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Safety Impact of Speed and Red Light Cameras

September 28, 2020

Congressional Research Service
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R46552

CRS REPORT
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SUMMARY

Safety Impact of Speed and Red Light Cameras

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Traffic safety, defined as the rate of traffic-related deaths and injuries per mile driven, has greatly improved in the United States over the past several decades. Yet, motor vehicle crashes remain one of the primary causes of premature death, and the leading cause of death for those under age 30, with around 37,000 people being killed each year and millions suffering injuries. These crashes result in estimated overall costs of hundreds of billions of dollars each year. Speeding is a contributing factor in over 9,000 deaths annually.

In-person enforcement is the most common form of speed enforcement in the United States. It has several limitations; law enforcement officers are able to stop only a small proportion of speeders. Road design and traffic conditions can make roadside stops difficult, and stops can be dangerous for both the driver and the law enforcement officer, who are at risk from being struck by passing vehicles as well as from each other. Similarly, officers are rarely on the scene when a motorist runs a red light. Automated traffic enforcement (ATE), such as cameras that capture images of vehicles that are traveling above the speed limit or running stop lights, addresses several of the limitations of in-person speed and red light enforcement: such systems can monitor thousands of cars an hour, are consistent and tireless, and do not put drivers or law enforcement officers at risk during the ticketing process. They raise other issues: their use has been challenged on legal grounds; some studies have found that while red light cameras reduce the number of right-angle crashes, they may increase the number of rear-end collisions; and ATE systems often incite complaints that they are being used to raise revenue rather than to promote safety. The National Highway Traffic Safety Administration (NHTSA) has recommended that ATE systems be used to supplement, not replace, in-person speed enforcement.

Evidence from other countries, where ATE systems are widely used, suggests that ATE can be an effective means of reducing the number of vehicle crashes and deaths and injuries without compromising mobility. In the United States, adoption of ATE has been more limited; out of tens of thousands of local jurisdictions, approximately 150 communities are currently using speed cameras and around 340 are using red light camera systems.

States and the federal government have acted to limit the use of ATE systems. Eight states prohibit speed cameras and red light cameras, and another two dozen or so have no specific legislation to support the implementation of ATE. Of the states that do have enabling legislation, many strictly limit the locations where such systems can be installed; often they are permitted only in school zones, which are typically not problem spots for speed-related crashes. Congress has prohibited states from using any of their federal transportation funding to fund ATE systems, except in school zones.

The Governors Highway Safety Association (GHSA) and the National Transportation Safety Board (NTSB) have called for creation of a grant program to encourage states to address speeding. As Congress considers reauthorization of surface transportation programs, it might address speeding; such a program could encourage the use of automated enforcement. Other options for Congress include altering restrictions on use of federal funds for ATE, providing states with incentives to change the legal status of ATE violations, and directing NHTSA to update its guidelines on automated speed enforcement, which date to 2008.

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Introduction

Traffic safety, when defined as the rate of traffic-related deaths and injuries per mile driven, has greatly improved in the United States over the past several decades. However, it remains the case that motor vehicle crashes are one of the primary causes of death in the United States, with around 37,000 people dying and millions suffering injuries each year;[1] traffic crashes are the leading cause of death of people under age 30.[2] It is estimated that these crashes result in overall costs of hundreds of billions of dollars each year.[3]

In 1990 the United States had one of the lowest rates of traffic deaths per mile in the world. Since then, many other countries with auto-centric transportation systems have improved their highway safety performance such that they now have lower traffic death rates than the United States.[4] Evidence from other countries suggests that automated traffic enforcement (ATE), such as cameras that record vehicles traveling above the speed limit or running stop lights, can be an effective means of reducing vehicle crashes and deaths and injuries without compromising mobility.[5] ATE has not been adopted widely in the United States, and both states and Congress have put limitations on its use.

This report examines the use of cameras to enforce traffic laws, and presents evidence about their effectiveness. It raises a number of issues as Congress considers highway safety in the context of reauthorization of federal surface transportation programs.

Speeding

Speeding, whether exceeding the posted speed limit or driving faster than is safe for the current conditions, is one of the leading contributors to traffic crashes and the resulting deaths and injuries. The National Highway Traffic Safety Administration (NHTSA) reports that speeding is a contributing factor in roughly a quarter of traffic deaths each year; in 2018, 9,378 people died in crashes in which at least one driver was speeding.[6] Speeding-related crashes may be

[1] In 2018, the most recent year for which data are available, 36,560 people were killed in motor vehicle crashes, down from 37,473 in 2017. National Center for Statistics and Analysis, *2018 Fatal Motor Vehicle Crashes: Overview*, National Highway Traffic Safety Administration, Traffic Safety Facts Research Note, DOT HS 812 826, Washington, DC, October 2019, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826.

[2] Centers for Disease Control and Prevention, *Winnable Battles: Motor Vehicle Injuries*, at https://www.cdc.gov/winnablebattles/report/motor.html.

[3] The calculation of the costs of motor vehicle crashes varies according to what types of costs are being counted. One study estimated a cost of $242 billion in 2010 from lost productivity, medical costs, legal costs, property damage, and time lost in congestion caused by crashes. When quality-of-life valuations were included, the estimated cost rose to $836 billion. L. J. Blincoe, T. R. Miller, and E. Zaloshnja, et al., *The Economic and Societal Impact of Motor Vehicle Crashes, 2010*, National Highway Traffic Safety Administration, DOT HS 812 013, Washington, DC, May 2015, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013. The numbers of motor vehicle crashes, deaths, and injuries were low in 2010 due to the effects of the 2007-2009 recession; applying the authors' methodology to more recent years would lead to higher cost estimates due to larger numbers of crashes and deaths.

[4] International Traffic Safety Data and Analysis Group, *Road Safety Annual Report 2019*, International Transport Forum, OECD, Paris, France, October 7, 2019, Table 3, at https://www.itf-oecd.org/sites/default/files/docs/irtad-road-safety-annual-report-2019.pdf.

[5] Other speed-management efforts have included reducing speed limits in residential areas to 30 kilometers per hour (18 miles per hour), adding traffic-calming features to help reduce speeds, and replacing intersections with roundabouts.

[6] National Highway Traffic Safety Administration, *Traffic Safety Facts, 2018 Data: Speeding*, DOT HS812 932, April 2020, p. 1. At https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812932. NHTSA refers to these as

underreported: in an analysis of 2014 crash data involving a traffic-related fatality reported to NHTSA, the National Transportation Safety Board (NTSB) found almost a thousand instances[7] in which vehicles that had been categorized as "not speeding" or "unknown if speeding" had been traveling at least 10 miles per hour (mph) over the posted speed limit.[8]

Speeding is a doubly risky behavior: it both increases the risk of being involved in a crash and increases the severity of a crash. Speeding limits a driver's ability to steer safely around curves, to avoid a dangerous situation, and to stop the vehicle in a short distance.

The relationship between speed and the risk of a crash is affected by many factors, including the age of the driver, whether alcohol is involved, and the characteristics of the roadway (such as width, curvature, and the presence of intersections). On the other hand, the relationship between speed and the severity of injury in a crash is straightforward: the kinetic energy involved in a crash increases exponentially as speed increases, and this is linked to greater risk of injury or death. Higher crash speeds reduce the ability of the safety systems in the vehicle (seat belts, airbags, crumple zones) and those around the roadway (guardrails and other barriers) to protect vehicle occupants. The effect of higher speeds on pedestrians and cyclists involved in a motor vehicle crash is especially critical, due to their lack of protection: according to a 1995 European Transport Safety Council study, a pedestrian struck by a vehicle travelling 20 mph has a 95% chance of survival, but a pedestrian struck at 45 mph has only a 15% chance of surviving.[9]

A periodic survey of speeding suggests that speeding is increasing in the United States: in free-flow traffic conditions the percentage of vehicles exceeding the posted speed limit by 10 mph or more rose from roughly 15% in 2007 to roughly 20% in 2015.[10]

The Location of Speed-Related Crashes

Speed-related crashes occur on roads of all types, with almost 10% of fatal speed-related crashes on roads where the speed limit was 30 mph or less (see **Figure 1**).

