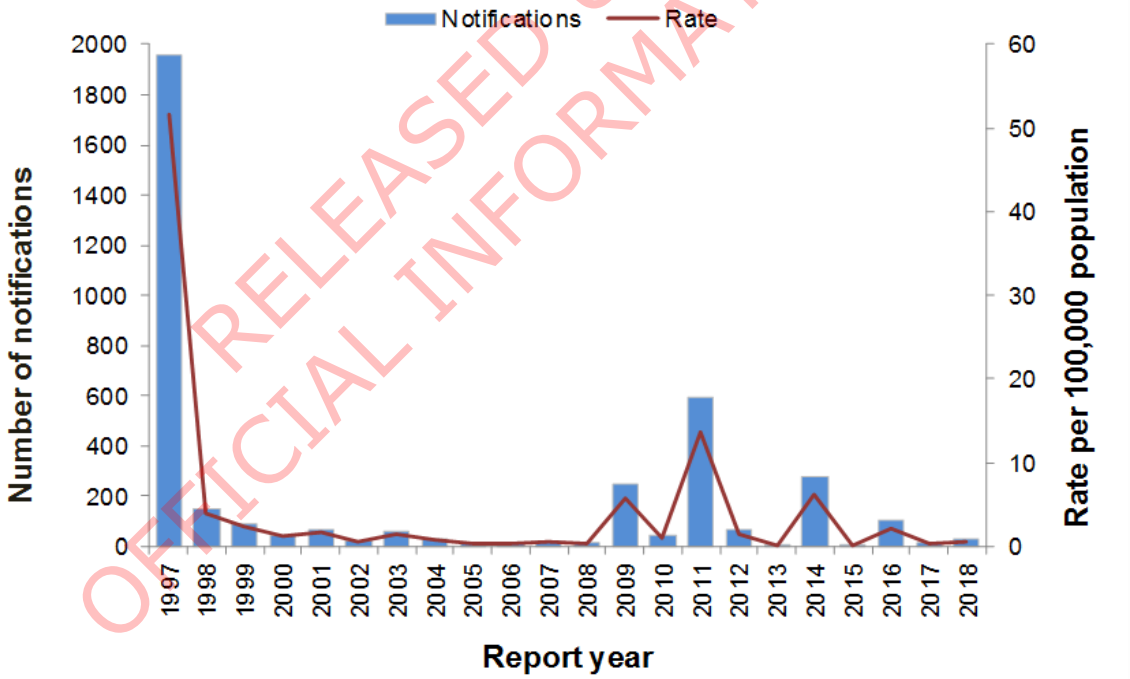
Cases of measles and rubella are reported as outbreaks when local transmission occurs, ie, imported cases without local transmission or cases unlinked to any other case (ie, 'sporadic') are not reported as outbreaks (though they result in similar public health measures).

2.2 Measles and rubella notifications[3] from 1997 to 2018

2.2.1 Measles

Figure 1 shows the number of measles notifications and rate per 100,000 population from 1997 to 2018. After the last large outbreak in 1997, annual incidence decreased dramatically. Between 2004 and 2008 in particular, there were fewer than 30 cases per year.

Figure 1: Number of measles notifications and rate per 100,000 population in New Zealand by year, 1997–2018



Notifications increased again in 2009 (248 cases; 5.8 per 100,000 population) and 2011 (596 cases; 13.6 per 100,000). Numbers decreased again in 2012 to 68 cases (1.5 per 100,000) and further in 2013 to eight cases (0.2 per 100,000). In 2014 notifications increased to 280 cases

[2] For more detail on classification refer to Ministry of Health (2004): http://www.health.govt.nz/publication/ethnicity-data-protocols-health-and-disability-sector

[3] Notifications refer to confirmed and probable cases.

(6.2 per 100,000) but decreased in 2015 to 10 cases (0.2 per 100,000). In 2016 there was again an increase in notifications to 103 cases (2.2 per 100,000), followed by a decrease in 2017 to 14 cases. In 2018, there were 30 notifications (0.6 per 100,000) (see 2.3 below).

2.2.2 Rubella

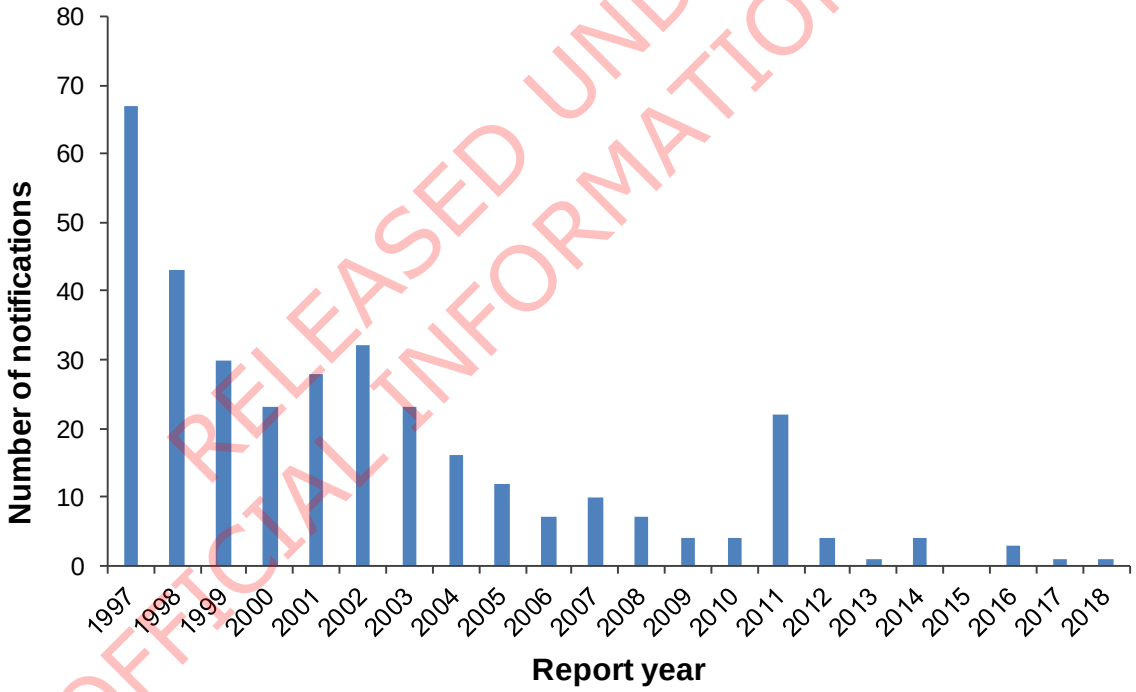
The last national rubella outbreak in New Zealand was in 1995/96. Most of the 306 cases notified involved young adult males, who would not have been offered immunisation. This emphasised the need to immunise both boys and girls to reduce the risk of exposure of pregnant women, as well as to reduce illness in men.

Figure 2 shows the annual number of rubella notifications from 1997 to 2018.

Between 1997 and 2016, the annual number of confirmed and probable rubella cases decreased gradually from 67 in 1997 to less than five in 2009-2010 and since 2012.

From 1982–1995 in New Zealand, 16 congenital rubella syndrome (CRS) cases were reported through the notification system (~2/100,000 live births). In the pre-vaccine era rates were roughly 10 times higher. Since 1998 there have been no cases of CRS in New Zealand newborns reported to the New Zealand Paediatric Surveillance Unit (NZPSU).

Figure 2: Number of rubella notifications in New Zealand by year, 1997–2018



2.3 Measles and rubella from 1 January 2017 to 30 April 2019

Rubella

Between 1 January 2018 and 31 May 2019, two rubella cases were notified. The laboratory-confirmed case was in a 32-year old male of Asian ethnicity, with unknown immunisation

history, notified in MidCentral DHB with onset date in January 2019. The case was imported from the Philippines, and the genotype was 1E. The probable (clinical) case was in a 23-month old immunised female of European or Other ethnicity, notified in Capital & Coast DHB with onset date in September 2018. The case was imported from Australia. Please refer also to Tables 1 to 8.

Measles
In 2018, 30 cases of measles were notified (0.6 per 100,000 population).

Twenty-six cases belonged to four separate outbreaks in the following DHBs: Canterbury (13 cases), Southern (8 cases), Auckland (2 cases), Nelson Marlborough (2 cases) and Capital and Coast (1 case).

There were four unlinked cases that were not related to any outbreaks. They were reported in April (one each in Waitemata and Waikato DHBs), November (Auckland DHB) and December (Waitemata DHB). Of these four cases, all were separate, independent importations with no further transmission from Thailand (D8 genotype not previously seen in NZ), Malaysia (B3 genotype previously seen in NZ) and the Philippines (2 cases with B3 genotypes not previously seen in NZ).

There has been a large increase in measles cases for 2019 over 2018. From 1 January to 31 May 2019, 176 measles cases were notified (annualised rate of 3.6 per 100,000 population).

One hundred and fifty-six belonged to eight separate outbreaks in the following DHBs: Waitemata (41 cases), Canterbury (37 cases), Bay of Plenty (21 cases), Auckland (14 cases), Waikato (14 cases), Counties Manukau (10 cases), Hutt Valley (5 cases), Lakes (4 cases), Capital and Coast (4 cases), Northland (3 cases), Southern (2 cases), and MidCentral (1 case). There were 19 cases not linked to an outbreak reported in January (1 case), February (1 case), March (4 cases), April (2 cases) and May (11 cases). Seven of the 19 cases were separate, independent importations with no further transmission from: Thailand (1 case, D8 genotype not previously seen in NZ), Philippines (2 cases, B3 genotype previously seen in NZ), Afghanistan (1 case, B3 genotype not previously seen in NZ), China (1 case, B3 genotype previously seen in NZ), United Kingdom (1 case, D8 genotype previously seen in NZ) and Vietnam (1 case, D8 genotype previously seen in NZ). The remaining 12 non-outbreak cases were from Waitemata, Auckland and Counties Manukau DHBs, were not genotyped and the source is unknown. Seven of these cases had epilinks with at least one other apparent sporadic case (2 clusters of 2 cases and 1 cluster of 3 cases).

All the measles cases are summarised in Tables 1 to 3 and 5 to 8 and Figures 3.

Please also refer to the map of New Zealand administrative areas provided as Appendix 1 for the location of Public Health Units and DHBs.

During the period between 1 January 2018 and 31 May 2019, seven of the twelve outbreaks (Outbreaks 1, 2, 6, 9, 10, 11 and 12) as well as 11/23 unlinked cases that were not related to an outbreak followed a separate, independent importation and all outbreaks had a probable source identified. Outbreaks 1, 2 and 4 had D8 genotypes that were different from each other and had not been seen before in New Zealand. Outbreaks 3, 7 and 8 had B3 genotypes that were different from each other and had not been seen before in New Zealand.

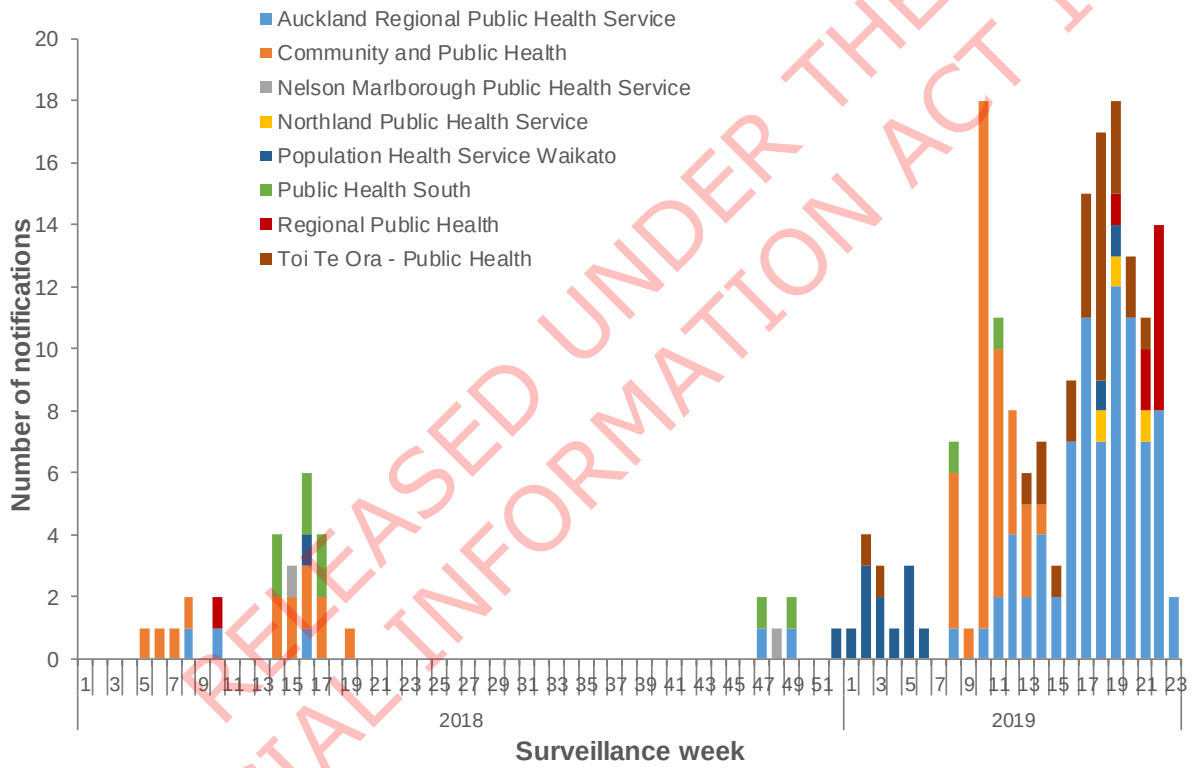
All cases genotyped during the period between 1 January 2018 and 31 May 2019 were D8 and B3 genotypes. Each outbreak or non-outbreak-related case with a D8 genotype had a different D8 genotype, except outbreaks 4, 6, 10 and the 7th and 13th non-outbreak-related cases (imported from the United Kingdom and Vietnam respectively) that had the same D8 genotype. Each outbreak or non-outbreak-related case with a B3 genotype had a different B3 genotype, except outbreaks 3 and 5 as well as the 3rd non-outbreak-related case (imported from Malaysia) that shared the same B3 genotype. Similarly, outbreak 9 and the 4th, 5th, 8th and 9th

non-outbreak-related cases (independently imported from the Philippines in 3 cases and from China in the remaining case) shared the same B3 genotype but this was different from the outbreaks and cases mentioned above.