"speeding-involved" fatalities, as there may have been other factors involved in the crash as well (e.g., alcohol-impairment).

[7] Equal to 4% of the reported speeding-related fatalities that year.

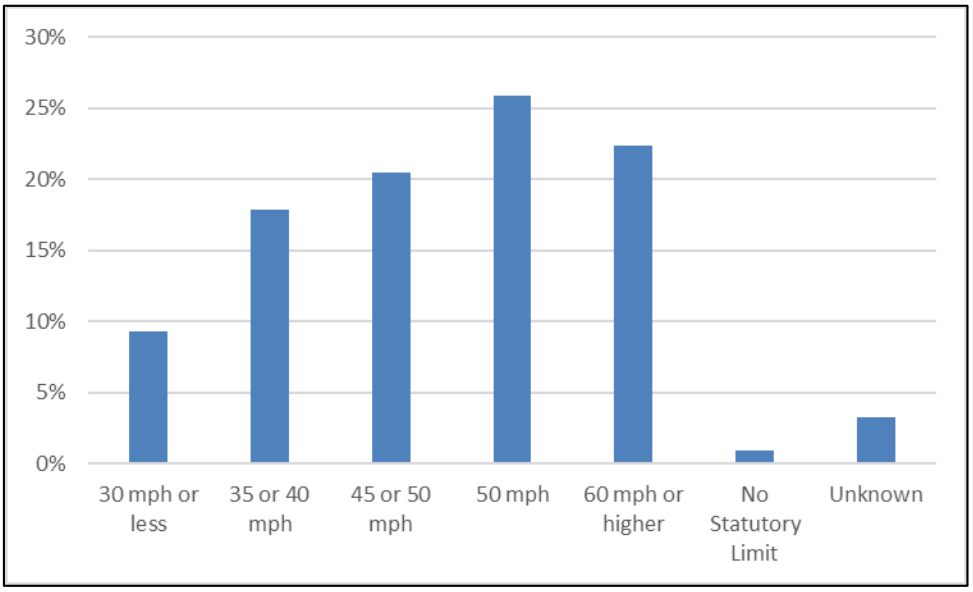
[8] National Transportation Safety Board, *Reducing Speed-Related Crashes Involving Passenger Vehicles*, NTSB/SS-17/01, July 25, 2017, p. 32, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[9] National Transportation Safety Board, *Reducing Speed-Related Crashes Involving Passenger Vehicles*, NTSB/SS-17/01, July 25, 2017, p. 27, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[10] This was true for interstates and other freeways, major arterial roads, and minor arterial and collector roads. R. Huey, D. De Leonardis, and M. Freedman, *National Traffic Speeds Survey: 2007*, National Highway Traffic Safety Administration, DOT HS 811 663, Washington, DC, August 2012, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/811663.pdf; D. De Leonardis, R. Huey, and J. Green, *National Traffic Speeds Survey III: 2015*, National Highway Traffic Safety Administration, DOT HS812 485, Washington, DC, March 2018, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812485_national-traffic-speeds-survey-iii-2015.pdf.

Figure 1. Vehicles in Fatal Crashes by Speed Limit, 2017

Percent of all vehicles involved in fatal crashes



Source: CRS, based on data from NHTSA, Traffic Safety Facts 2017, Table 33.

Note: Includes each vehicle in multivehicle crashes.

Links Between Speeding and Other Risky Behaviors

Not all drivers are equally likely to be involved in speed-related fatal crashes. Young male drivers are much more likely to be involved in such crashes than are female drivers or older drivers.[11] Drivers involved in such crashes are also more likely, in the five years before the fatal crash, to have been involved in other crashes, to have had their driver's licenses suspended or revoked,[12] or to have been cited for speeding or driving while intoxicated, compared to drivers involved in fatal crashes who were not speeding.[13] Alcohol use is closely linked to involvement in speed-related fatal crashes: 42% of drivers involved in speed-related crashes had some alcohol in their system, while 19% of drivers in fatal crashes not involving speeding had some alcohol in their system.[14] Studies indicate that alcohol both impairs driver skill and increases risky driving behaviors, including speeding and following too close.[15]

[11] National Highway Traffic Safety Administration, *Traffic Safety Facts, 2018 Data: Speeding*, DOT HS812 932, April 2020, Figure 1, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812932.

[12] Among speeding drivers involved in fatal crashes in 2018, 25% did not have a valid driver's license at the time of the crash. National Highway Traffic Safety Administration, *Traffic Safety Facts, 2018 Data: Speeding*, DOT HS812 932, April 2020, p. 1, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812932.

[13] Ibid., Figure 2.

[14] Ibid., Table 3.

[15] Jennifer R. Laude and Mark T. Fillmore, "Simulated Driving Performance Under Alcohol: Effects on Driver-Risk Versus Driver-Skill," *Drug Alcohol Dependency*, Vol 154 (September 1, 2015), pp 271-277, at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4536118/.

Drivers have a paradoxical view of speeding: most drivers regard speeding as dangerous, but most drivers also admit to speeding.[16] Like many other risky driving behaviors, speeding increases the risk of a crash but usually does not result in a crash. While drivers may say speeding is dangerous, in practice they may not perceive speeding as being particularly risky. Thus speeding is formally criticized, but is a socially accepted behavior.[17] Roadway design has improved over time, which may contribute to speeding by making drivers feel safe driving at higher speeds. A speeding driver can influence the driving behavior of others; seeing someone speed by one's vehicle can make it more likely that one will adopt that behavior.[18]

Deterring Speeding

Speed enforcement generally aims to deter speeding. Deterrence in this context has multiple components. It involves enacting laws that prohibit speeding, publicizing and enforcing those laws, and punishing offenders. Drivers may assume that law enforcement will tolerate speeds slightly over the posted limit. If drivers believe that they are likely to be detected and fined or arrested for exceeding that margin, most will limit their speed accordingly.[19]

Conceptually, deterrence is typically divided into three components: the swiftness of the punishment, the certainty of the punishment, and the severity of the punishment. Research indicates that the certainty of being caught is vastly more important than is the severity of the punishment in affecting behavior.[20] In-person speed enforcement—a police officer pulling over a speeding driver or a driver who has just run a red light—may be swift, but the likelihood of being caught is low: no officer may be nearby, traffic enforcement is typically only one among many responsibilities for an officer, and, given the time required to write the ticket for an offending driver, an officer can deal with only a handful of offenders in the course of an hour.

Using roadside stops by law enforcement officers to deter speeding may raise other concerns. Pulling a driver over to issue a citation for speeding may increase congestion and pose a safety hazard, and in some locations a driver may be unable to stop out of the flow of traffic. Roadside stops can be dangerous, due both to the risk that other vehicles will hit law enforcement

[16] In a 2019 survey, 87% of drivers considered it unacceptable to drive 10 mph over the speed limit on a residential street, yet 42% reported having done so in the previous 30 days. AAA Foundation for Traffic Safety, *2019 Traffic Safety Culture Index*, June 2020, p. 17, https://aaafoundation.org/wp-content/uploads/2020/06/2019-Traffic-Safety-Culture-Index.pdf.

[17] This is true not only in the United States (e.g., L.J. Mountain, W.M. Hirst, and M.J. Maher, "Costing Lives Or Saving Lives: A Detailed Evaluation of the Impact of Speed Cameras," *Traffic Engineering and Control*, vol. 45, no. 8 (2004), pp. 280-287), but also in many other countries (e.g., David Soole, Barry Watson, and Judy Fleiter, "A Review of International Speed Enforcement Policies and Practices: Evidence-based Recommendations for Best Practice," In S. Landry, N. Stanton, A. Vallicelli, and G. Di Bucchianico, *Advances in Human Aspects of Transportation, Part I: Proceedings of the 5th International Conference on Applied Human Factors and Ergonomics*, AHFE 2014, pp. 553-566, https://eprints.qut.edu.au/75877/.