Between 1 June and 30 June 2019 there has been one further outbreak reported from Lakes DHB (6 cases, ongoing transmission, separate importation from Singapore, D8 genotype had not been seen before in New Zealand).

Please refer to Table 9 for more details on measles outbreaks and Table 10 for more details on measles cases not related to any outbreak. Please note that while Figures 3-6 and Tables 1-3 and 5–8 only include data up to 31 May 2019, the count of cases linked to the outbreaks in Table 9 also includes cases reported in June 2019.

Figure 3: Number of measles notifications in New Zealand by Public Health Unit and week of rash onset, 1 Jan 2018 – 31 May 2019



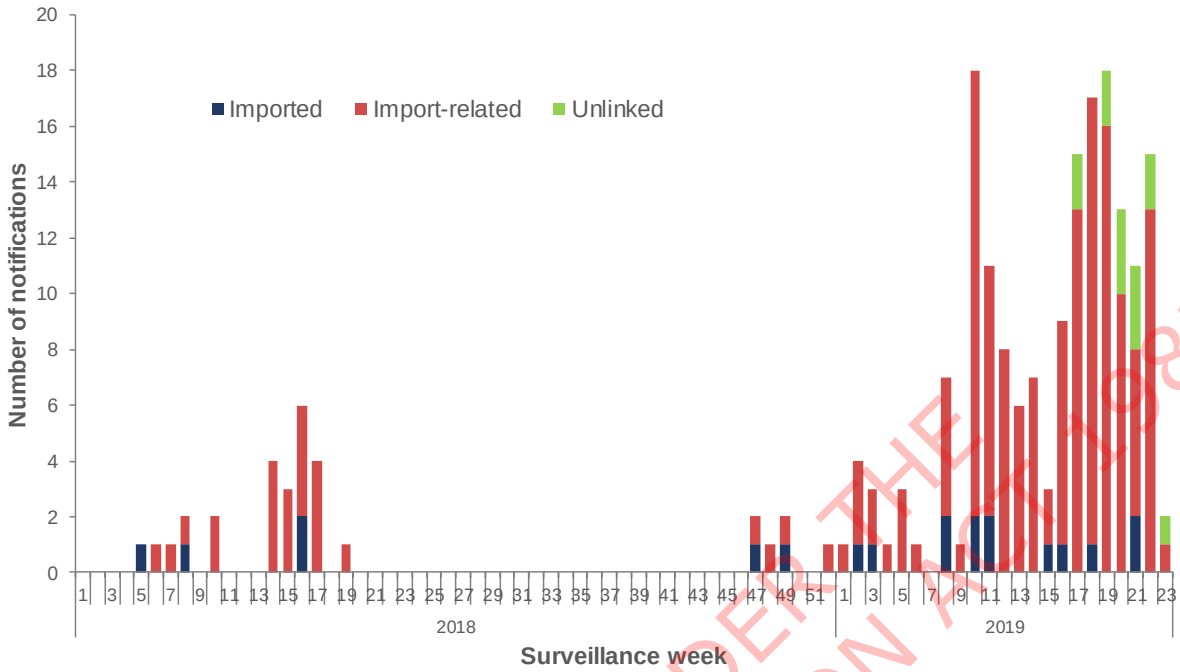
Notes: - One case reported from Auckland Regional Public Health Service on 6 May 2019 did not have a rash onset date

- The Public Health Unit administrative and geographical areas presented in the graph are, from North to South:

Northland Public Health Service which includes Northland DHB, the northern part of the North Island
Auckland Regional Public Health Service (ARPHS) which includes Waitemata, Auckland and Counties Manukau DHBs, ie, the whole Auckland region below Northland in the North Island
Population Health Service, Waikato, which includes Waikato DHB below the Auckland region in the North Island
Toi Te Ora Public Health which includes Bay of Plenty and Lakes DHBs in the middle of the North Island
Regional Public Health which includes Capital and Coast, Hutt Valley and Wairarapa DHBs, ie, the whole Wellington region, southern part of the North Island
Nelson Marlborough Public Health Service which includes Nelson Marlborough DHB, ie, the northern part of the South Island
Community Public Health which includes West Coast, Canterbury and South Canterbury DHBs, ie, the middle part of the South Island
Public Health South which includes Southern DHB, ie, the southern part of the South Island.

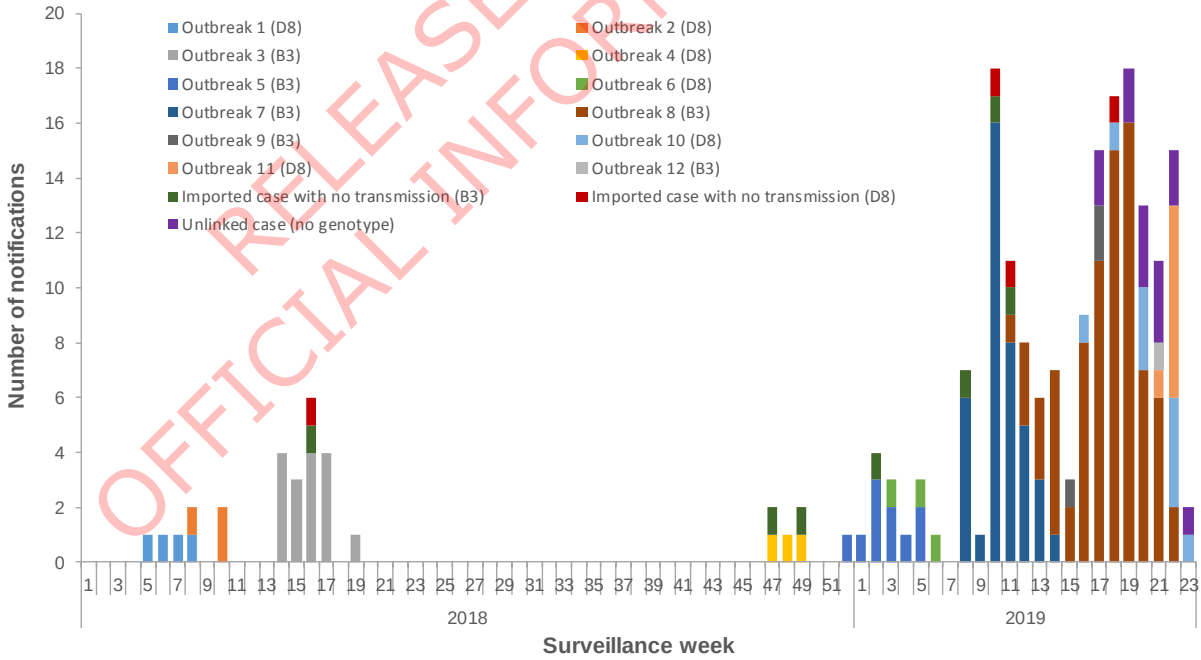
- All Public Health Unit administrative areas are shown on a map in Appendix 1.

Figure 4: Number of measles notifications in New Zealand by source of infection and week of rash onset, 1 Jan 2018 – 31 May 2019



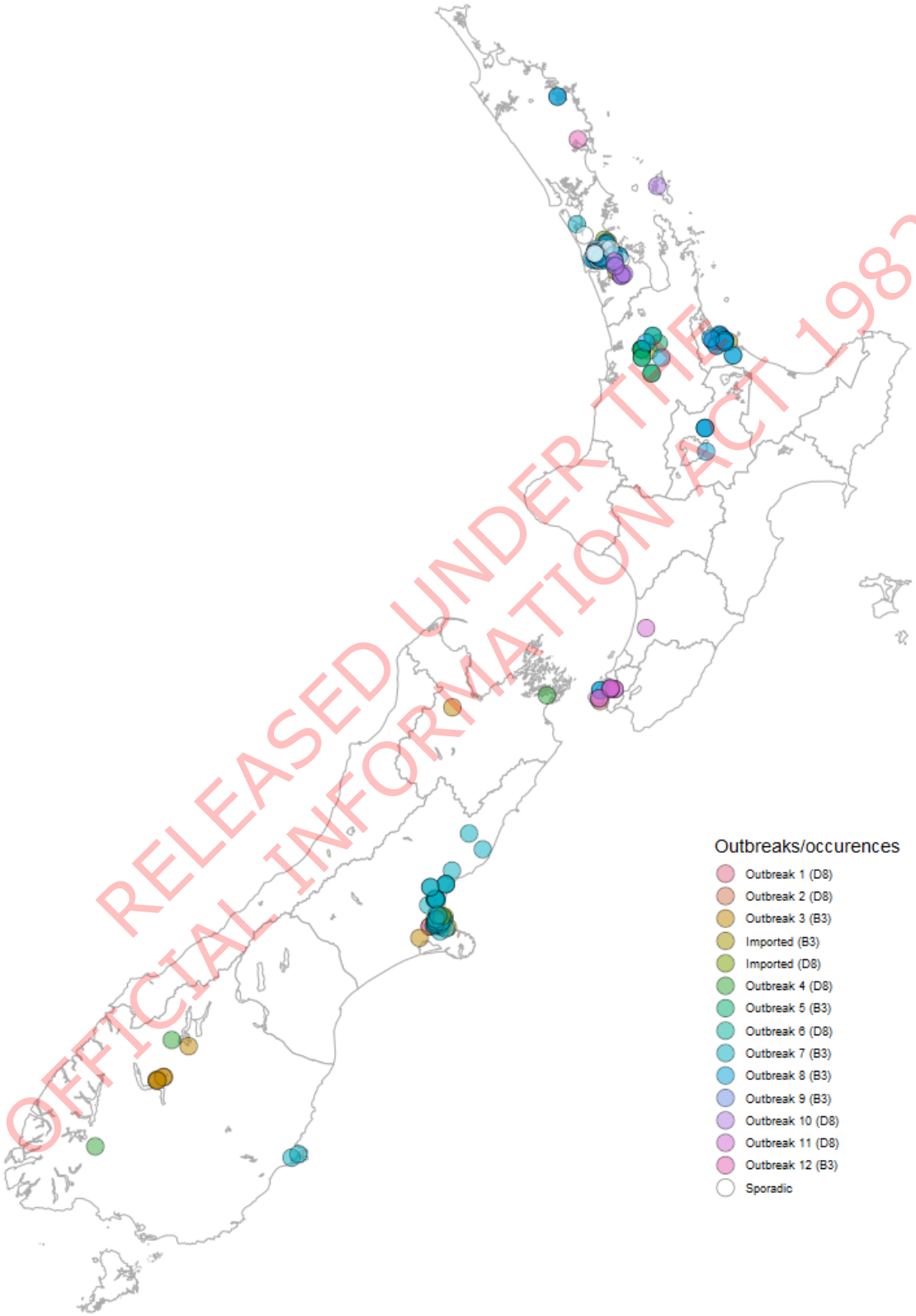
Note: One case reported on 6 May 2019 did not have a rash onset date

Figure 5: Number of measles notifications in New Zealand by outbreak status and week of rash onset, 1 Jan 2018 – 31 May 2019



Note: One case from Outbreak 8 (B3) reported on 6 May 2019 did not have a rash onset date

Figure 6: Location of all notified outbreak and non-outbreak measles cases in New Zealand, 1 Jan 2018 – 31 May 2019



Note: Public Health Unit administrative areas are shown in Appendix 1.

The prioritised ethnicities of the 206 cases reported from 1 January 2018 to 31 May 2019 were Māori (28 cases), Pacific (23 cases), Asian (18 cases), European or Other (133 cases), MELAA (1 case) and unknown (3 cases).

Tables 1 to 7A[4] describe the number of suspected cases investigated for measles and rubella, the number of measles cases by case classification and origin of infection, the age and vaccination status of laboratory-confirmed and epidemiologically linked cases of measles (excluding imported cases), the number of all measles cases by DHB and month, confirmed measles and rubella incidence rate and number of CRS cases (for the last 8 calendar years) and measles outbreaks, as well as and measles cases not related to an outbreak.

Table 1: Number of suspected cases investigated for measles and rubella

Number of suspected cases investigated for measles and rubella in 2018

Initial diagnosis of suspected case	Total suspected cases	Classified as measles*	Classified as rubella*	Clinically measles or rubella compatible	Discarded (non-measles, non-rubella)
Measles	348	30	0	0	318
Rubella	22	0	0	1	21
Total	**370**	**30**	**0**	**1**	**339**

Number of suspected cases investigated for measles and rubella from 1 January to 31 May 2019

Initial diagnosis of suspected case	Total suspected cases	Classified as measles*	Classified as rubella*	Clinically measles or rubella compatible	Discarded (non-measles, non-rubella)
Measles	1231	176	0	0	1055
Rubella	8	0	1	0	7
Total	**1239**	**176**	**1**	**0**	**1062**

* To include laboratory-confirmed and epidemiologically linked, regardless of origin.

As only two cases were classified and notified as rubella between 1 January 2018 and 31 May 2019, the full description of these cases are provided above at beginning of 2.3.

[4] They follow as much as possible current WPRO reporting requirement.