[18] Judy J. Fleiter, Alexia Lennon, and Barry Watson, "How Do Other People Influence Your Driving Speed? Exploring the 'Who' and the 'How' of Social Influences on Speeding From a Qualitative Perspective," *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 13, issue 1, January 2010, pp. 49-62, at https://doi.org/10.1016/j.trf.2009.10.002.

[19] Jeremy D. Davey and James E. Freeman, "Improving Road Safety Through Deterrence-Based Initiatives: A Review of Research," *Sultan Qaboos University Medical Journal*, vol. 11(1), February 2011, pp. 29-37, at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3074684/.

[20] Daniel S. Nagin, "Deterrence in the Twenty-First Century," in *Crime and Justice in America*, ed. M. Tonry, Chicago, Ill: University of Chicago Press, 199-264, cited in "Five Things About Deterrence," National Institute of Justice, U.S. Department of Justice, June 5, 2016, https://nij.ojp.gov/topics/articles/five-things-about-deterrence#note1.

officers,[21] stopped drivers, passengers, or their vehicles and the potential for the interaction between the law enforcement officer and driver or passenger to lead to violence during traffic stops.

Traffic stops can be problematic in other ways. The discretion that law enforcement officers employ in deciding whether or not to stop a vehicle that is speeding, to search a vehicle when stopped, and to issue a citation or even arrest the driver raises constitutional questions about abuse of civil rights and bias in enforcement.[22] In the exercise of that discretion, some studies suggest minorities are pulled over and ticketed at higher rates than other groups.[23]

Enforcement of speed limits can influence driving behavior through two means: specific deterrence (the impact of legal penalties on offenders) and general deterrence (the impact of the threat of detection and penalties on the general driving public). Studies have found that when speed enforcement is focused on a particular location, speeding is reduced at that location. Some studies have found that the reduction in speeding is confined to that location; other studies have found a "halo" effect, with speeds declining in the area around the speed camera location.[24] Another approach to general deterrence is the use of mobile speed cameras; when speed enforcement efforts are regularly moved from one location to another, drivers may feel that speed enforcement can happen anywhere at any time and adhere more closely to the speed limit wherever they are driving.[25] A third approach to general deterrence is the use of point-to-point (average speed) cameras, which measure a driver's average speed over a distance up to several miles. Studies of average speed camera programs have found large reductions in average speed, speed variability, fatal and serious injury crash rates, and reductions in journey times (due to the reduction in crash-induced congestion and in the accordion effect of braking).[26]

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[21] Over the period 2009-2018, an average of a dozen law enforcement officers a year died after being struck by a vehicle: National Law Enforcement Officers Memorial Fund, *Causes of Law Enforcement Deaths Over the Past Decade (2009-2018)*, at https://nleomf.org/facts-figures/causes-of-law-enforcement-deaths.

[22] Illya Licthenberg, "Police Discretion and Traffic Enforcement: A Government of Men," *Cleveland State Law Review*, vol. 50, issue 3 (2003), p. 425, at https://engagedscholarship.csuohio.edu/clevstlrev/vol50/iss3/4/.

[23] Tom Abate, "Black Drivers Get Pulled Over by Police Less at Night When Their Race is Obscured by 'Veil of Darkness,' Stanford Study Finds," *Stanford News*, May 5, 2020, at https://news.stanford.edu/2020/05/05/veil-darkness-reduces-racial-bias-traffic-stops/; Wendy C. Regoeczi and Stephanie Kent, "Race, Poverty, and the Traffic Ticket Cycle: Exploring the Situational Context of the Application of Police Discretion," *Policing*, vol. 37, no. 1 (2014), pp. 190-205. However, the conclusions of such measures are subject to question, as "there is no clear way to establish the correct population at risk for police attention," Greg Ridgeway and John McDonald, *Methods for Assessing Racially Biased Policing*, RAND Corporation, 2010, p. 27, at https://www.rand.org/content/dam/rand/pubs/reprints/2011/RAND_RP1427.pdf.

[24] This "halo" effect has also been noted with in-person speed enforcement efforts; European Commission, *Mobility and Transport: Road Safety*, "Time and Distance Halo Effects," at https://ec.europa.eu/transport/road_safety/specialist/knowledge/speed_enforcement/additional_considerations_on_speed_enforcement/time_and_distance_halo_effects_en.

[25] David Soole, Barry Watson, and Judy Fleiter, "A Review of International Speed Enforcement Policies and Practices: Evidence-based Recommendations for Best Practice," pp. 7 & 9, *Proceedings of the 5th International Conference on Applied Human Factors and Ergonomics AHFE 2014*, edited by T. Abram, W. Karwowski and T. Marek, Krakow, Poland, July 19-23, 2014, pp. 5-6, at https://eprints.qut.edu.au/75877/18/75877.pdf.

[26] The accordion effect refers to the impact of decelerations and accelerations by a driver in response to the vehicle ahead, which increase in impact as the number of drivers reacting increases. For example, a driver going 60 mph encounters a vehicle going 55 mph and for some reason cannot immediately pass it, so brakes to slow to 55 mph; if another driver is close behind, that driver will also brake, perhaps slightly harder in reaction to the brake lights of the vehicle that had been going 60 mph, and so forth, producing a "backward traveling wave" that can last for miles. This effect can cause a lane of traffic to come to a complete stop, sometimes referred to as a phantom traffic jam. "Traffic Jam Mystery Solved by Mathematicians," Phys.org, December 19, 2007, at https://phys.org/news/2007-12-traffic-mystery-mathematicians.html.

Red Light Running

Red light violations involve a driver entering and proceeding through a signalized intersection after the traffic signal has turned red. Drivers turning right on red without coming to a stop before turning or turning right on red where that action is prohibited also are considered red light violations.

As with speeding, most instances of running a red light do not result in a crash. However, crashes resulting from red light violations can be particularly severe,[27] as they often result in right-angle ("T-bone") collisions in which the force of the vehicle running the red light strikes a crossing vehicle in the side. Modern cars typically have sophisticated engineering features to protect occupants in the event of front- and rear-impact crashes. The length of the vehicle body in front of and behind the passenger compartment allows for crumple zones to absorb the energy of the crash and for seat belts and airbags to protect the occupants from the forces of impact. In side-impact crashes, the initial impact may be directly into the passenger compartment, where there is little space or material to absorb the energy of the striking vehicle before it reaches the vehicle occupant, and at an angle where seat belt and side-impact airbags offer comparatively less protection for occupants.

In 2018, 846 people were killed, and an estimated 139,000 people were injured in crashes that involved running of red lights.[28] Many of those killed and injured were pedestrians and cyclists.

According to the Insurance Institute for Highway Safety, drivers involved in fatal red light running crashes that involved multiple vehicles are more likely to be young males, to have prior crashes or convictions for driving while intoxicated, and to be driving without a valid license at the time of the crash.[29] They are also more likely to be speeding or intoxicated at the time of the red light running crash.

The challenges of preventing red light running are similar to some of the challenges to preventing speeding. Red light running has a degree of social acceptability: most drivers condemn running of red lights, while many drivers also admit to doing so.[30]

In-person enforcement of red light running has issues similar to those of in-person enforcement of speed limits. Police resources are limited relative even to the number of red lights where red light violations may commonly occur. Chasing down a motorist who has run a red light may be dangerous, road conditions may make a roadside stop dangerous, and a roadside stop may exacerbate traffic congestion, particularly during rush-hour traffic conditions.

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[27] *Making Intersections Safer: A Toolbox of Engineering Countermeasures to Reduce Red-Light Running*, Institute of Transportation Engineers and Federal Highway Administration, 2003, pp. 6-7, at https://safety.fhwa.dot.gov/intersection/conventional/signalized/rlr/rlr_toolbox/rlrbook.pdf.

[28] Insurance Institute for Highway Safety, *Red Light Running*, "By the Numbers," at https://www.iihs.org/topics/red-light-running#by-the-numbers.

[29] Ibid.

[30] Eighty-six percent of drivers surveyed reported running a red light to be very or extremely dangerous, yet 31% reported doing so within the previous 30 days. AAA Foundation for Traffic Safety, *2019 Traffic Safety Culture Index*, June 2020, Tables A5 & A7, at https://aaafoundation.org/wp-content/uploads/2020/06/2019-Traffic-Safety-Culture-Index.pdf.

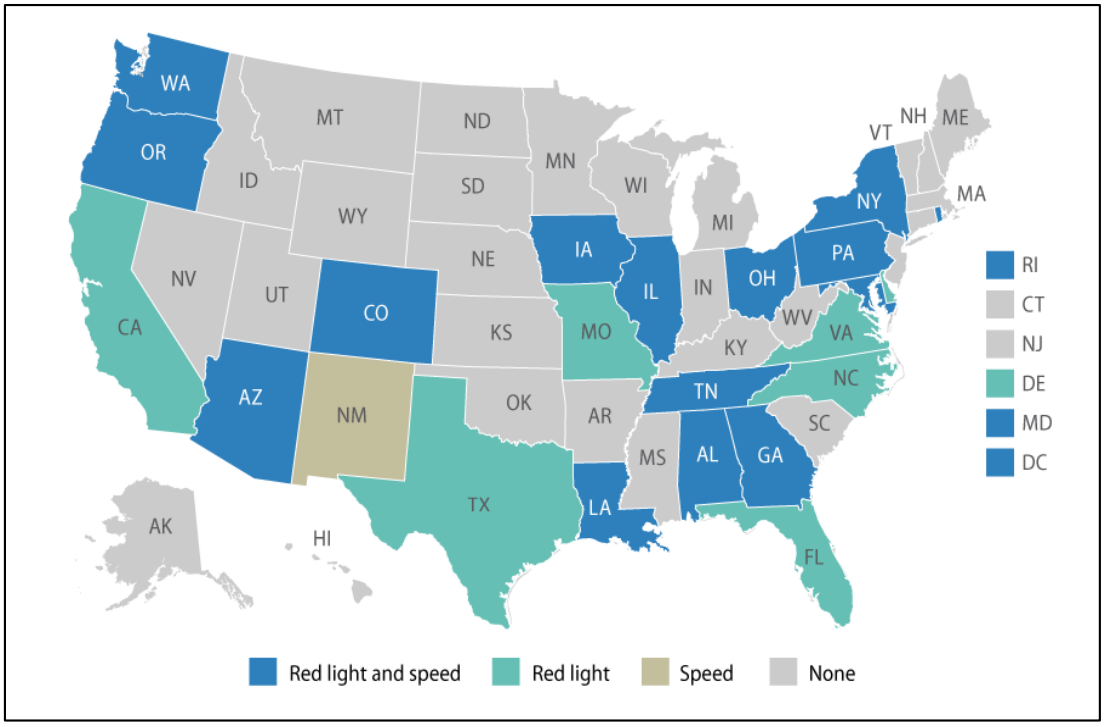
Automated Enforcement

ATE uses cameras to identify a vehicle that exceeds the posted speed limit (typically by some specified margin) or has violated a red traffic signal and to take a photo of the vehicle (and, in some cases, the driver). Law enforcement and ATE vendor personnel then review the photo to identify whether it has recorded a speeding or red light violation. State motor vehicle records are used to determine where to mail the citation. The photo is used to generate a citation that is mailed to either the owner of the vehicle or, in some states, the driver of the vehicle (identified from the photo).

Rather than directly own speed cameras or red light cameras, local or state authorities normally contract with private companies that provide the equipment and help to operate it.[31]

In some states, speeding and red light running violations are treated like parking tickets; the vehicle owner is fined, but no criminal charges are brought, no "points" are assessed to the driver's license, and the violations are not reported to insurance companies. The penalties are not assessed to the driver of the vehicle, but to the owner. In other states, these violations are treated like moving traffic violations, with the systems required to provide evidence to identify the driver, and penalties including license sanctions may be levied against the driver, rather than the owner, of the vehicle. In one form or another, ATE is employed in approximately half the states (**Figure 2**).

Figure 2. States Where Speed or Red Light Cameras Are in Use, 2020



Source: Insurance Institute for Highway Safety.

[31] National Highway Traffic Safety Administration, *Speed Enforcement Program Guidelines*, DOT HS 810 915, March 2008, p. 18, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/810915.pdf; R. J. Miller, J. S. Osberg, R. Retting, et al., *System Analysis of Automated Speed Enforcement Implementation*, National Highway Traffic Safety Administration, DOT HS 812 257, April 2016, p. 50, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812257_systemanalysisase.pdf.

Automated Speed Enforcement

Automated speed enforcement combines a vehicle speed detection system with a camera to identify and photograph speeding vehicles. There are a variety of speed camera systems: cameras can be fixed (i.e., placed in one spot and left there, typically at a location chosen due to a relatively high number of speed-related crashes) or mobile (placed in a vehicle that can be driven to a location and parked for a period of time, then driven to another location; these vehicles can be marked or unmarked).

A third type of speed camera system, used in other countries but not in the United States, is the average speed camera system (sometimes called a point-to-point camera system). This type of speed camera addresses a criticism of fixed speed cameras: that drivers who know the location of the cameras slow down at those locations but speed before and after passing the cameras. Average speed cameras are mounted in pairs at a distance (ranging from hundreds of yards to several miles), take a time-stamped photo of each vehicle, use license plate readers to check the time each vehicle took to travel from the first location to the second, and issue tickets when a vehicle's average speed over the distance is above the limit.[32]

There have been many studies of speed camera programs; most have concluded that speed cameras reduced speeding and/or crashes in the vicinity of the cameras, and in some cases in the surrounding areas. Several reviews that looked at dozens of studies from around the world found that despite methodological issues in most studies, speed cameras reduce speeding and/or crashes.[33] In its evidence-based guide to traffic safety measures, NHTSA gives ATE (including both speed cameras and red light cameras) the highest rating for effectiveness;[34] the setting of speed limits themselves is the only other countermeasure rated as demonstrated to be effective in limiting speeding.[35] Similarly, automated speed enforcement is the only speeding-related countermeasure included by the Centers for Disease Control and Prevention in its tool to enable states to model cost-effective interventions to reduce traffic deaths and injuries.[36] The NTSB also considers automated speed enforcement to be "an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries."[37]

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[32] Jenoptik, *Average Speed Cameras*, at https://www.jenoptik.us/products/road-safety/average-speed-camera.

[33] Lawrence E. Decina, Libby Thomas, and Raghavan Srinivasan, et al., *Automated Enforcement: A Compendium of Worldwide Evaluations of Results*, National Highway Traffic Safety Administration, DOT HS810 763, Washington, DC, September 2007, at https://www.nhtsa.gov/DOT/NHTSA/Traffic%20Injury%20Control/Articles/Associated%20Files/HS810763.pdf; Cecilia Wilson, Charlene Willis, and Joan K. Hendrikz, et al., "Speed Cameras for the Prevention of Road Traffic Injuries and Deaths," *Cochrane Database of Systematic Reviews 2010*, Issue 11, https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004607.pub4/full; Daniel J. Graham, Cian Naik, Emma J. McCoy, "Do Speed Cameras Reduce Road Traffic Collisions?," *PLOS One*, September 16, 2019, at https://doi.org/10.1371/journal.pone.0221267.

[34] Automated enforcement receives five stars for effectiveness, denoting measures that have been "Demonstrated to be effective by several high-quality evaluations with consistent results." C. M. Richard, K. Magee, and P. Bacon-Abdelmoteleb, et al., *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, Ninth Edition*, National Highway Traffic Safety Administration, DOT HS812 478, Washington, DC, April 2018, pp. 3-20–3-26, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812478_countermeasures-that-work-a-highway-safety-countermeasures-guide-.pdf.