Table 2: Number of measles cases by case classification and origin of infection

Number of measles cases by case classification and origin of infection in 2018

Measles	Laboratory-confirmed	Epidemiologically linked	Total	Clinically compatible
Imported	6	0	6	0
Import-related	22	2	24	0
Endemic	0	0	0	0
Unknown	0	0	0	0
Total	**28**	**2**	**30**	**0**

Number of measles cases by case classification and origin of infection from 1 January to 31 May 2019

Measles	Laboratory-confirmed	Epidemiologically linked	Total	Clinically compatible
Imported	13	0	13	0
Import-related	130	20	150	0
Endemic	0	0	0	0
Unknown	12	1	13	0
Total	**155**	**21**	**176**	**0**

Table 3: Number of rubella cases by case classification and origin of infection

Number of rubella cases by case classification and origin of infection in 2018

Rubella	Laboratory-confirmed	Epidemiologically linked	Total	Clinically compatible
Imported	0	0	0	1
Import-related	0	0	0	0
Endemic	0	0	0	0
Unknown	0	0	0	0
Total	**0**	**0**	**0**	**1**

Number of rubella cases by case classification and origin of infection from 1 January to 31 May 2019

Rubella	Laboratory-confirmed	Epidemiologically linked	Total	Clinically compatible
Imported	1	0	1	0
Import-related	0	0	0	0
Endemic	0	0	0	0
Unknown	0	0	0	0
Total	**1**	**0**	**1**	**0**

Table 4: Congenital rubella syndrome (CRS) cases

Number of suspected CRS cases by case classification and origin of infection in 2018

CRS	Laboratory-confirmed	Clinically compatible*	Discarded
Imported	0	0	0
Import-related	0	0	0
Endemic	0	0	0
Unknown	0	0	0

*Data from New Zealand Paediatric Surveillance Unit

Table 5: Age and vaccination status of laboratory-confirmed and epidemiologically linked cases of measles (excluding imported cases) in 2018

Measles	<15 months	15 months–3 years	4–9 years	10–19 years	20–29 years	30–49 years	50+	Total
0 doses	2		1	3	6	2	1	15
1 dose		1				2		3
2 or more doses								0
Unknown						5	1	6
Total	**2**	**1**	**1**	**3**	**6**	**9**	**2**	**24**

Notes: - Immunisation status in EpiSurv is based on either documentation or patient/caregiver recall.
- Empty cells = 0

Rubella: none

Table 6: Age and vaccination status of laboratory-confirmed and epidemiologically linked cases of measles and rubella (excluding imported cases) from 1 January to 31 May 2019

Measles	<15 months	15 months–3 years	4–9 years	10–19 years	20–29 years	30–49 years	50+	Total
0 doses	26	17	7	34	17	9	3	**113**
1 dose					2	5		**7**
2 or more doses		1	1	1	7	1		**11**
Unknown		1		2	12	16	1	**32**
Total	**26**	**19**	**8**	**37**	**38**	**31**	**4**	**163**

Notes: - Immunisation status in EpiSurv is based on either documentation or patient/caregiver recall.
- Empty cells = 0

Rubella: none

The 10 cases fully immunised with two MMR doses were further investigated. For the doses where batch number was available, there was no common batch number. Immunisation records were not available for two young adults.

Table 7: Number of all measles cases by DHB and month

a. Number of all measles cases (classified as laboratory-confirmed or epidemiologically linked) by DHB and month, 2018

DHB	Population size	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Waitemata	620300				1								1	2
Auckland	536800		1	1								1		3
Waikato	416400				1									1
Capital & Coast	317500			1										1
Nelson Marlborough	150600				1							1		2
Canterbury	563200	1	3		8	1								13
Southern	330100				6							2		8
Total	**2934900**	**1**	**4**	**2**	**17**	**1**	**0**	**0**	**0**	**0**	**0**	**4**	**1**	**30**

Note: Empty cells = 0

b. Number of all *measles* cases (classified as laboratory-confirmed or epidemiologically linked) by DHB and month, 1 January to 31 May 2019

DHB	Population size	Jan	Feb	Mar	Apr	May	Total
Northland	179100				1	2	**3**
Waitemata	620300			5	19	29	**53**
Auckland	536800			6	2	9	**17**
Counties Manukau	558200		1		2	9	**12**
Waikato	416400	11	1		1	1	**14**
Lakes	109700				1	3	**4**
Bay of Plenty	237000	2			13	7	**22**
MidCentral	179300					1	**1**
Hutt Valley	149500					5	**5**
Capital and Coast	317500					4	**4**
Canterbury	563200		5	34			**39**
Southern	330100		1	1			**2**
Total	**4018000**	**13**	**8**	**46**	**39**	**70**	**176**

Note: Empty cells = 0

c. Number of all *rubella* cases (classified as laboratory-confirmed or epidemiologically linked) by DHB and month, 2018

None

d. Number of all *rubella* cases (classified as laboratory-confirmed or epidemiologically linked) by DHB and month, 1 January to 31 May 2019

DHB	Population size	Jan	Feb	Mar	Apr	May	Total
MidCentral	179300	0	1	0	0	0	1
Total	**179300**	**0**	**1**	**0**	**0**	**0**	**1**

Table 8: Confirmed measles and rubella incidence rate, and number of CRS cases (for the last 10 calendar years)

Incidence	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Measles incidence per 1 million population*	53.9	9.4	120.7	12.3	0.7	57.9	1.1	20.7	2.1	4.9
Rubella incidence per 1 million population*	0.5	0	1.8	0.5	0	0.7	0	0	0	0
Number of CRS cases	0	0	0	0	0	0	0	0	0	0

* The numerator is total number of measles/rubella cases including laboratory-confirmed and epidemiologically linked but excluding imported cases.

Table 9: Measles outbreaks from 1 January 2018 to 30 June 2019

Outbreak ID	Initial DHB affected	Date of rash onset on 1st case	Date of rash onset of last case	Total number of cases	Genotype	MeanNS entry	Variant lineage*	Country of importation
1	Canterbury	27/1/18	19/2/18	4	D8 (different from previous strains in NZ)	MVs/Christchurch.NZL/4.18/D8	No exact matches found. Closest match to named strain = MVs/Thiruvananthapuram.IND/18.12/	India
2	Counties Manukau	21/2/18	7/3/18	3	D8 (different from previous strains in NZ)	MVs/Auckland.NZL/8.18/D8	No exact matches found. Closest match to named strain = MVi/Pune.IND/10.13/	India
3	Canterbury	3/4/18	11/5/18	16	B3 (different from previous strains in NZ, identical to MVs/Victoria.AUS/10.18/2 imported into Australia from Malaysia)	MVs/Christchurch.NZL/13.18/B3	Exact match = MVi/Gombak.MYS/44.16/	Australia or Malaysia?
4	Southern	17/11/18	1/12/18	3	D8 (different from previous strains in NZ, identical to recent strains reported from Japan, Vietnam and Western Australia)	MVs/Te Anau.NZL/46.18/D8	Exact match = MVs/Gir Somnath.IND/42.16/	Japan? Vietnam? Western Australia?
5	Waikato	28/12/2018	26/01/2019	10	B3 (same as Outbreak 3 and case 18-339485-AK imported from Malaysia)	MVs/Te Awamutu.NZL/52.18/B3	Exact match = MVi/Gombak.MYS/44.16/	Malaysia?
6	Bay of Plenty	14/01/2019	5/02/2019	3	D8 (same as Outbreak 4)	MVs/Tauranga.NZL/2.19/[D8]	Exact match = MVs/Gir Somnath.IND/42.16/	Japan
7	Canterbury	6/03/2018	30/03/2019	40	B3 (different from previous strains in NZ)	MVs/Dunedin.NZL/7.19/B3	No exact matches found. Closest match to named strain = MVi/Gombak.MYS/40.15/	Philippines?
8	Auckland	9/03/2019	ongoing	93**	B3 (different from previous strains in NZ)	MVs/Auckland.NZL/10.19/7/[B3]	No exact matches found. Closest match to named strain = MVs/Kabul.AFG/20.2014/3	Not known
9	Bay of Plenty	9/04/2019	21/04/2019	3	B3 (same as previous strains in NZ)	MVs/Tauranga.NZL/15.19/5/[B3]	No exact matches found. Closest match to named strain = MVi/Gombak.MYS/40.15/	Philippines
10	Waitemata	18/04/2109	ongoing	30**	D8 (same as Outbreaks 4 and 6 and case 19-346522-CH, but independent importation)	MVs/Auckland.NZL/16.19/5/[D8]	Exact match = MVs/Gir Somnath.IND/42.16/	Thailand
11	Hutt Valley	20/05/2019	ongoing	10**	D8 (same as Outbreaks 4, 6 and 10 and cases 19-	MVs/Lower Hutt.NZL/21.19/[D8]	Exact match = MVs/Gir Somnath.IND/42.16/	Australia

Outbreak ID	Initial DHB affected	Date of rash onset on 1st case	Date of rash onset of last case	Total number of cases	Genotype	MeanNS entry	Variant lineage*	Country of importation
					350240-AK and 19-346522-CH, but separate importation).			
12	Northland	21/05/2019	ongoing	11**	B3 (same as Outbreak 9, but separate importation).	MVs/Whangarei.NZL/21.19/2/[B3]	No exact matches found. MVi/Gombak.MYS/40.15	Philippines
13	Lakes	8/06/2019	ongoing	6**	D8	MVs/Taupo.NZL/23.19/4/[D8]	No exact matches found. Closest match to named strain = MVs/Gir Somnath.IND/42.16	Singapore

* Identity with named strain or exact match in MeaNS or no exact match. For more details, see genotyping section.
** Outbreaks ongoing as on 12 July 2019: The total number includes June cases.
? Probable but unconfirmed country of importation
Notes: Rash onset dates are used as they are more reliable.
Outbreak 3 also had cases in Nelson Marlborough and Southern DHBs.
Outbreak 4 also had cases in Nelson Marlborough DHB.
Outbreak 6 also had cases in Waikato DHB.
Outbreak 7 also had cases in Waitemata and Southern DHBs.
Outbreak 8 also had cases in Northland, Waitemata, Counties Manukau, Waikato, Lakes and Bay of Plenty DHBs.
Outbreak 10 also had cases in Auckland and Counties Manukau DHBs.
Outbreak 11 also had cases in Capital and Coast and MidCentral DHBs.
Outbreak 13 reported in June.

Table 10A: Confirmed measles cases not related to an outbreak (imported with no transmission or unlinked to a known outbreak) from 1 January 2018 to 30 June 2019

Case ID	DHB	Date of rash onset	Genotype	MeanNS entry	Variant lineage*	Source	Country of importation
2018 (1 January—31 December)							
18-326394-AK	Waitemata	14 Apr	D8 Different from previous strains in NZ	MVs/Auckland.NZL/15.18/D8	No exact matches found. Closest match to named strain = MVs/Samut	Imported	Thailand
18-326324-HN	Waikato	15 Apr	B3 Different from previous strains in NZ	MVs/Hamilton.NZL/15.18/B3	No exact matches found. Closest match to named strain = Mvi/Gombak.MYS/40.15/	Imported	Philippines
18-339485-AK	Auckland	21 Nov	B3 Identical to strains from outbreak 3, but separate importation from Malaysia.	MVs/Auckland.NZL/46.18/B3	Exact match = Mvi/Gombak.MYS/44.16/	Imported	Malaysia
18-340574-AK	Waitemata	3 Dec	B3 Different from previous strains in NZ including 2bp difference to 18-326324-HN	MVs/Auckland.NZL/48.18/B3	No exact matches found. Closest match to named strain = Mvi/Gombak.MYS/40.15/	Imported	Philippines
2019 (1 January—30 June)							
19-342864-TG	Bay of Plenty	8 Jan	B3 Identical to 18-340574-AK , but separate independent importation	MVs/Tauranga.NZL/1.19/B3	No exact matches found. Closest match to named strain = Mvi/Gombak.MYS/40.15/	Imported	Philippines
19-346139-AK	Counties Manukau	22 Feb	B3 Different from previous strains in NZ	MVs/Auckland.NZL/8.19/5/B3	No exact matches found. Closest match to named strain = MVs/Kabul.AFG/20.2014/3	Imported	Afghanistan
19-346522-CH	Canterbury	4 Mar	D8 Identical to Outbreaks 4 and 6 but separate independent importation	MVs/Christchurch.NZL/10.19/2/D8	Exact match = MVs/Gir_Somnath.IND/42.16/	Imported	UK
19-347038-AK	Auckland	8 Mar	B3 Identical to 18-340574-AK and 19-342864-TG respectively, but separate independent importation	MVs/Auckland.NZL/10.19/6/B3	No exact matches found. Closest match to named strain = Mvi/Gombak.MYS/40.15	Imported	Philippines
19-347265-AK	Waitemata	14 Mar	B3 Identical to 18-340574-AK, 19-342864-TG and 19-347038-AK but separate independent importation	MVs/Auckland.NZL/11.19/2/B3	No exact matches found. Closest match to named strain = Mvi/Gombak.MYS/40.15	Imported	China
19-348039-CH	Canterbury	15 Mar	D8 Different from previous strains in NZ	MVs/Christchurch.NZL/11.19/D8	No exact matches found. Closest match to named strain = MVs/Gir	Imported	Thailand

Case ID	DHB	Date of rash onset	Genotype	MeanNS entry	Variant lineage*	Source	Country of importation
19-349670-AK	Waitemata	20 Apr		Genotyping not feasible		Unknown	
19-349539-AK	Waitemata	23 Apr		Genotyping not feasible		Unknown	
19-350240-AK	Auckland	1 May	D8 Identical to Outbreaks 4, 6 and 10 and case 19-346522-CH, but separate importation	MVs/Auckland.NZL/18.19/4/D8	Exact match = MVs/Gir Somnath.IND/42.16/	Imported	Vietnam?
19-351033-AK	Counties Manukau	6 May		Genotyping not feasible		Unknown	
19-350643-AK	Waitemata	9 May		Not genotyped**		Unknown	
19-351106-AK	Waitemata	15 May		Not genotyped**		Unknown	
19-351236-AK	Waitemata	16 May		Not genotyped**		Unknown	
19-351098-AK	Waitemata	17 May		Not genotyped**		Unknown	
19-351247-AK	Waitemata	20 May		Not genotyped**		Unknown	
19-351237-AK	Auckland	21 May		Not genotyped**		Unknown	
19-351373-AK	Waitemata	22 May		Not genotyped**		Unknown	
19-351894-AK	Waitemata	31 May		Not genotyped**		Unknown	
19-351776-AK	Waitemata	31 May		Not genotyped**		Unknown	

* Identity with named strain or exact match in MeaNS or no exact match. For more details, see genotyping section.
? Probable but unconfirmed country of importation
** These cases were not yet linked to an outbreak or genotyped at the time of the report writing
Note: Rash onset dates are used as they are more reliable.

Table 10B: Confirmed rubella cases not related to an outbreak (imported with no transmission or unlinked) from 1 January 2018 to 30 June 2019

Case ID	DHB	Date of rash onset	Genotype	RubeNS entry	Variant lineage*	Source	Country of importation
19-344544-PN	MidCentral	30 June 2019	1E	RVs/Pahiatua.NZL/05.19/	Exact match = Rvi/Gansu.CHN/25.18/1 Closest match to named strain = Rvi/MYS/01_1E		Philippines

* Identity with named strain or exact match in RubeNS or no exact match. For more details, see genotyping section.
Note: Rash onset dates are used as they are more reliable

2.2.3 National response to measles outbreaks between 1 January in 2018 and to 31 May 2019.

The response to measles importations and subsequent outbreaks in 2018 and 2019 followed the standard New Zealand approach: the response is managed locally by the PHUs and DHBs, with support from the Ministry whenever required. Case and contact management was carried out as per normal protocols.