[35] The other measures considered are Aggressive Driving and Other Laws; High-Visibility Enforcement; Other Enforcement Methods; Penalty Types and Levels; Diversion and Plea Agreement Restrictions, Traffic Violator School; and Communications and Outreach Supporting Enforcement. Ibid.

[36] *The Motor Vehicle Prioritizing Interventions and Cost Calculator for States (MV PICCS)*, at https://mvpiccs-viz.cdc.gov:8008/.

[37] National Transportation Safety Board, *Reducing Speed-Related Crashes Involving Passenger Vehicles*, NTSB/SS-

Use of Speed Cameras in Other Countries

A number of countries have made extensive use of speed cameras in their highway safety programs.[38] In France, use of automated enforcement was a key feature of a highway safety initiative announced in 2002, and was credited with reductions in both average speeds and fatal crashes.[39] Australia introduced such cameras in 1985, and as of 2014 mobile speed cameras were "arguably the most common method of enforcing speed limits."[40] The percentage of light vehicles in free-flowing traffic exceeding the speed limit by more than 10 kilometers per hour (roughly 6 mph) dropped from 36% in 2001 to 10% in 2009.[41] The United Kingdom introduced speed cameras and other speed-calming measures in 1990. A comparison of fatal crashes over the ensuing decade in the U.K. and the United States (where speed cameras were introduced in a limited and sporadic fashion) found that U.K. road deaths dropped by 34% from 1990-1999, compared to a 6.5% drop in the United States. The study suggested the greater reduction in fatal crashes in the U.K. was due largely to small decreases in the speed of drivers due to the introduction of speed cameras and other speed-calming measures.[42]

Speed Camera Usage in the United States

Of the tens of thousands of local governments in the United States, 152 communities had speed camera programs in place as of August 2020.[43] Eight states prohibit the use of automated enforcement, 19 states explicitly permit it, and 23 states do not have legislation addressing automated enforcement.

Listing the states that permit speed cameras can give a misleading impression of the extent of their usage, since systems typically operate in specific communities rather than statewide. For example, New Mexico has speed cameras in one small community,[44] and New York has speed cameras in two communities (one of these is New York City, which includes 45% of the state's population). Both states limit the cameras to school zones.[45] In Maryland, where 41 jurisdictions

17/01, July 25, 2017, p. 37, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[38] David Soole, Barry Watson, and Judy Fleiter, "A Review of International Speed Enforcement Policies and Practices: Evidence-based Recommendations for Best Practice," *Proceedings of the 5th International Conference on Applied Human Factors and Ergonomics AHFE 2014*, edited by T. Abram, W. Karwowski, and T. Marek, Krakow, Poland, July 19-23, 2014, at https://eprints.qut.edu.au/75877/18/75877.pdf.

[39] Laurent Carnis and Etienne Blais, "An Assessment of the Safety Effects of the French Speed Camera Program," *Accident Analysis and Prevention*, 51 (2013) 301-309.

[40] David Soole, Barry Watson, and Judy Fleiter, op cit., p. 2.

[41] Transportation Research Board, *Achieving Traffic Safety Goals in the United States: Lessons from Other Nations*, Special Report 300, Washington, DC, 2011, pp. 77, 81.

[42] Elihu Richter, Lee S. Friedman, Tamar Berman, Avrahim Rivkind, "Death and Injury from Motor Vehicle Crashes: A Tale of Two Countries," *American Journal of Preventive Medicine*, vol. 29, no. 5, 2005, pp. 440-449.

[43] Insurance Institute for Highway Safety, personal communication, August 26, 2020.

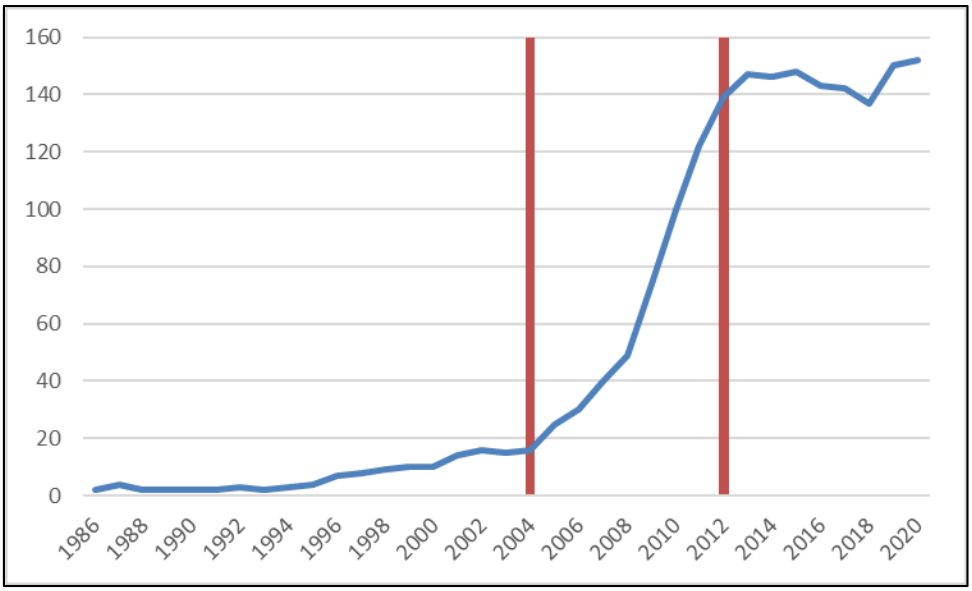
[44] New Mexico Department of Transportation, *Biennial Survey of State Automated Traffic Enforcement Systems*, 2020, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/new_mexico_ae2020_survey.pdf.

[45] New York State, *Automated Traffic Enforcement System Biennial Survey* [FY2020], at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/new_york_ae2020_survey.pdf.

use speed cameras,[46] state law limits their placement to work zones on roads with speed limits of 45 mph or more and to school zones, with a few other allowances in specific jurisdictions.[47]

The first sustained automated speed enforcement program in the United States was implemented in Paradise Valley, AZ, in 1987.[48] Adoption of speed cameras was relatively slow, with some communities adopting and later canceling automated speed enforcement programs. This pattern changed in the mid-2000s, when the number of communities adopting automated speed enforcement grew from around 20 in 2005 to over 140 in 2013 before plateauing (see **Figure 3**).

Figure 3. Trend in Communities Using Automated Speed Enforcement



Source: CRS, based on data from the Insurance Institute of Highway Safety.

Note: The numbers in the chart are net numbers for each year; the total number of communities that have used such systems is somewhat larger, as some communities have adopted and subsequently terminated their systems. Red bars represent years of notable policy changes: the 2004 American Association of State Highway and Transportation Officials resolution supporting greater use of automated speed enforcement, and the 2012 congressional limitation on use of ATE.

Although speed camera programs are typically adopted at the community level, both federal and state actions appear to play a role in the use of automated speed enforcement. Congress gave the federal Department of Transportation (DOT) the discretion to promote the use of ATE in 1991. However, usage of camera systems stayed relatively low until after the American Association of State Highway and Transportation Officials (AASHTO, the association of state departments of transportation and transit agencies) adopted a resolution calling on states to support greater use of

[46] Seventeen jurisdictions have both speed and red light cameras, 24 have only speed cameras, and 5 have only red light cameras. University of Maryland Center for Advanced Transportation Technology, *Automated Enforcement Survey Report*, Table 2, Maryland Department of Transportation, Motor Vehicle Administration, Highway Safety Office, February 27, 2020, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/maryland_ae2020_survey.pdf.

[47] University of Maryland Center for Advanced Transportation Technology, *Automated Enforcement Survey Report*, Maryland Department of Transportation, Motor Vehicle Administration, Highway Safety Office, February 27, 2020, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/maryland_ae2020_survey.pdf.