A number of routine local and national response activities were conducted in 2018 and 2019, including:

- **Enhanced surveillance**
  Enhanced surveillance for measles was put in place as soon as an index case with potential vulnerable contacts was seen in a PHU with GPs being informed and Medical Officers of Health requested to inform the Ministry immediately of any suspected or confirmed case of measles, with timely updates when an outbreak had been confirmed.

- **Immunisation response**
  Usually, during measles outbreaks, completing MMR two-dose immunisation is strongly recommended in the places affected for those who have not two received two doses of measles-containing vaccine or have no serological evidence of immunity. An enhanced immunisation response is part of the 'Manage It' response phase (see below)

  However only one PHU (Community and Public Health in Canterbury) implemented an immunisation campaign in response to a significant local measles outbreak in 2019. The outbreak subsequently subsided with no further outbreak-related cases reported, despite all the other events and gatherings that occurred in the main city (Christchurch) at that time (linked to the terrorist shootings in March 2019). During this outbreak, there was an increased vaccine demand in the both in Canterbury and other parts of the country, resulting in a temporary shortage of vaccine and vaccine distribution. This resulted in a shifting of both the national advice and local advice to focus first on ensuring all children were vaccinated according to the schedule times, and second priority on adolescents and young adults obtaining the first MMR vaccine. Offering a second MMR was given a lower priority until supplies were adequate.

- **Public awareness**
  The Ministry carried out national communications in coordination with DHBs. Communications regarding measles and overseas travel and measles immunisation were conducted. They included an emphasis on MMR dose one immunisation given some problems with timely vaccine supply to respond to the demand.

- **Outbreak management:**

  In few instances PHUs had to move towards a "Manage It" rather than the usual "Stamp It Out" public health response as 1) the virus was considered likely to be widespread in their region and 2) the workload due to contact tracing not sustainable. This usually means a focus on those at highest risk from measles (household members and the vulnerable, such as unvaccinated children in early learning services) but devolving other contact tracing and communication activities. In one of these PHU (ARPHS) the outbreaks were still peaking at the beginning of August 2019.

- **Long term strategy**
  No funding has been available nationally to support supplementary immunisation activities to increase immunity against measles. However the Ministry is reviewing strategies to target adolescents and young adults who are under immunised with a view to implementation in 2020 subject to funding.

3 Line of evidence 2: quality of measles, rubella, and congenital rubella syndrome (CRS) surveillance

3.1 Epidemiological surveillance capacity description

3.1.1 New Zealand's national notifiable disease surveillance system (EpiSurv)

Under the Health Act 1956, health professionals are required to inform their local Medical Officer of Health of any notifiable disease that they suspect or diagnose. Since December 2007, laboratories have also been required to report notifiable diseases to Medical Officers of Health. These notifications provide the basis for surveillance and control of notifiable diseases in New Zealand.

Measles and rubella became notifiable on 1 June 1996.

Notification data are entered at each PHU via a secure web-based portal into New Zealand's computerised notifiable disease surveillance database (EpiSurv). The near real-time data are collated and analysed on behalf of the Ministry of Health by the Institute of Environmental Science and Research Ltd (ESR). The data collected depends on the specific disease, but usually include demography, case classification, outcome, basis of diagnosis, risk factors and some clinical management information.

Laboratories report notifiable diseases to Medical Officers of Health through the direct laboratory notification (DLN) electronic system. They use laboratory notification flowcharts that are based on the case definitions.

In practice, when measles or rubella cases occur, they are fully investigated by the local PHU, which tries to identify the chain of transmission and the origin of infection. This detailed information is available at PHU level and summarised on EpiSurv.

3.1.2 Measles and rubella surveillance and EpiSurv data

Case classifications

New Zealand

- **Under investigation:** A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Confirmed**: A clinically compatible illness that is laboratory confirmed or epidemiologically linked to a confirmed case.[5]
- **Probable**: A clinically compatible illness.
- **Not a case**: A case that has been investigated and subsequently found not to meet the case definition.

Clinical description

Measles

An illness clinically compatible with **measles** is an illness characterised by all of the following:

1. generalised maculopapular rash, starting on the head and neck
2. fever (at least 38ºC if measured) present at the time of rash onset
3. cough or coryza or conjunctivitis or Koplik's spots present at the time of rash onset.

Rubella

An illness clinically compatible with **rubella** is an illness with a generalised maculopapular rash, fever and one or more of the following:

- arthralgia/arthritis
- lymphadenopathy
- conjunctivitis.

Rubella often presents atypically and is difficult to diagnose clinically with certainty. Up to 50 percent of rubella infections are subclinical. If accurate diagnosis is important, it must be laboratory confirmed.

Congenital rubella syndrome (CRS)

Regarding **CRS** in particular, the most common anomalies are deafness, cataract or glaucoma, congenital heart disease and mental retardation. In addition, infants with CSR are often growth retarded and may have radiolucent bone disease, hepatosplenomegaly, thrombocytopenia and purpuric skin lesions. Severe cases may spontaneously abort, or have multiple manifestations in infancy; mild cases may have only a single manifestation. In general, the younger the foetus when infected, the more severe the illness.

Laboratory evidence for diagnosis

Measles

If the case received a vaccine containing the measles virus in the 6 weeks prior to symptom onset then laboratory confirmation requires:

- evidence of infection with a wild-type virus strain obtained through genetic characterisation.

If the case did not receive a vaccine containing the measles virus in the 6 weeks prior to symptom onset, then laboratory confirmation requires at least one of the following:

[5] The epidemiological link doesn't apply to CRS for case confirmation.

- detection of IgM antibody specific to the virus
- IgG seroconversion or a significant rise (four-fold or greater) in antibody level for the virus between paired sera tested in parallel where the convalescent serum was collected 10 to 14 days after the acute serum
- isolation of measles virus by culture
- detection of measles virus nucleic acid.

It is strongly recommended that, for any sporadic cases of suspected measles, two or more samples be taken: preferably blood for serology, and nasopharyngeal swab or urine sample for nucleic acid testing (NAT).

Genetic characterisation should be carried out in accordance with advice from the national measles reference laboratory, in particular for imported cases, for sporadic cases unrelated to a known outbreak, and during the course of a prolonged outbreak for cases without clear epidemiological links to previously confirmed cases.

The use of laboratory tests may change in an established outbreak.

Rubella
If the case received a vaccine containing the rubella virus in the 6 weeks prior to symptom onset then laboratory confirmation requires:

- evidence of infection with a wild-type virus strain obtained through genetic characterisation.

If the case did not receive a vaccine containing the rubella virus in the 6 weeks prior to symptom onset, then laboratory confirmation requires at least one of the following:

- detection of IgM antibody specific to the virus
- IgG seroconversion or a significant rise (four-fold or greater) in antibody level for the virus between paired sera tested in parallel where the convalescent serum was collected 10 to 14 days after the acute serum
- isolation of rubella virus by culture
- detection of rubella virus nucleic acid.

For more detail on case classifications refer to the Ministry of Health's *Communicable Disease Control Manual 2012* (http://www.health.govt.nz/publication/communicable-disease-control-manual-2012).

WHO

- **Suspected case of measles or rubella**: a patient in whom a health-care worker suspects measles or rubella infection, or a patient with fever and maculopapular (non-vesicular) rash
- **Laboratory-confirmed measles or rubella case**: A suspected case of measles or rubella that has been confirmed by a proficient laboratory.
- **Epidemiologically-linked confirmed measles or rubella case**: A suspected case of measles or rubella that has not been confirmed by a laboratory but was geographically and temporally related, with dates of rash onset occurring 7–21 days apart for measles (or 12-23 days for rubella), to a laboratory-confirmed case or, in the event of a chain of transmission, to another epidemiologically-confirmed measles or rubella case.
- **Clinically measles compatible**: A case with fever and maculopapular (non-vesicular) rash and one of cough, coryza or conjunctivitis, for which no adequate clinical specimen was taken and which has not been linked epidemiologically to a laboratory-confirmed case of measles or another laboratory-confirmed communicable disease.

- **Clinically rubella compatible**: a case with maculopapular (non-vesicular) rash and fever (if measured) and one of arthritis/arthralgia or lymphadenopathy, for which no adequate clinical specimen was taken and which has not been linked epidemiologically to a laboratory-confirmed case of rubella or another laboratory-confirmed communicable disease
- **Suspected CRS case**: any infant less than one year of age in whom a health worker suspects CRS, usually in an infant 0-11 months old who presents with heart disease and/or suspicion of hearing impairment and/or one or more of the following eye signs (cataracts, congenital glaucoma, pigmentary retinopathy) OR if infant's mother has history of suspected or confirmed rubella during pregnancy, even when the infant shows no signs of CRS.
- **Laboratory confirmed CRS case**: A suspected case with at least one condition from group A (cataracts, congenital glaucoma, congenital heart disease, hearing impairment, pigmentary retinopathy) and meets the laboratory criteria for CRS laboratory confirmation.
- **Clinically confirmed CRS case**: A case in which no adequate clinical specimen was taken but in whom a health worker detects at least two of the complications listed in group A (cataracts, congenital glaucoma, congenital heart disease, hearing impairment, pigmentary retinopathy) or one in group A and one in group B (purpura, splenomegaly,microcephaly, developmental delay, meningoencephalitis, radiolucent bone disease, jaundice that begins within 24 hours after birth).

Table 11 shows how the notifications recorded in EpiSurv have been aligned to match as closely as possible the WHO case classifications.

Table 11: Alignment of New Zealand case classification to match WHO classification

EpiSurv	WHO
Under investigation	Suspected
Confirmed with laboratory confirmation	Laboratory-confirmed
Confirmed with no laboratory confirmation[1]	Epidemiologically-confirmed*
Probable	Clinically compatible Clinically confirmed (CRS)

*The epidemiological link does not apply to CRS for case confirmation

3.1.3 New Zealand Paediatric Surveillance Unit

Surveillance for CRS has been undertaken by the New Zealand Paediatric Surveillance Unit (NZPSU) since January 1998.

The method of surveillance of the NZPSU is based on that developed in the United Kingdom in 1986 by the British Paediatric Surveillance Unit. It has subsequently been used for the monitoring of rare childhood conditions in several other countries, including Australia, and also by other specialist groups.

Annually, the NZPSU obtains a list of paediatricians who are registered with the New Zealand Medical Council and if any are not enrolled with the network they are invited to join.

Every month participants are sent either a reply-paid card or an email (depending on their preferred method of reporting) to report whether in the previous month they have seen any

cases of the conditions under surveillance. When a case of any of the conditions is reported, the reporting clinician is sent a short questionnaire to complete on the case. There were 262 paediatricians on NZPSU mailing list in 2018, with an average monthly response return rate of 85% throughout the year. Where possible, cases are regularly compared with other data sources such as hospital discharge data and notifications to the local Medical Officer of Health.

The enrolment rate of paediatricians and return rate of report cards have always been very high since the NZPSU was established.

The case definition used by the NZPSU for CRS is as follows: any child or adolescent up to 16 years of age who in the opinion of the notifying paediatrician has definite or suspected congenital rubella, with or without defects, based on history, clinical and laboratory findings. A suspected case is considered as definite only upon laboratory confirmation.

3.2 Epidemiological surveillance performance indicators

Table 12: WHO indicators and targets for epidemiological surveillance quality of measles and rubella notifications in New Zealand, 2018

Indicator	Target	2018[1]
Proportion of surveillance units reporting measles data to the national level on time	≥ 80%	100%
Reporting rate of discarded non-measles non-rubella cases at the national level	≥ 2 per 100,000 population	5.7 per 100,000 population
Proportion of 2nd administrative level units reporting at least two discarded non-measles non-rubella cases per 100,000	≥ 80% of 2nd level administrative units	75%[2]
Proportion of all suspected measles cases that have had an adequate investigation initiated within 48 hours of notification	≥80% of suspected cases	Data not currently available. Each notified case is considered to be under investigation until a further classification is made. All relevant clinical and demographic information on the suspected case is expected to be collected within one working day whenever possible.
Proportion of suspected cases with adequate specimen collection[3]	≥ 80% of suspected cases, excluding epidemiologically linked cases	95.1%[4]
Proportion of specimens received at the laboratory within five days of collection	> 80%	> 80%[5]
Proportion of laboratory-confirmed chains of transmission (defined as two or more confirmed measles cases) with specimens adequate for detecting measles virus collected and tested in an accredited laboratory	≥ 80%	100%[6]
Proportion of national measles laboratories that are WHO-accredited	100% of laboratories	100% NMRL at CHL as the only WHO-accredited national measles and rubella reference laboratory
Proportion of laboratories (government and private) that conduct measles diagnostic testing that have adequate quality assurance mechanisms in place	100% of laboratories	100% All laboratories in New Zealand are accredited to the ISO15189 standard through the IANZ laboratory accreditation programme. A requirement is participation in QA programmes for every routine test. In addition to external QA programmes, the NMRL at CHL has initiated a measles and rubella sample exchange programme with all laboratories in New Zealand that are doing measles and rubella testing
Proportion of results reported by the laboratory within four days of receiving the specimen	> 80%	100%
Proportion of virus detection and genotyping results (where appropriate) that are completed within two months of receipt of specimen	≥ 80% of specimens received	100%

1 A value in red indicates that the indicator did not meet the target.

2 See Table 12A for the cases and rates by DHB (2nd level administrative unit).

3 This indicator has been calculated using the following data: proportion of all notified measles and rubella cases (including discarded cases) that were not epidemiogically-linked to a measles or rubella case and that were laboratory-tested. In New Zealand, it is strongly recommended that two or more samples be taken for any sporadic cases of suspected measles: preferably blood for serology, and nasopharyngeal swab or urine sample for nucleic acid testing (NAT). So nasopharyngeal swabs are considered as appropriate for PCR testing, and

testing in all laboratories performing measles and rubella tests is considered as appropriate, though only one of them (the National Measles Reference Laboratory) is WHO accredited.