[48] National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, p. 5, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

automated speed enforcement in 2004.[49] The Governors Highway Safety Association (GHSA) issued a similar call the following year, asking Congress to create a grant program to encourage the use of automated speed enforcement. In 2007 the International Association of Chiefs of Police passed a resolution encouraging the use of speed cameras in locations with high rates of crashes, in conjunction with in-person traffic enforcement.[50]

Some surveys of communities where automated speed enforcement programs were implemented have found that support for automated speed enforcement increased after implementation.[51] However, an ongoing survey by the AAA Foundation for Traffic Safety suggests that public support for speed cameras has been waning. In 2008, 68% of respondents "somewhat" or "strongly" supported using automated speed enforcement on neighborhood streets, with 18% "somewhat" or "strongly" opposed; in 2018, 42% of respondents "somewhat" or "strongly" supported using cameras to ticket cars going 10 mph over the speed limit on residential streets, and 53% "somewhat" or "strongly" opposed such a law.[52]

One possible reason for increased public opposition to speed cameras is that they appear to result in a greater number of citations than in-person stops. In 2015, an estimated 7.9 million U.S. drivers were stopped by police for speeding, not all of whom received speeding tickets. In 2017, more than 2.2 million speed camera tickets were issued in the Washington, DC, metropolitan area alone.[53] While these numbers are not directly comparable, they indicate that automated enforcement may be associated with a much greater number of citations per million licensed drivers.

After allowing the Secretary of Transportation to encourage states to adopt speed cameras in 1991, in 2012 Congress prohibited states from using federal transportation funding to purchase, operate, or maintain ATE systems except in certain circumstances.[54] The number of communities using speed cameras has grown slightly since 2012.

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[49] Transportation Research Board, *Automated Enforcement for Speeding and Red Light Running*, National Cooperative Highway Research Program Report 729, Washington, DC, 2012, p. 3, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa1304/resources2/27%20-%20Automated%20Enforcement%20for%20Speeding%20and%20Red%20Light%20Running.pdf.

[50] Ibid.

[51] E.g., Jessica B. Cicchino, Joann K. Wells, and Anne T. McCartt, "Survey About Pedestrian Safety and Attitudes Toward Automated Traffic Enforcement in Washington, DC," *Traffic Injury Prevention*, vol. 15, no. 4 (2014), pp. 414-423, and Richard A. Retting, Sergey Y. Kyrychenko, and Anne T. McCartt, 2008. "Evaluation of Automated Speed Enforcement on Loop 101 Freeway in Scottsdale, Arizona," *Accident Analysis & Prevention* vol. 40, no. 4 (2008), pp. 1506-1512, cited in National Transportation Safety Board, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*, Safety Study NTSB/SS-17/01, July 25, 2017, p. 39, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[52] Since the question had become more specific about the policy in 2018 compared to 2008, it is possible that the change in wording affected the levels of support and opposition expressed. AAA Foundation for Traffic Safety, *2008 Traffic Safety Culture Index*, Table 20, April 2008, at https://aaafoundation.org/wp-content/uploads/2018/02/2008TSCIndexReport.pdf; *2018 Traffic Safety Culture Index*, Table 6, June 2019, at https://aaafoundation.org/wp-content/uploads/2019/06/2018-TSCI-FINAL-061819_updated.pdf.

[53] Elizabeth Davis, Anthony Whyde, and Lynn Langton, *Bureau of Justice Statistics Special Report: Contacts Between Police and the Public, 2015*, Office of Justice Programs, U.S. Department of Justice, NCJ 251145, October 2018, Table 5 (number of drivers in traffic stops) and Table 10 (reasons for traffic stops), at https://www.bjs.gov/content/pub/pdf/cpp15.pdf; Luz Lazo, "Drivers continue to ignore speed cameras in the District, earning city more than $100 million," *Washington Post*, September 26, 2018, at https://www.washingtonpost.com/transportation/2018/09/26/drivers-continue-ignore-speed-cameras-district-earning-city-more-than-million.

[54] In The Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), Section 1533 prohibited states from using any of their federal Highway Safety Improvement Program funds, which are distributed by the Federal Highway

NHTSA Guidelines for Speed Camera Systems

NHTSA issued operational guidelines in 2008 for states and communities implementing speed camera programs.[55] The guidelines cover such topics as planning, site selection, system procurement, public awareness, processing notices of violations, and evaluating the programs.

A later survey of communities with speed camera programs found that 63% of program administrators were not aware of the NHTSA operational guidelines, though most programs were consistent with the guidelines in many areas.[56] The survey found that among the NHTSA guidelines that communities most frequently failed to follow were the following:

- Automated speed enforcement programs should use a combination of fines and license sanctions as penalties and should provide photographic evidence to identify the driver of the vehicle. Some 23% of respondents used both fines and sanctions to penalize violators, and 32% used photos to identify drivers.[57]
- During the planning process for implementing an automated speed enforcement program, an advisory panel of stakeholder representatives should guide the program development and provide input. Some 27% of respondents reported the existence of such an advisory panel.[58]

In a 2017 report, the NTSB noted that DOT's 2008 speed camera program guidelines did not reflect more recent changes in technology and operations, such as the use of point-to-point speed enforcement. It recommended that the Federal Highway Administration and NHTSA update the guidelines and promote their use.[59]

Red Light Camera Programs

In numerous studies, red light cameras have been shown to decrease the number of both red light violations and crashes involving injuries and fatalities at signalized intersections.[60] There is some

Administration, to purchase, operate, or maintain an ATE system, except in school zones, and Section 31102(c) prohibited states from using any of their federal Highway Safety Formula Program funds, which are distributed by NHTSA, to purchase, operate, or maintain an ATE system, with no exceptions.

[55] National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

[56] R. J. Miller, J. S. Osberg, R. Retting, et al., *System Analysis of Automated Speed Enforcement Implementation*, National Highway Traffic Safety Administration, DOT HS812 257, April 2016, p. 99-100, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812257_systemanalysisase.pdf.

[57] There is evidence that monetary fines assessed against the vehicle owner can be effective in deterring speeding, but "this approach helps feed ASE criticism that these programs are created for the mere purpose of collecting fines and do not serve legitimate traffic safety goals." Ibid, pp. 99-100. Several states provide that penalties shall be assessed against the vehicle and not the driver; in such states there is no need for communities to have automated speed enforcement technology that identifies the driver.

[58] The survey notes that given the often contentious nature of automated speed enforcement programs, incorporating stakeholder input from the beginning of the planning process can improve the odds of a successful implementation.

[59] National Transportation Safety Board, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*, Safety Study NTSB/SS-17/01, July 25, 2017, p. 42, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[60] A. S. Aeron-Thomas and S. Hess, "Red-light Cameras for the Prevention of Road Traffic Crashes," *Cochrane Database of Systematic Reviews* 2005, Issue 2, Art. No. CD003862; Charles Goldenbeld, Stijn Daniels, and Govert Schermers, "Red Light Cameras Revisited: Recent Evidence on Red Light Camera Safety Effects," *Accident Analysis & Prevention*, vol. 128, July 2019, pp. 139-147, at https://www.sciencedirect.com/science/article/pii/

evidence that red light cameras, while reducing right-angle crashes at intersections, can lead to an increase in rear-end collisions as drivers change their behavior to avoid entering intersections when the traffic signal is yellow and are run into from behind by more aggressive drivers. Such collisions are typically less destructive than the right-angle collisions resulting from red light running, thus red light cameras reduce overall crash severity. [61] Not all studies have found increases in rear-end collisions; nor have all studies found statistically significant reductions in overall crash severity.[62]

Use of Red Light Camera Enforcement

Red light cameras are used extensively in other countries.[63] The first red light camera program in the United States was introduced in New York City in 1992. By 2012 there were approximately 556 communities with red light camera programs across 25 states and the District of Columbia. [64] A backlash to the spread of red light cameras began around this time.[65] According to the Insurance Institute for Highway Safety, the number of communities with red light camera programs has declined to approximately 340.[66]

The trend of declining support among drivers for automated speed enforcement seen in the AAA Foundation for Traffic Safety's series of surveys of traffic safety culture is also seen with regard to red light cameras. In 2008, 70% of respondents somewhat or strongly supported red light cameras, and 18% somewhat or strongly opposed them; in 2019, 43% somewhat or strongly supported red light cameras, and 57% somewhat or strongly opposed them.[67] This decline in support may have been due partly to well-publicized charges that some systems were ineffective or abusive.[68]

S0001457518303610.