4 See Table 12B. This proportion is in red are.

5 Though data are not available, it is estimated that the majority of samples for measles or rubella virus testing are received by New Zealand laboratories within 24 hours (a single working day).

6 See Table 9 for list of outbreaks by genotype.

Table 12A: Number and rate of discarded non-measles non-rubella cases by DHB, 2018

District health board	Population estimate	Cases	Rate per 100,000	Year(s)
Northland	179100	3	1.7	2018
Waitemata[1]	620300	48	7.7	2018
Auckland[1]	536800	20	3.7	2018
Counties Manukau[1]	558200	35	6.3	2018
Waikato	416400	33	7.9	2018
Lakes	109700	2	1.8	2018
Bay of Plenty	237000	6	2.5	2018
Tairawhiti	145500	1	0.7	2016-2018
Taranaki	119800	2	1.7	2018
Hawke's Bay	165800	8	4.8	2018
Whanganui	129000	4	3.1	2017-2018
MidCentral	179300	10	5.6	2018
Hutt Valley	149500	5	3.3	2018
Capital and Coast	317500	4	1.3	2018
Wairarapa	133600	10	7.5	2016-2018
Nelson Marlborough	150600	9	6.0	2018
West Coast	130300	20	15.3	2015-2018
Canterbury[1]	563200	61	10.8	2018
South Canterbury	119500	3	2.5	2017-2018
Southern	330100	23	7.0	2018
New Zealand	4885300	280	5.7	2018

1 The four most populated district health boards (Auckland, Waitemata, Counties Manukau and Canterbury) had rates between 3.7 and 10.8 per 100,000 in 2018. They include approximately 47% of New Zealand total population.

Notes:

- Where DHB has a population of <100,000, the rate is calculated by combining data from the previous year(s) for the given DHB to achieve ≥ 100,000 person-years of observation.
- Rates in red are for DHBs that did not meet the target of at least two discarded non-measles non-rubella cases per 100,000 population.

Although only 75% of the DHBs have been reporting at least two discarded non-measles non-rubella cases per 100,000 in 2018, the 25% not meeting this target represent merely 16% of the New Zealand population, as also reflected by the reporting rate of discarded non-measles non-rubella cases at the national level (5.7 per 100,000 population, much higher than the target of 2 per 100,000).

Table 12B: Breakdown of measles and rubella suspected cases that were not epidemiologically linked and whether they were laboratory-tested, 2018

Description	2018
Total	**206**
Laboratory-tested	194
Not laboratory tested	10
Unknown	2
Proportion of cases that were laboratory-tested	**95.1**

In addition to these indicators, the level of compliance of health professionals with the requirement, under the Health Act 1956, to notify measles under suspicion needs to be taken into account. One audit performed in Waikato[6] indicates that 34% of the suspected measles cases were not notified by health professional on suspicion (despite they requested a diagnostic test for measles). This may lead to delayed public health measures around measles cases and require stronger messaging to health professionals.

6 https://www.waikatodhb.health.nz/assets/Docs/For-Health-Professionals/Public-Health-Bulletins/00e879f7aa/2019-May.pdf

4 Line of evidence 3: MMR immunisation coverage and population immunity

4.1 Immunisation coverage

4.1.1 Analytical methods and interpretation

4.1.1.1 National Immunisation Register (NIR) data

The National Immunisation Register (NIR) was rolled out nationally to all DHBs during 2005 and all live children born from 1 January 2006 are registered on the NIR. Children who have moved permanently overseas or are deceased are excluded from the NIR's numerator and denominator data sets. Children who relocate to New Zealand permanently and receive subsequent vaccinations are enrolled on the NIR following their immunisation event.

Changes in the number of children in each birth cohort reflect the movement of children in and out of the country and immigration.

The data presented in this report were extracted from the NIR database on 6 June 2019.

There is a difference in the coverage data presented in the 2019 report compared to previous reports due to a coding error in previous years which resulted in some records being dropped from the previous yearly reports. The coding error has been corrected for the 2019 report and has resulted in a decrease in the percentage coverage for all cohorts compared to those reported in previous years. This decrease has been in average 2.2% per year for MMR dose one over 10 years and 4.7% per year for MMR dose two over 7 years.

4.1.1.2 Geographic location

MMR immunisation coverage rates are presented by DHB, the second level health administrative unit in New Zealand. Children are allocated to a DHB based on where they reside.

4.1.1.3 Identifying each unique individual

The National Health Index (NHI) number is a unique number that is assigned to each person using health and disability support services. The NHI is an index of information associated with that unique number. The Health Information Privacy Code 1994 places restrictions on the creation and use of unique identifiers such as the NHI number.
The NHI holds the following information: NHI number, name (including alternative names such as maiden names); address; date of birth; gender; New Zealand resident and citizenship status; place of birth; ethnicity; date of death (if appropriate). Clinical information is not recorded on the NHI database.

4.1.1.4 Socioeconomic status

MMR coverage rates by deprivation area have been analysed using the NZDep2013—New Zealand's latest index of deprivation. NZDep2013 measures relative socioeconomic deprivation and combines nine variables from the 2013 census which reflect eight dimensions of deprivation. The deprivation score, which ranges from 1 (least deprived) to 10 (most deprived), is calculated for each geographical meshblock[7] in New Zealand (Atkinson et al. 2014). It should be noted that NZDep2013 deprivation scores apply to areas rather than individual people. Approximately equal numbers of people reside in areas associated with each of the 10 deprivation levels.[8]

4.1.1.5 Ethnicity

Coverage and decline rates are also presented for different ethnic groups. Ethnicity data are available from the NHI database.

A prioritised classification of ethnicity is used, with the Māori ethnic group at the top of the hierarchy followed by Pacific Peoples, Asian, Other and the NZ European ethnic group at the bottom of the hierarchy. [9]

4.1.2 MMR immunisation coverage rates by birth cohort in New Zealand since the implementation of the National Immunisation Register (NIR)

Based on the available NIR data, MMR coverage for dose one and dose two is shown for each yearly cohort of children born, respectively, from 2006 to 2016 and from 2006 to 2013. At the time the data were extracted the cohorts of children born during 2016 and 2013 were still completing their first and second dose (scheduled to be given at fifteen months and four years of age, respectively) in 2019. MMR immunisation coverage for dose one and two is reported at national and DHB level, as well as by prioritised ethnicity and deprivation quintiles (NZDep 2013).

Coverages for dose one and two across all cohorts vary from figures presented in 2018 as a coding error that was present in previous year codes has been identified and corrected.

4.1.2.1 National coverage

Table 13 highlights the number of children in each cohort at the national level and the MMR immunisation coverage of children who completed their MMR immunisation. As measured on 6 June 2019, MMR coverage of dose one for those born in 2016 is 91.2% and dose two for those born in 2013 is 87.7%. It is expected that dose two coverage of these cohorts will continue to improve given the increased accountability that is now in place.

7 A meshblock is the smallest geographic unit for which statistical data is collected by Statistics NZ. Meshblocks vary in size from part of a city block to large areas of rural land. Each meshblock abuts another to cover all of New Zealand. Generally, meshblocks in rural areas have a population of around 60 people, while in urban areas meshblocks are roughly the size of city blocks and contain approximately 110 people.

8 For more details on NZDep2013, please refer to http://www.otago.ac.nz/wellington/research/hirp/otago020194.html.

9 For more detail on classification refer to Ministry of Health (2004): http://www.health.govt.nz/publication/ethnicity-data-protocols-health-and-disability-sector

Table 13: MMR dose one and dose two coverage by birth cohort and dose (2006-2016)

Birth cohort	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
MMR first dose	87.0%	89.1%	91.6%	92.5%	92.5%	92.6%	93.3%	93.4%	93.2%	92.4%	91.2%
MMR second dose	82.6%	84.2%	85.6%	86.3%	87.0%	88.0%	87.7%	N/A	N/A	N/A	N/A

N/A= not applicable
Note: Routine vaccination coverage is by birth cohort

While MMR coverage ranges between 87.0% and 93.4% for MMR dose one in the birth cohorts 2006–2016, coverage is expected to improve for the 2015-2016 birth cohorts as some children delay with their immunisation schedule. MMR immunisation coverage for dose two ranged between 82.6% and 88.0% for the birth cohorts 2006-2013 (Table 13).

4.1.2.2 Coverage by DHB

Figures 7A shows that while many DHBs have consistently had coverage of MMR dose one close to 93%, the lowest MMR coverage was found in West Coast DHB followed by Northland and Bay of Plenty DHBs. This more or less mirrors the higher decline rates in these DHBs. These DHBs have population sizes ranging from 32,450 (West Coast, the smallest of all DHBs) to 234,350 (Bay of Plenty DHB) and represent approximately 9% of New Zealand's total population.

While dose two coverage has overall increased or remained consistent across DHBs, Figure 7B shows that only seven DHBs have a coverage of 90% or above in the 2013 birth cohort. Coverage in all other DHBs coverage is below 90% with coverage for the West Coast DHB being the lowest at 78.3% for MMR dose.

Figure 7A: MMR dose one coverage by birth cohort and DHB (2006-2016) ranked from lowest to highest based on year 2016 coverage

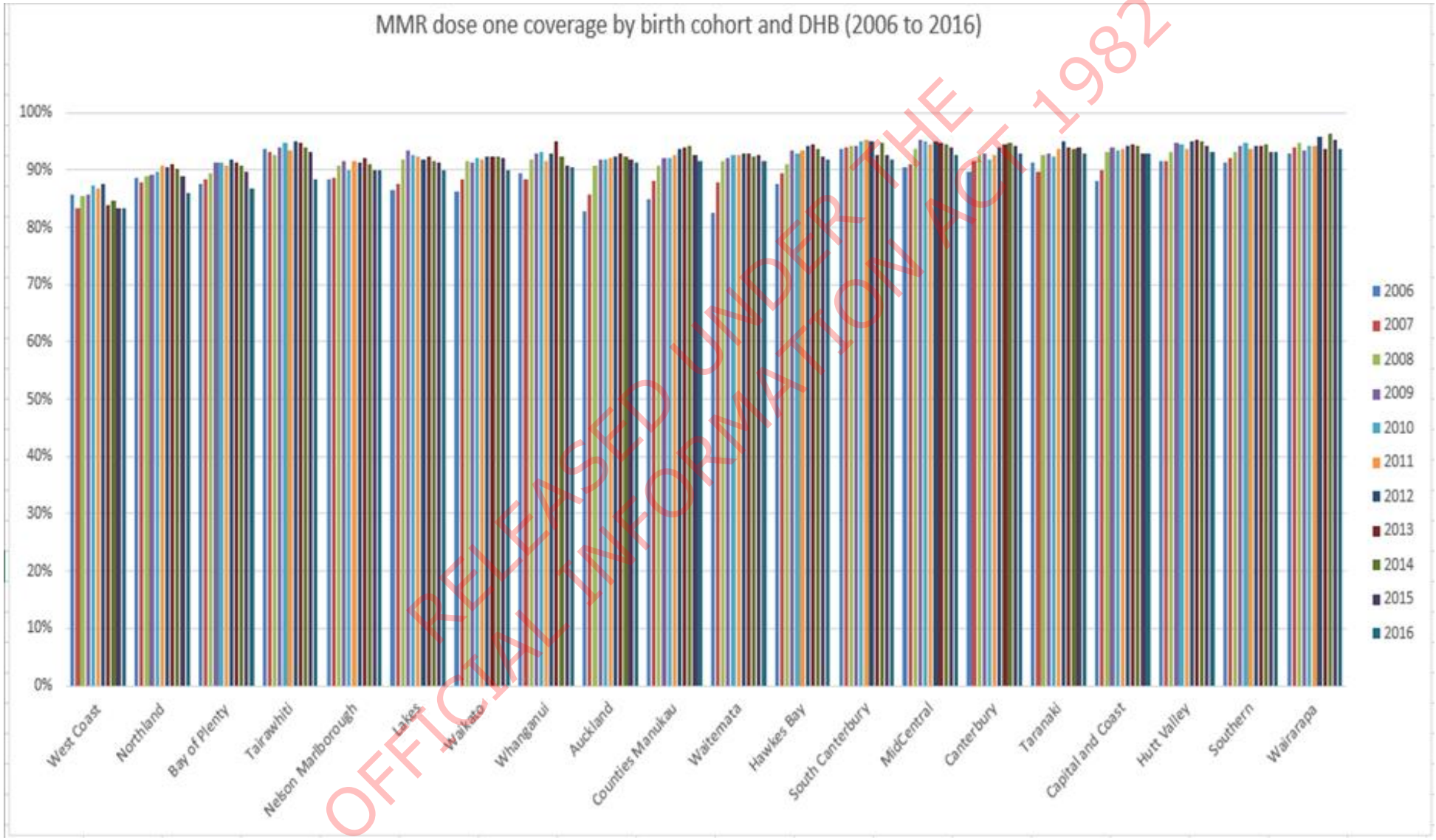
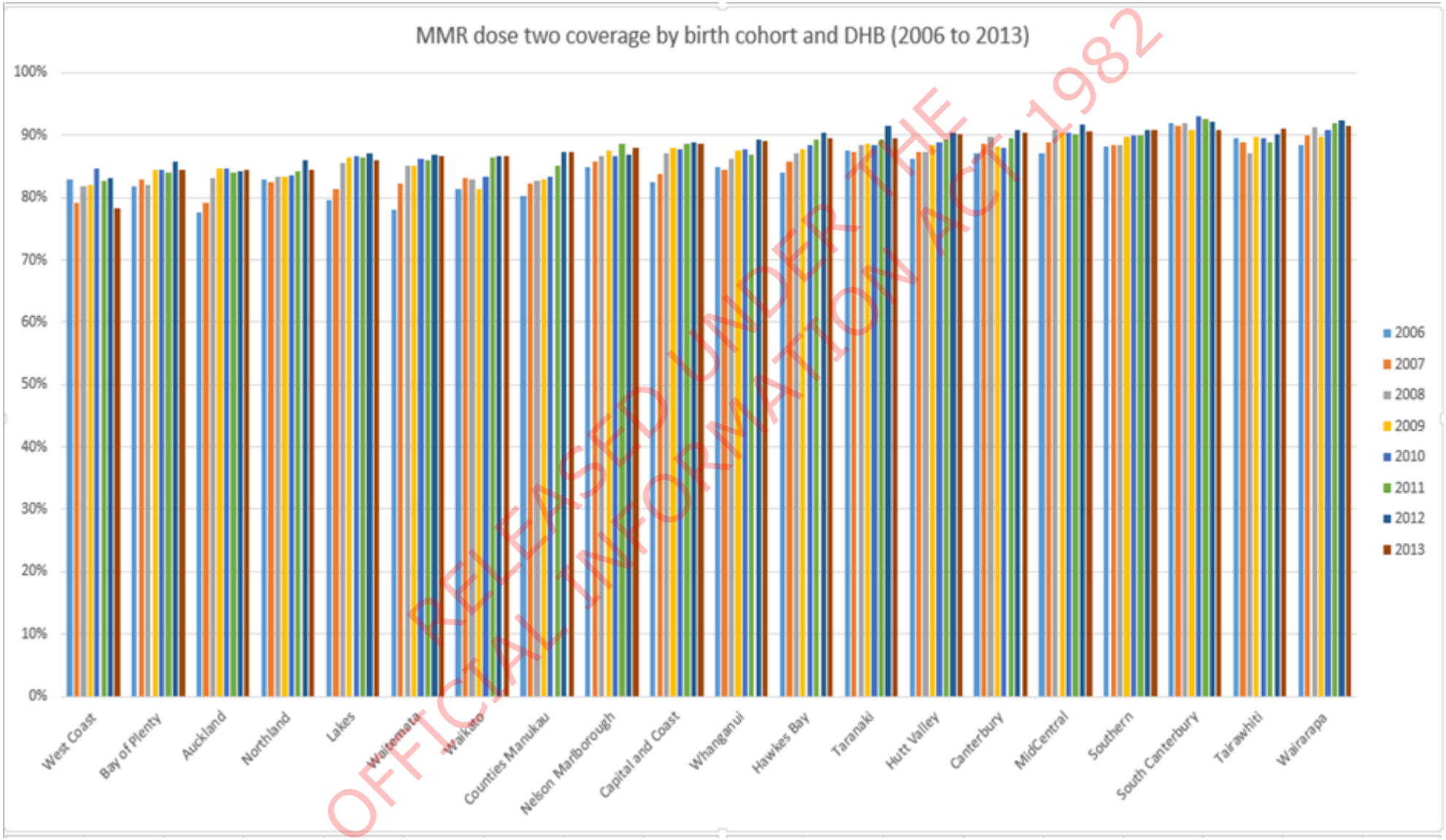


Figure 7B: MMR dose two coverage by birth cohort and DHB (2006-2013) ranked from lowest to highest based on year 2013 coverage



4.1.2.3 Coverage by ethnicity

Table 14 presents national immunisation coverage by prioritised ethnicity of MMR dose one by birth cohort from 2006 to 2016 and MMR dose two by birth cohort 2006-2013.

Table 14: MMR dose one coverage by birth cohort and ethnicity (2006-2016)

Birth cohort	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
MMR first dose											
NZ European	92.0%	92.0%	92.7%	93.4%	93.4%	93.5%	94.0%	94.0%	93.7%	93.4%	92.0%
Maori	91.7%	92.0%	93.3%	93.6%	93.5%	93.0%	93.5%	93.5%	93.0%	91.9%	89.0%
Pacific Island	85.0%	89.0%	91.2%	92.3%	92.2%	92.1%	93.1%	93.1%	92.9%	91.8%	91.0%
Asian	75.9%	83.1%	90.8%	92.1%	92.6%	93.0%	94%	94.9%	95.1%	94.4%	94.0%
Other Ethnicities	72.3%	77.0%	84.2%	86.3%	86.0%	87.8%	88.3%	88.2%	87.9%	86.5%	87.0%
MMR second dose											
NZ European	88.5%	88.8%	88.9%	89.1%	89.5%	90.3%	91.0%	90.0%	N/A	N/A	N/A
Maori	86.1%	86.2%	86.0%	85.7%	85.8%	86.5%	87.4%	86.6%	N/A	N/A	N/A
Pacific Island	79.7%	82.1%	81.8%	81.4%	82.4%	82.3%	84.5%	84.2%	N/A	N/A	N/A
Asian	72.4%	78.0%	85.1%	85.7%	86.9%	88.0%	89.5%	90.1%	N/A	N/A	N/A
Other Ethnicities	66.4%	70.0%	75.5%	77.2%	77.0%	78.7%	79.1%	79.7%	N/A	N/A	N/A

N/A= not applicable
Note: Routine vaccination coverage is by birth cohort

Among the 2016 cohort, Asian, NZ European, and Pacific children have the highest coverage (93.7%, 92.4% and 91.0% respectively) for MMR dose one. Māori, Pacific and Other Ethnicities had the lowest (86.6%, 84.2% and 79.7 respectively). As in previous years Māori children have tended to be late with their vaccinations. For dose two 2013 cohort NZ European children have the highest coverage at 90.4% followed by Asian at 90.1%. Māori, Pacific and 'Other' ethnicities have slightly lower coverage (86.6%, 84.2% and 79.7 respectively).

4.1.2.4 Coverage by socioeconomic status

Table 15: MMR dose one coverage by birth cohort and index of deprivation (2006-2016)

Birth cohort	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
MMR first dose											
Dep 1-2	87.1%	89.5%	92.7%	93.4%	93.2%	94.2%	94.3%	94.3%	94.0%	93.7%	92.9%
Dep 3-4	87.0%	89.0%	93.0%	92.4%	92.5%	92.6%	93.4%	93.4%	93.5%	92.7%	92.5%
Dep 5-6	86.6%	88.6%	90.9%	92.2%	92.3%	92.1%	92.9%	92.0%	92.6%	92.3%	90.8%
Dep 7-8	87.4%	88.9%	90.8%	91.6%	91.9%	91.7%	92.5%	92.5%	92.6%	91.7%	90.9%
Dep 9-10	87.0%	89.3%	91.6%	92.7%	92.5%	92.4%	93.1%	93.1%	93.2%	92.0%	90.0%
MMR second dose											
Dep 1-2	84.1%	86.1%	88.7%	89.0%	88.9%	90.2%	90.4%	90.1%	N/A	N/A	N/A
Dep 3-4	83.4%	85.3%	87.4%	87.2%	87.4%	88.4%	89.2%	89.5%	N/A	N/A	N/A
Dep 5-6	82.0%	83.9%	85.0%	85.8%	86.8%	86.9%	88.2%	87.3%	N/A	N/A	N/A
Dep 7-8	82.1%	83.5%	84.4%	84.5%	85.2%	86.0%	87.2%	86.7%	N/A	N/A	N/A
Dep 9-10	81.6%	82.9%	83.5%	83.8%	84.0%	84.6%	86.1%	85.8%	N/A	N/A	N/A

N/A= not applicable
Notes: Index of deprivation based on NZDep2013
Routine vaccination coverage is by birth cohort

For MMR dose one, there is no significant coverage difference noted by deprivation level (Table 15). However for MMR dose two, coverage is lower in the higher deprivation levels for all birth cohorts (2006 to 2013).

By monitoring vaccination by deprivation, general practice teams are now better able to meet the needs of their community and increase coverage in more deprived areas.

4.2 Summary of population immunity

4.2.1 Measles

The current immunity and coverage information, as well as the population profile of the outbreaks and the results of the work previously carried out by the Infectious Disease Research Centre of Massey University for the Ministry on measles risk assessment, modelling and benefit-cost analysis shown in a previous report, highlight targets for immunisation coverage improvements, and support the need for MMR catch up/supplementary immunisation activities. It is estimated that around 90% of the overall New Zealand population is immune to measles, which is below the 95% immunity required to interrupt measles transmission. The main immunity gap has been estimated to be in those borne between around 1980 and 2005.

Serosurveys
This has been further confirmed by the results of the 2014/15 serosurvey carried out within the National Health Survey. Given a better sampling method, the results of the 2014/15 survey are likely to be more valid.

Table 16: IgG seropositivity for measles found in 2014/15 serosurvey

Birth cohorts*	Measles IgG, positive only (95%CI)	Measles IgG, positive or equivocal (95%CI)
1970-1979	86.0% (81.5-89.5)	92.2% (89.0-94.5)
1980-1989	72.7% (67.6-77.3)	84.6% (79.9-88.3)
1990-1999	73.1% (67.1-78.4)	83.4% (77.8-87.8)

* birth cohort years are approximate given the data were presented using age groups

In general, the serosurvey shows systematically lower measles seropositivity results than the 2005/7 serosurvey. The gap between IgG positive and positive or equivocal is similar in the two serosurveys: over 10% in those borne from 1980, and about halve of this in those born before.

The results of the 2014/15 serosurvey would decrease the overall population immunity estimate by about 2% if only those positive for measles IgG are considered as immune, and increase it by about 1% if those positive or equivocal for measles IgG are considered as immune. It is pertinent to consider that the true population immunity is likely to be between these two values--therefore not affecting the overall immunity estimate in a significant manner

NIR data
A historic coding error affecting the coverage rates by birth cohort obtained from NIR data presented in the previous reports has been corrected in the current report. This correction has resulted in a decrease in the coverage rates for all birth cohorts compared to those reported in

previous years. This decrease has been in average 2.2% per year for MMR1 over 10 years and 4.7% per year for MMR2 over 7 years.

The decrease in the overall population immunity estimate is between 0.2 and 0.3 %, therefore the overall population immunity is not significantly affected by the coding error.

In general, these changes are unlikely to have a significant importance as other uncertainties are affecting this estimate (e.g. confidence intervals, use of data from various sources). However they highlight that the 1980-2000 birth cohort is highly vulnerable and that our MMR coverage rates since the NIR was introduced are not as high as we thought, therefore that further or supplementary immunisation efforts need to be carried out.

4.2.2 Rubella

Given the low incidence of rubella reflected by the low notification rates, the absence of reported congenital rubella syndrome since 1998 despite comprehensive active surveillance in place, and the improvements in MMR coverage rates in routine childhood immunisation, specifically enhancing rubella prevention and control is not considered a priority in New Zealand at this stage.

The 2005/7 and 2014/15 serosurveys show an immunity gap in the New Zealand population for rubella in the 1990-1999 birth cohorts with seropositivity rates of 85 and 64% respectively. This confirms there is an immunity gap in that birth cohort, with seropositivity results much lower in this birth cohort in the 2014/15 serosurvey, similarly to what was found for measles. Given a better sampling method, the results of the 2014/15 survey are likely to be more valid.

In the 1980-1989 birth cohort the 2014/15 serosurvey shows a significantly different seropositivity for measles and rubella, 73% and 87% respectively. Other than measles and rubella being different components of the MMR vaccine, the reasons for such a difference are unclear, as MMR vaccine has been used since 1990.

Rubella is less transmissible than measles. Addressing measles immunity gap with MMR vaccine would contribute to minimise the immunity gap identified for rubella.

5 Line of evidence 4: Sustainability of the National Immunisation Programme

The Ministry's National Immunisation Programme (the Programme) aims to prevent vaccine preventable diseases, including measles and rubella, through vaccination and to achieve high and equitable immunisation coverage to prevent cases, outbreaks and epidemics.

This section included the description of New Zealand's current approach to measles immunisation in relation to:

- National Immunisation Programme
- New Zealand's Immunisation Schedule
- National Immunisation Register (NIR)
- immunisation follow-up
- education and awareness raising
- vaccine effectiveness: maintaining the cold chain
- campaigns
- funding support
- vaccine procurement.

For details on these nine areas please refer sections 5.1 to 5.10 of the 2017 'Progress towards measles and rubella elimination in New Zealand' report, as there are no particular changes in these areas.

MMR continues to be part of the NZ Immunisation Schedule at ages 15 months and 4 years. Two doses of MMR vaccine are also funded for all susceptible individuals at risk of either measles, mumps, or rubella.

There are a series of activities that are planned with regards the measles and MMR:

- the review of the current guidance on outbreak response (incl. resource mobilisation)
- making sure temporary immigrants have systematic access to funded immunisation.
- advancing MMR dose two immunisation from the fourth to the second year of life.

The 2020 National Immunisation Schedule Project plan is addressing changes to the National Immunisation Schedule in 2020 (which are expected to include MMR dose two in the second year of life).

Despite recommendations from the NVC and RVC, there has not been any national supplementary immunization activity and there has been no documentation to the NVC

regarding progress with planning, funding and implementation of an appropriate supplementary immunisation activity (SIA) to address the immunity gap and declining infant immunization rates. The NVC has not been advised as to progress of their recommendations and government response. The NVC notes with disappointment that the recent increase in measles importation and subsequent outbreaks could have been avoided had its recommendations been acted upon in a timely manner.

6 Line of evidence 5: Genotyping

Table 17: Measles viruses genotyped by month, 2014-May 2019

Month of rash onset	H1	B3	D8	D9	D4	A	TOTAL
YEAR 2014							
Jan		12	1			2	15
Feb		6	1			1	8
Mar	1	8		2			11
Ap		7				1	8
May		6				2	8
June		11				2	13
July		3	1				4
Aug						1	1
Sept		1				1	2
Oct				1			1
Nov		2				1	3
Dec							0
TOTAL	1	56	3	3		11	74
YEAR 2015							
Jan							0
Feb							0
Mar		1	1			1	3
Apr			1				1
May			3				3
June			1				1
July							0
Aug						1	1
Sept						3	3
Oct							0
Nov							0
Dec					1	1	2
TOTAL		1	6		1	6	14
YEAR 2016							
Jan							0
Feb			4			2	6
Mar							0
Apr			6				6
May			15			2	17
June			10			4	14
July			2				2
Aug			3				3

Month of rash onset	H1	B3	D8	D9	D4	A	TOTAL
Sept			1				1
Oct			1				1
Nov							0
Dec							0
TOTAL			42			8	50
YEAR 2017							
Jan							0
Feb			4			2	6
Mar			1				1
Apr							0
May			2				2
June							0
July						1	1
Aug							0
Sept							0
Oct							0
Nov							0
Dec							0
TOTAL			7			3	10
YEAR 2018							
Jan			1			1	2
Feb			4			1	5
Mar			2				2
Apr		9	1			2	12
May		1				2	3
June							0
July							0
Aug						2	2
Sept						1	1
Oct							0
Nov		1	1				2
Dec		2					2
TOTAL		13	9			9	31
YEAR 2019							
Jan		3	2			1	6
Feb		9				2	11
Mar		17	2			28	47
Apr		19	1			11	31
May		8	6				11

Since 2014, six rubella viruses have been genotyped: 1 in 2014, 0 in 2015, 3 in 2016, 1 in 2017, 0 in 2018 and 1 in 2019). All were genotype 2B, except in 2019, when genotype 1E was found.