[61] One study that looked at red light camera programs in seven cities (132 intersections) found that right-angle crashes decreased by 25%, while rear-end collisions increased by 15%. Since the rear-end collisions were less severe than right-angle crashes, the net benefit was estimated to be $39,000 (in 2001 dollars) per intersection per year. Forrest M. Council, Bhagwant Persaud, and Kimberly Eccles, et al., *Safety Evaluation of Red-Light Cameras*, ITS Joint Program Office and Office of Safety Research and Development, Federal Highway Administration, FHWA-HRT-05-048, Washington, DC, April 2005, at https://www.fhwa.dot.gov/publications/research/safety/05048/05048.pdf.

[62] A fact sheet published by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, *Automated Red Light Enforcement*, "Effectiveness," (no date, "page last reviewed December 2, 2015"), at https://www.cdc.gov/motorvehiclesafety/calculator/factsheet/redlight.html) cites several reviews of the literature and several individual studies supporting the effectiveness of red light camera programs in reducing overall crash severity, but also cites several studies that found no reduction in overall crash severity. The fact sheet notes that it is difficult to compare the studies directly, as they used a variety of methodologies, data sources, time periods, comparisons to controls, and metrics to reach their conclusions, but concludes it seems "premature to conclude that red light cameras have been widely found to be highly effective."

[63] Ibid.

[64] Data from the Insurance Institute of Highway Safety, cited in National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, p. 5, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

[65] Daniel C. Vock, "Why Cities Hit the Brakes on Red Light Cameras," *Governing*, March 2015, at https://www.governing.com/topics/public-justice-safety/gov-cities-hit-brakes-red-light-cameras.html.

[66] Insurance Institute for Highway Safety, personal communication, August 26, 2020.

[67] AAA Foundation for Traffic Safety, *2008 Traffic Safety Culture Index*, Table 20, April 2008, at https://aaafoundation.org/wp-content/uploads/2018/02/2008TSCIndexReport.pdf; *2019 Traffic Safety Culture Index*, Table 5, June 2020, at https://aaafoundation.org/wp-content/uploads/2020/06/2019-Traffic-Safety-Culture-Index.pdf.

[68] Daniel C. Vock, "Why Cities Hit the Brakes on Red Light Cameras," *Governing*, March 2015, at https://www.governing.com/topics/public-justice-safety/gov-cities-hit-brakes-red-light-cameras.html. See also David

Automated Traffic Enforcement Issues

Some studies of red light camera programs have found that the number of crashes at intersections increased, at least temporarily, after installation of red light cameras.[69] Cameras may contribute to an increase in rear-end crashes as a following vehicle runs into a vehicle that has stopped at a red light. These crashes usually cause only property damage while virtually all studies have found that the cameras reduce the number of right-angle crashes, which are more deadly.[70] Nevertheless, some critics object to red light cameras on the basis of the studies showing increases in rear-end collisions.

Studies of speed management more broadly have found that infrastructure changes can be effective in reducing speeding and red light running. For example, red light running can be reduced by having a longer yellow interval.[71] A study of this approach in Philadelphia, PA, found that increasing the yellow interval by 1 second reduced red light violations by 36%. The study also found that subsequently installing red light cameras at the same intersections decreased red light violations a further 96%.[72] Thus, increasing the yellow-signal interval can result in reductions in red light running violations, at least in the short term. Some studies have found that over time drivers appear to adjust to increased yellow intervals, with the result that some drivers resume running the red lights.[73] Also, increases in the yellow interval are not without cost, as they reduce the throughput capacity of the intersection.[74]

Some analysts assert that ATE systems do not work as well as in-person enforcement to remove risky drivers from the road: a speeding driver who is pulled over by an officer and is found to be under the influence of alcohol can be removed from the road immediately and possibly suspended from driving,[75] whereas a speed camera would send a ticket to the driver's (or vehicle owner's) address days later without inhibiting the driver's activity for the rest of that trip. The documented effect of speed camera programs in reducing injury crashes and fatalities suggests that the deterrent effect of the increased possibility of a penalty provided by a speed camera program may compensate for the delayed imposition of the penalty compared to the immediate but less certain

Kidwell, "How Chicago's Red Light Ticketing Turns Yellow Lights Into Cash," *Chicago Tribune*, October 12, 2014, at https://www.chicagotribune.com/news/ct-red-light-camera-yellow-light-1012-20141012-story.html, and David Kidwell, "Redflex to Pay $20 Million to Chicago to Settle Lawsuit Over Red-Light Camera Bribery," *Chicago Tribune*, February 6, 2017, at https://www.chicagotribune.com/investigations/ct-red-light-cameras-lawsuit-settled-met-20170206-story.html.

[69] For example, a Federal Highway Administration study of red light camera programs in seven jurisdictions found an overall increase in rear-end collisions and a reduction in right-angle crashes. Forrest M. Council, Bhagwant Persaud, Kimberly Eccles, et al., *Safety Evaluation of Red-Light Cameras*, FHWA-HRT-05-048, April 2005, at https://www.fhwa.dot.gov/publications/research/safety/05048/05048.pdf.

[70] Ibid. An economic analysis estimated that the value of the reduction in right-angle crashes was larger than the increased cost of the rear-end collisions.

[71] National Motorists Association, *Yellow Light Timing*, at https://www.motorists.org/issues/red-light-cameras/yellow-lights/#:~:text=This%20study%20shows%20that%20an,by%20at%20least%2050%20percent.

[72] Richard A. Retting, Susan A. Ferguson, and Charles M. Farmer, Reducing Red Light Running Through Longer Yellow Signal Timing and Red Light Camera Enforcement: Results of a Field Investigation, Insurance Institute for Highway Safety, January 2007, at https://www.cob.org/wp-content/uploads/iihs-report_.pdf.

[73] Ibid., p. 8.

[74] Federal Highway Administration, Office of Safety, "5.7.3 Vehicle Timing–Vehicle Clearance," *Signalized Intersections: An Informational Guide*, at https://safety.fhwa.dot.gov/intersection/conventional/signalized/fhwasa13027/ch5.cfm#s573.

[75] Since many drivers continue to drive even though their licenses are suspended, the safety impact of license suspension should not be exaggerated.

penalty provided by in-person enforcement. Nevertheless, NHTSA recommends ATE as a supplement to, not a replacement for, in-person speed enforcement.[76]

Some have questioned the constitutionality of ATE. The issues raised in this regard include concerns that an automated enforcement ticket assumes that the offender is guilty until proven innocent, rather than vice versa, and the lack of opportunity for offenders to confront their accuser.[77] Some courts have ruled against speed and red light camera programs on various grounds; other courts have consistently rejected challenges based on assertions that the programs violate constitutional protections.[78]

In a 2010 House hearing on ATE,[79] in which NHTSA and other witnesses testified to the effectiveness of ATE in promoting safety, several Members and two witnesses asserted that communities embraced ATE primarily to generate revenue rather than to improve safety, citing instances of apparent bad faith in the operation of ATE programs.[80] One study of Chicago's red light camera program, which found that the program resulted in reductions in right-angle crashes and increases in rear-end crashes, reported that even community groups that acknowledged the safety benefits of the program indicated that its value might be diminished by the perception that it was intended to generate revenue.[81] To allay such concerns, NHTSA recommends transparency on the part of ATE program administrators, along with a focus on the principle that the goal of the program is to reduce the number of violations, not generate revenue.[82]

Issues for Congress

Restrictions on Use of Federal Funds

The federal government does not regulate the use of automated traffic enforcement. The decision to allow or prohibit the use of ATE is left to the states. But federal law can influence the decisions of states and localities. Congress requires every state to have a highway safety program designed to reduce traffic accidents and the resulting deaths, injuries, and property damage.[83] Such programs are required to address the following issues: speeding, driving while impaired, aggressive and distracted driving, proper use of occupant protection devices (e.g., seat belts),

[76] National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

[77] Joel O. Christensen, "Wrong on Red: The Constitutional Case Against Red-Light Cameras," *Washington University Journal of Law & Policy*, vol. 32, 2010, pp. 443-466, at https://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=1086&context=law_journal_law_policy.