More details regarding measles and rubella genotypes are provided in Attachments 1-4.

7 Conclusions

7.1 Measles and rubella elimination has been sustained in 2018 but measles elimination is threatened in 2019 given lack of progress with closing immunity gaps, multiple measles importations, and growing outbreaks in many parts of New Zealand, in particular in the Auckland region

- After 1½ years without local measles transmission detected since June 2012, measles outbreaks occurred from 2014 following measles importations. Importation has been documented through travel history, epidemiological associations and/or genotyping.
- An increase in importations and outbreaks has been seen in 2019. This has been reflecting the international measles situation. Outbreaks have been fuelled by the immunity gap in the New Zealand population (see 7.2 below).
- This has led to the highest cumulative number of measles cases in 2019 from the beginning of the year to week 31 in New Zealand since 1997: until 2 August 2019, 441 cases have been reported, with 175 (40%) hospitalisations and 312 cases from the Auckland region (71% of all cases)[10]. There are four separate outbreaks in progress, two in Auckland region. In general, the 'under five' age group has been most affected, particularly the 'under one', especially among Pacific and Māori ethnic groups. Among the cases of 'European or Other' ethnicities, the 15-29 age group has been the second most affected. For Pacific and Māori ethnic groups, the second most affected age groups are the 20-29 and the 15-19 age groups, respectively.[11]
- According to WHO indicators, New Zealand's national surveillance system is performing reasonably well. Although only 75% of the DHBs have been reporting at least two discarded non-measles non-rubella cases per 100,000 in 2018, they represent approximately 84% of New Zealand population, as also reflected by the high reporting rate of discarded non-measles non-rubella cases at the national level.
- Rubella is no longer a public health problem in New Zealand; there have been no notifications of congenital rubella syndrome since 1998. Overall, the annual number of rubella cases has been decreasing, with less than five cases reported each year since 2012.

7.2 There is a need to ensure that existing significant pockets of susceptible individuals are immunised to avoid or minimise further measles outbreaks.

- The NIR plays an important role by allowing the tracking of the vaccination status of children, including the monitoring of overdue vaccinations and providing reliable immunisation coverage information. Unfortunately complete annual immunisation data are available on the NIR only from the 2006 birth cohort onwards. Timeliness of immunisation delivery has remained a priority for the Ministry.
- Measles-containing vaccine coverage had been low in New Zealand prior to the implementation of the NIR in 2005, resulting in significant numbers of susceptible

[10] https://surv.esr.cri.nz/PDF_surveillance/MeaslesRpt/2019/WeeklyMeasles05082019.pdf. Up-to-date information is available at https://surv.esr.cri.nz/surveillance/WeeklyMeaslesRpt.php

[11] Please refer to the additional analysis in Appendix 2 profile of imported cases compared to subsequent outbreak cases, in particular regarding their age groups and ethnicity.

individuals. Of note is that in the early 1990s immunisation coverage for two years olds was less than 60% with significant equity gaps with coverage much lower for children from Māori and Pacific ethnicities. Infant immunisation coverage has improved considerably in New Zealand since then and equity gaps reduced, and particularly since the instigation of the NIR in 2005. The 2014/15 serosurvey data confirms the previous estimates that the New Zealand population born after 1980 and before 2000 has the lowest proportion of people immune against measles, at around 73%. For those born after 2000 and before 2005, an estimate of MMR dose one coverage is given by the National Childhood Immunisation Coverage Survey 2005, with 82% coverage at two years of age. Again an equity gap with lower coverage for Māori children was identified (but not in Pacific children this time).

- From 2006, coverage improved, reaching about 93% for MMR dose one and over 87% for MMR dose two in the recent annual birth cohorts. However this coverage is still sub-optimal as compared to WHO recommendation of 95% coverage for two doses of measles-containing vaccine to sustain measles elimination. NIR data also highlights that inequities between ethnicities are still present, with Māori and Pacific Island children still in the lower range of the immunisation coverage. Children living in more highly deprived areas still have lower MMR dose two coverage rates.
- The current immunity and coverage information, as well as the population profile of the outbreaks, and the findings of the measles risk assessment, modelling and benefit-cost analysis presented in the 2016 report, highlight targets for immunisation coverage improvements, and support the need for MMR catch up/supplementary immunisation activities.
- The NVC is keen to see further urgent action from government to close the existing immunity gap to measles in the teenager/young adult population and to address the system factors (including institutional racism) that create equity gaps particularly for Māori children and those in situations of socioeconomic deprivation.

7.3 If measles is not controlled, the current situation in New Zealand may become a threat for other less resourced countries in the region.

- As on 5 August 2019, according to the current international information available, no measles outbreaks have been reported by Pacific Island countries and territories in 2019, and the Ministry has received no notifications through the International Health Regulation National Focal Point channel about measles importations to Pacific Island countries.
- There is a risk of measles importation to Pacific Island countries through travellers with no immunity to measles, particularly as the current outbreaks in Auckland region have been affecting Pacific Island people.
- Since the beginning of the outbreaks in 2019, the situation in New Zealand has been reported through the Pacific Public Health Surveillance Network on PacNet as an epidemic alert in the Pacific.

7.4 Recommendations to the Ministry of Health.

The Committee made the following recommendations to the Ministry:

- Targeted vaccination is required, aimed at closing immunity gaps in the population starting with the most vulnerable areas, in particular the Auckland region (Waitemata and Counties Manukau especially). This should be supported by a strong communication campaign, and could make use of the heightened level of public awareness and receptivity to prevention messages owing to the outbreaks.

- Further steps should be taken, via the appropriate international channels (such as PacNet), to ensure that Pacific nations are aware of the New Zealand outbreaks and make sure people are immunised.
- Measures to ensure that travellers into and out of New Zealand are vaccinated should be considered, including awareness raising of the risks of measles and the need to be vaccinated for measles.

References

Atkinson J, Salmond C and Crampton P (2014). *NZDep2013 Index of Deprivation*. University of Otago, Wellington, New Zealand.
http://www.otago.ac.nz/wellington/research/hirp/otago020194.html

ESR surveillance reports: http://www.surv.esr.cri.nz/surveillance/surveillance.php

Hayman, D., Marshall, J., French, N., Carpenter, T., Roberts, M., & Kiedrzynski, T. 2017. *Cost-benefit analyses of supplementary measles immunisation in the highly immunized population of New Zealand*. Vaccine (2017), http://dx.doi.org/10.1016/j.vaccine.2017.07.077

Hayman, D., Marshall, J., French, N., Carpenter, T., Roberts, M., & Kiedrzynski, T. 2017. *Global importation and population risk factors for measles in New Zealand: A case study for highly immunized populations*. Epidemiology and Infection, 145(9), 1875-1885. doi:10.1017/S0950268817000723

Institute of Environmental Science and Research Limited (2012). *Guidelines for the Investigation and Control of Disease Outbreaks.* Institute of Environmental Science and Research Limited (ESR), Wellington, New Zealand.

Ministry of Health. 2004. *Ethnicity Data Protocols for the Health and Disability Sector*. Wellington: Ministry of Health. http://www.health.govt.nz/publication/ethnicity-data-protocols-health-and-disability-sector

Ministry of Health. 2012. *Communicable Disease Control Manual 2012*. Wellington: Ministry of Health. https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual

Ministry of Health. 2017. *Immunisation Handbook 2017*. Wellington: Ministry of Health. https://www.health.govt.nz/publication/immunisation-handbook-2017

NZPSU surveillance reports:
http://dnmeds.otago.ac.nz/departments/womens/paediatrics/research/nzpsu/annual_rpts.html

World Health Organization Regional Committee. 2012. *Resolution on Elimination of Measles and Acceleration of Rubella Control* WPR/RC63.R5. WHO, WPRO.

World Health Organization. 2013. *Guidelines on Verification of Measles Elimination in the Western Pacific Region*. WHO, WPRO.

World Health Organization. 2014. *Meeting Report. Third Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific*. RS/2014/GE/04(KOR). WHO, WPRO.

World Health Organization. 2015. *Meeting Report. Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific*. RS/2015/GE/03(MAC). WHO, WPRO.

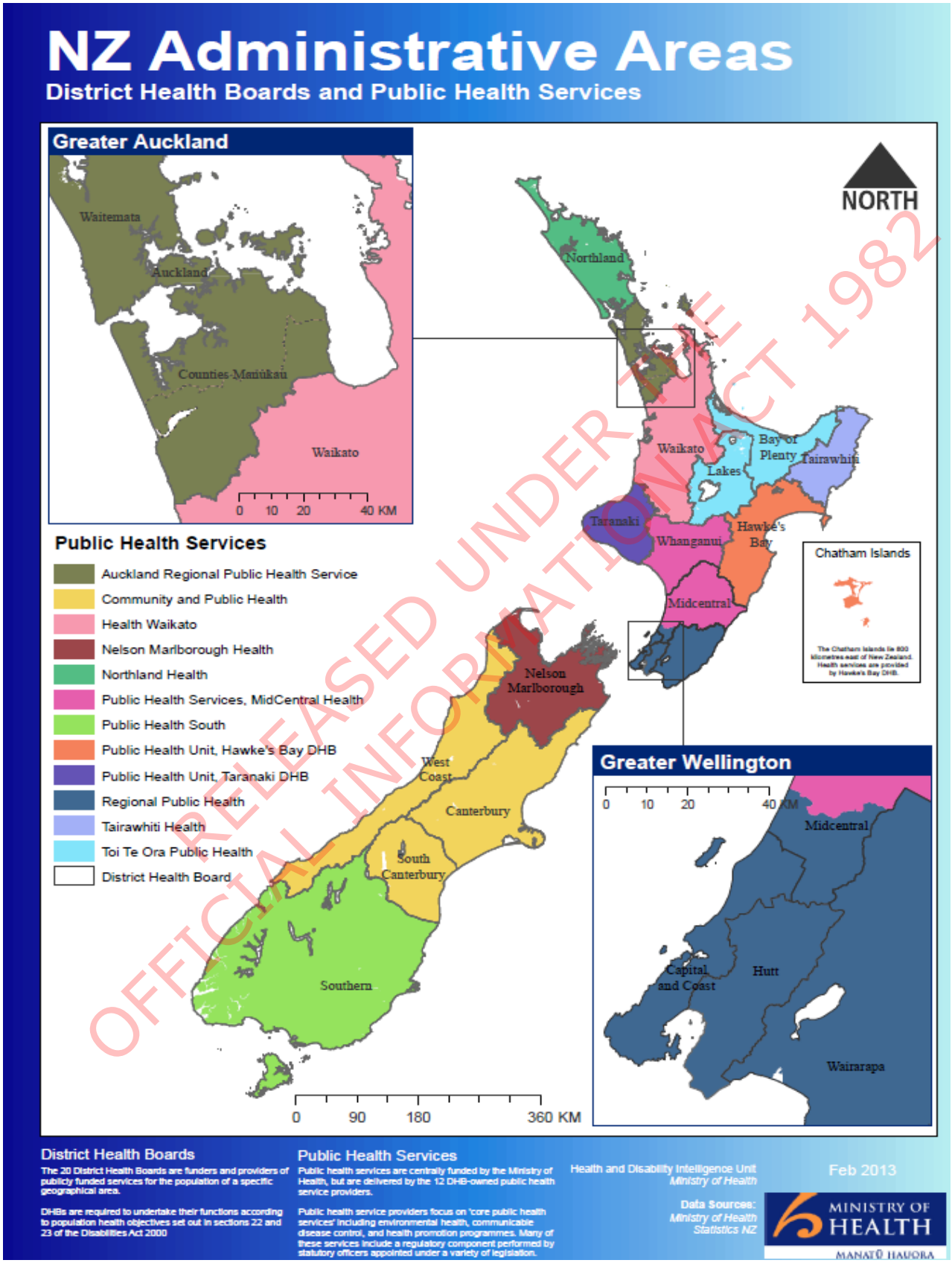
World Health Organization. 2017. *Guidelines on Verification of Measles and Rubella Elimination in the Western Pacific Region*. Final draft 16 Jan 2018. WHO, WPRO.

World Health Organization. 2016. *Meeting Report. Fifth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific*. RS/2016/GE/25(AUS). WHO, WPRO.

World Health Organization. 2017. *Meeting Report. Sixth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific*. RS/2017/GE/49(CHN). WHO, WPRO.

World Health Organization. 2019. *Meeting Report. Seventh Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific*. RS/2018/GE/51(MYS). WHO, WPRO.

Appendix 1 - NZ Administrative Areas



Appendix 2 - Additional analysis

On the request of the NVC, additional analysis was carried out to look at the profile of imported cases compared to subsequent outbreak cases, in particular regarding their age groups and ethnicity. Data from 2014 to 19 July 2019 were used. As a comparison for the proportion of cases by ethnicity, among the prioritised ethnicities used in the document Māori ethnicity represents 15% of the population, Pacific 7%, Asian 13%, Middle Eastern/Latin American/African (MELAA) 1% and European and others 64%.

Table 18: Imported cases (all) by age group and ethnicity, 2014 to 19 July 2019

Ethnicity	Age groups										Grand Total	% of total cases by ethnicity
	<1	1–4	5–9	10–14	15–19	20–29	30–39	40–49	50–59	69–09		
Māori					1	1	1				171	**32%**
Pacific Peoples	1	1									73	**14%**
Asian	4	5		4	2	5	4				25	**5%**
MELAA						1					5	**1%**
European or Other	2	1	2		3	11	4	2	1		251	**47%**
Unknown				1		1					10	**2%**
Grand Total	**7**	**7**	**2**	**5**	**6**	**19**	**9**	**2**	**1**		**535**	
% of total cases by age group	**12%**	**12%**	**3%**	**9%**	**10%**	**33%**	**16%**	**3%**	**2%**	**0%**		

Notes: - MELAA = Middle Eastern/Latin American/African
- Empty cells = 0

Most of the imported cases are of Asian (41%) or European or Other ethnicity (45%). Imported cases are over-represented in the under 5 age group (24%), especially the under one (12%), followed by the 20 to 29 age group[12] (33%).

Table 19: Imported cases followed by an outbreak by age group and ethnicity, 2014 to 19 July 2019

Ethnicity	Age groups										Grand Total	% of total cases by ethnicity
	<1	1–4	5–9	10–14	15–19	20–29	30–39	40–49	50–59	69–09		
Māori					1		1				2	**7%**
Pacific Peoples	1										1	**4%**
Asian		2		3		2	3				10	**36%**
MELAA						1					1	**4%**
European or Other	1		1		3	5	1		1		12	**43%**
Unknown				1		1					2	**7%**
Grand Total	**2**	**2**	**1**	**4**	**4**	**9**	**5**		**1**		**28**	
% of total cases by age group	**7%**	**7%**	**4%**	**14%**	**14%**	**32%**	**18%**	**0%**	**4%**	**0%**		

Notes: - MELAA = Middle Eastern/Latin American/African
- Empty cells = 0

[12] Approximately the double of the population size of the under 5 age group

Regarding the imported cases followed by an outbreak, the difference with all imported cases is that the under 5 age group is less represented among these imported cases—as expected given the higher mobility of older people.

Table 20: Outbreak cases (imported cases not included), 2014 to 19 July 2019

Ethnicity	Age groups										Grand Total	% of total cases by ethnicity
	<1	1–4	5–9	10–14	15–19	20–29	30–39	40–49	50–59	69–09		
Māori	18	47	14	36	33	18	2	2	1		171	**32%**
Pacific Peoples	14	14	4	11	8	16	4	2			73	**14%**
Asian	1	4		1	7	8	4				25	**5%**
MELAA		2				3					5	**1%**
European or Other	11	25	10	40	62	52	19	23	8	1	251	**47%**
Unknown				1	5	2	1	1			10	**2%**
Grand Total	**44**	**92**	**28**	**89**	**115**	**99**	**30**	**28**	**9**	**1**	**535**	
% of total cases by age group	**8%**	**17%**	**5%**	**17%**	**21%**	**19%**	**6%**	**5%**	**2%**	**0%**		

Notes: - MELAA = Middle Eastern/Latin American/African
- Empty cells = 0

Among the subsequent outbreak cases, cases are over-represented in the under 5 age group (25% of cases), especially the under one (8%), and the 10 to 19 age groups (38%), especially the 15 to 19 (21%), followed by the 20 to 29 age group (19%).

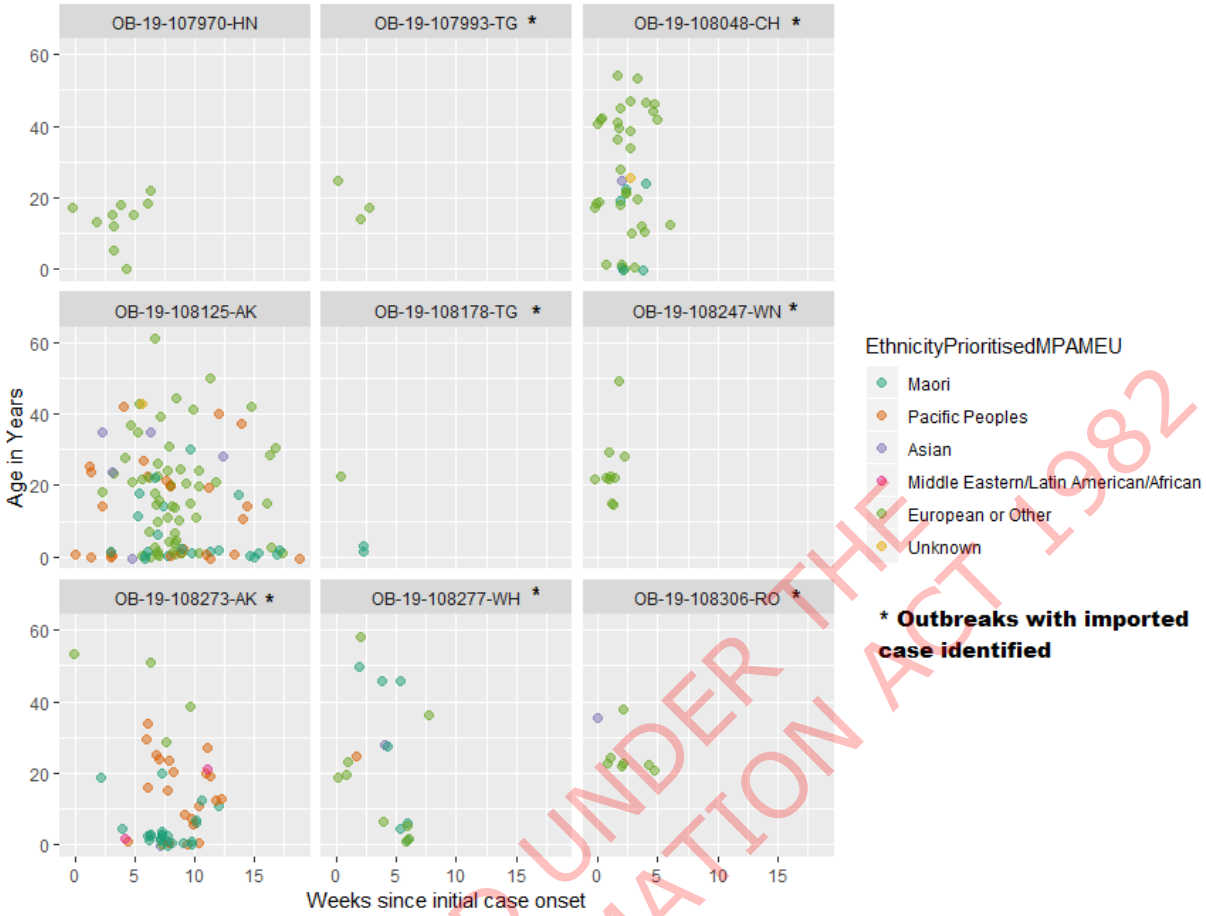
Ninety three percent of the cases are of European or Others (47%), Māori (32%) or Pacific (14%) ethnicities. Māori and Pacific ethnicities largely over-represented among the cases, twice as in the overall population.

As an illustration for 2019 only, Figure 8 below shows cases by outbreak and by week (X axis, 0 being the week of the first case), age in years (Y axis) and ethnicity (dot colour) in 2019 (as of 26 July 2019).

Outbreaks in 2019 to date are due to adult travellers importing measles (here European or Other (6 importations) and Asian (1 importation)), with a subsequent spread in the case of bigger outbreaks to vulnerable groups, like toddlers and the ethnicities known to be more vulnerable to infectious diseases: Pacific and Māori ethnicities are over-represented among the cases as the main two outbreaks are spreading in South Auckland.[13]

[13] https://surv.esr.cri.nz/PDF_surveillance/MeaslesRpt/2019/WeeklyMeasles05082019.pdf

Figure 8: outbreak cases by week and age in years and ethnicity, 2019 only (data to 19 July 2019)



Sent by: Andrea.McNeill@esr.cri.nz
27/09/2019 06:39 a.m.

To: NHCC_Intelligence@health.govt.nz"
<NHCC_Intelligence@health.govt.nz>,

Subject: FW: WHO UNICEF Health Advisory: Risk of measles importation to Pacific Islands.

Just for information

From: bounce-925219-107816@lyris.spc.int <bounce-925219-107816@lyris.spc.int> **On Behalf Of** BIAUKULA, Viema Lewagalu
Sent: Thursday, 26 September 2019 5:36 PM
To: Pacific Public Health Surveillance Network <pacnet@lyris.spc.int>
Cc: WP FJI Surveillance <wpfjisurveillance@who.int>
Subject: [pacnet] WHO UNICEF Health Advisory: Risk of measles importation to Pacific Islands.

Dear Pacific colleagues

Please find below and attached a WHO-UNICEF Pacific Health Advisory for Measles.

HEALTH ADVISORY: RISK OF MEASLES IMPORTATION TO PACIFIC ISLANDS

SITUATIONAL UPDATE

Since 2017, there has been a global resurgence of measles cases. In proximity to Pacific Island countries and areas, outbreaks of measles have been reported in Australia, Cambodia, China (including Hong Kong and Macao), Japan, Lao People's Democratic Republic, Malaysia, New Zealand, Philippines, Republic of Korea, United States of America and Viet Nam.

MEASLES RISK TO PACIFIC ISLAND COUNTRIES AND AREAS

In Pacific Island countries and areas (not inclusive of Australia, New Zealand or Papua New Guinea), the last recorded outbreak occurred in 2014 and the region is now in the measles elimination phase. A single laboratory confirmed case of measles therefore constitutes an outbreak in a Pacific Island country or area.
Given the recent large-scale measles outbreaks in neighbouring nations and the significant population movements between these countries and the Pacific, there is an increased risk of the virus being imported to the Pacific.
Vaccination is the best protection against vaccine-preventable diseases. For measles, at least 95% immunization coverage is needed to achieve 'herd immunity', which helps protect communities by slowing or stopping the spread of the virus because the large majority of people are immune. Achieving and sustaining herd immunity reduces the risk of large outbreaks and also protects individuals who can't be vaccinated, including young infants, pregnant women and people with certain medical conditions.

Despite significant efforts, some Pacific island countries and areas have not reached the 95% immunization coverage target for measles, making them more vulnerable to outbreaks.
Given recent outbreaks of measles in neighbouring countries, WHO and UNICEF have assessed that there is an increased likelihood of the measles virus being imported to Pacific Island countries and areas. In response to this heightened risk, WHO and UNICEF are continuing to support Pacific health authorities and partners in country efforts to vaccinate all children and high risk groups, and strengthen their outbreak preparedness and response.

VACCINATE AGAINST MEASLES

Measles can be prevented by vaccination with a measles-containing vaccine.
The two main types of vaccines utilised in the Pacific are Measles-Rubella (MR) and Measles-Mumps-Rubella (MMR). Following one dose of a measles containing vaccine about 95% of people are protected from measles. After two doses, more than 99%of people are protected. It is critical that children and adults ensure they are up-to-date with their immunizations, as per their national immunization schedule.

TRAVELLER ADVICE

Travellers who are uncertain of their measles vaccination status should receive at least one dose of a measles-containing vaccine at least 15 days prior to travel.
If a person is unsure of whether they or their child have received a measles-containing vaccine or have natural immunity through infection, they should be vaccinated again. It is safe to have the vaccine more than twice.
We all have a responsibility to protect our communities, and those we are travelling to, by ensuring we are properly vaccinated.

Important information about measles

About measles virus

Measles is caused by a highly infectious virus that spreads easily from person to person through the ai – via breathing, coughing and sneezing.

Signs and symptoms

Measles has a long incubation period (time from exposure to onset of symptoms) with a range of 7 to 18 days (most commonly 10-12 days), which means it is possible for international travellers to spread the virus to their travel destination before they have symptoms.

Initial (non-specific) signs and symptoms are:

- high fever (may spike to more than 40°C or 104°F)
- runny nose (coryza)
- cough
- red, watery eyes (conjunctivitis)
- small white spots on the inside of the cheeks (koplik spots)

Several days (3-5 days) after the initial symptoms, a rash will develop:

- the rash usually starts as flat red spots, at the hairline and behind the ears, spreading over the face and upper neck then down the body. The rash is not itchy.
- Some infants and young children may also experience diarrhoea.

Who is most at risk?

Anyone who hasn't previously had measles or been immunized with MR or MMR vaccines can get measles. About 90 percent of susceptible people who are exposed to someone with the virus will be infected.
Unvaccinated young children and unvaccinated pregnant women are at highest risk of measles and its complications, including death.

What is the treatment for measles?

There is no specific treatment for measles and most people recover within 2-3 weeks.
However, particularly in malnourished children and people with reduced immunity, measles can cause serious complications, including blindness, encephalitis, severe diarrhoea, ear infection, and pneumonia. Severe complications from measles can be reduced through supportive care that ensures good nutrition, adequate fluid intake and treatment of dehydration with oral rehydration solution. Appropriate antibiotics should be prescribed to treat eye and ear infections, and pneumonia.
For further information about measles and immunization services in your country, contact your national health authority.

You can also learn more by reading the WHO Measles Factsheet at: https://www.who.int/news-room/fact-sheets/detail/measles

Media contacts:

WHO **Rose Aynsley**
Risk Communication Officer
WHO Division of Pacific Technical Support
Email: aynsleyt@who.int | Phone: +679 759 3470

UNICEF **Zubnah Khan**
Communications Officer
UNICEF Pacific
Email: zukhan@unicef.org | Phone: +679 3300 349

WHO_UNICEF_Pacific_Health Advisory_Measles_FOR RELEASE.pdf

Refer to 'Document 3A'

Weekly Briefing for Associate Minister of Health Hon Julie Anne Genter for the week: 25 - 29 November 2019 (Excerpt)

2.2 Ministry of Health support to Samoa measles response

Action: No action required. This information is for noting.

Item: Samoa is currently experiencing a significant measles outbreak. On 15 November 2019, the Government of Samoa announced a 30-day State of Emergency in response to this outbreak.

New Zealand's assistance to date has been well received. The Ministry of Health has been working closely with the Ministry of Foreign Affairs and Trade (MFaT) to support the New Zealand Government's humanitarian response.

New Zealand, via MFAT, has fulfilled requests for support from Samoa, which have included medical supplies, including face masks, gowns, hand sanitiser, stretcher beds and vaccination fridges.

On 18 November 2019, a further package of support was approved by the Government of Samoa, which included the deployment of the New Zealand Medical Assistance Team (NZMAT).

The first rotation of an eight-person NZMAT arrived on 19 November 2019 to provide surge support to Leulumoega Rural District Hospital in Apia.

A second NZMAT rotation is on standby to deploy in the next week to ten days. This second rotation will have additional staff to allow for any potential request to provide assistance to the second island of Savai'i or other locations as required.

In addition to this NZMAT deployment, MFAT have contracted Counties Manukau District Health Board (CMDHB) to provide nurse vaccinators. The first rotation of eight nurses arrived in Apia on 20 November 2019.

From 21 November 2019, situation reports from deployed NZMAT teams will commence. Copies of situation reports will be provided to your office.

Contact: Deborah Woodley, Deputy Director-General, Population Health and Prevention, s 9(2)(a)