[78] Matthew S. Maisel, "Slave to the Traffic Light: A Road Map to Red Light Camera Legal Issues," *Rutgers Journal of Law & Public Policy*, vol. 10, no. 4, Spring 2013, pp. 401-434.

[79] U.S. Congress, House Committee on Transportation and Infrastructure, Subcommittee on Highways and Transit, *Utilization and Impacts of Automated Traffic Enforcement*, 111th Cong., 2nd sess., June 30, 2010.

[80] See, for example, the written testimony of Dan Danila, representing the National Motorist Association, a group totally opposed to ATE, at ibid.

[81] Hani S. Mahmassani, Joseph L. Schofer, Breton L. Johnson, et al., *Chicago Red Light Camera Enforcement: Best Practices & Program Road Map*, Northwestern University Transportation Center, March 17, 2017, at https://www.transportation.northwestern.edu/docs/research/featured-reports/RLC-Report-Web.pdf.

[82] National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

[83] 23 U.S.C. §402.

accidents involving motorcycles, school buses, and commercial vehicles, and improvements to law enforcement services in these regards. Congress has also established grant programs to encourage states to take specific steps to address almost all of these issues. But Congress has not created a program to encourage states to take specific steps to discourage speeding. The NTSB, the GHSA, and other traffic safety organizations have urged Congress to add a speed management grant program, since speeding is one of the leading contributors to traffic deaths.

In the 2012 surface transportation authorization act, Congress virtually eliminated federal financial support of ATE by limiting states' discretion to spend federal funds for that purpose except in school zones.[84] This limitation was reiterated in the 2016 surface transportation authorization act.

In a 2019 House hearing on highway safety, the NTSB testified that speed management is one of its most wanted transportation safety improvements. It recommended expanded use of automated speed enforcement.[85]

H.R. 2, a surface transportation reauthorization bill passed by the House of Representatives on July 1, 2020, would make limited changes to the current federal policy toward ATE systems. It would allow states to spend their NHTSA Highway Traffic Safety formula funds to purchase, operate, or maintain an ATE system in a school or work zone, and would require that any ATE system that received federal funding comply with guidelines established by DOT.[86]

If Congress wishes to address the issue of speed management as part of its effort to reduce traffic deaths and injuries, one option would be to remove the restrictions on ATE it imposed in 2012, returning to its previous stance of allowing states and local government the discretion to use some of their federal transportation funding to adopt automated enforcement programs without limiting the location of the cameras. Alternatively, Congress could continue its current policy.

Speed Management Incentive Grants

The GHSA and the NTSB have called upon Congress to create a grant program to encourage states to address speeding. Should Congress decide to create such a program, it might include automated enforcement, NHTSA's highest-rated measure to address speeding, as part of the program. Such a program could address the issues identified here by (a) removing, or waiving for the purposes of this program, the restrictions on federal funding for the implementation of ATE; (b) making eligibility for a grant contingent on use of speed cameras and compliance with a majority of NHTSA's operational guidelines for speed camera programs; (c) making eligibility for a grant dependent on a state treating speed and red light camera violations like moving traffic violations, as NHTSA's guidelines recommend; and (d) making eligibility for a grant contingent on allowing communities to locate speed cameras in locations in addition to school and work zones.

State Restrictions on Use of ATE

In most states that permit ATE, state legislation limits the locations where ATE can be used. The most common restriction is limiting automated speed enforcement to school zones. The NTSB

[84] See footnote 54 for details.

[85] U.S. Congress, House Committee on Transportation and Infrastructure, Subcommittee on Highways and Transit, *Every Life Counts: Improving the Safety of Our Nation's Roadways*, 116th Cong., 1st sess., April 9, 2019.

[86] H.R. 2 (116th Congress), §3002(2).

noted that school zones are not locations at high risk for speeding-related injuries and death; just seven of the estimated 9,283 U.S. speeding-related fatalities in 2014 occurred in school zones.[87] This point was echoed by representatives from agencies with automated speed enforcement programs.[88] If it wishes to encourage more effective use of automated enforcement, Congress could make states' eligibility for certain transportation grants contingent on allowing communities to locate speed cameras in locations in addition to school and work zones. Such an approach might lead to some states that are currently eligible for such grants to become not eligible until and unless they change their legal treatment of ATE.[89]

Legal Status of ATE Violations

The treatment of individuals caught speeding and running red lights by automated devices appears to make a difference in the deterrent effects of the programs. One study found that several cities in states that treat the citations like parking violations (no points on a license, minimum fine of $35 to $75) had higher repeat offender rates than did several cities in states where the citations were treated like moving traffic violations (minimum fines of $160 to $280, points assessed against a driver's license).[90] The study also found that the speed camera ticket payment rate was lower in the cities in the former category.[91]

In states that do not have a law addressing ATE, some communities have implemented camera enforcement programs under general traffic laws.[92] An NTSB study found that officials of transportation departments in states that lacked automated speed enforcement legislation expected that implementing an automated enforcement program in the absence of an enabling law would subject the program to significant legal challenges.[93]

Traffic violations are matters of state, not federal, law. However, Congress could encourage states to increase the deterrent effect of speeding and red light violations detected by ATE. One approach would be to make eligibility for certain transportation grants dependent on a state treating speed and red light camera violations like moving traffic violations, as NHTSA recommends. Such an approach might lead to some states that are currently eligible for such grants to become not eligible until and unless they change their legal treatment of ATE.

[87] National Transportation Safety Board, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*, Safety Study NTSB/SS-17/01, July 25, 2017, p. 40, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

[88] Ibid., pp. 40-41.

[89] Such an approach could involve creating a new grant program, with such a requirement for eligibility, along the lines of the incentive grant programs in 23 U.S.C. §405, or adding such a requirement to existing grant programs, along the lines of 23 U.S.C. §164; if the latter, the penalty could involve transferring a portion of the state's grant to its highway safety program, as in 23 U.S.C. §164, or withholding a portion of the funding, as in 23 U.S.C. §161.

[90] Scott Calvert, Paul Overberg, and Max Rust, "Speed Cameras: The Cities with the Worst Offenders," *Wall Street Journal*, December 22, 2019.

[91] Ibid. The reason for the higher rate of payment for the citations in the cities where the fines were higher was not clear.

[92] For example, nine cities in Iowa (including the four largest cities: Des Moines, Davenport, Cedar Rapids, and Sioux City) and Hannibal, MO. See Missouri and Iowa biennial ATE survey reports submitted to NHTSA at https://www.nhtsa.gov/highway-safety-grants-program/2018-automated-traffic-enforcement-system.

[93] National Transportation Safety Board, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*, Safety Study NTSB/SS-17/01, July 25, 2017, p. 40, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.

Direct DOT to Update its Operational Guidelines

NHTSA's speed camera program operational guidelines[94] have not been updated since their publication in 2008. As the NTSB has pointed out, the guidelines do not include information about recent innovations such as point-to-point cameras.[95] Also, the NTSB found that the guidelines were not well known among agencies operating speed camera programs. Congress could direct NHTSA to issue updated guidelines in order to bring more attention to the information and improve the conduct of speed camera programs.

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Disclaimer

[94] National Highway Traffic Safety Administration, *Speed Enforcement Camera Systems Operational Guidelines*, DOT HS 810 916, March 2008, at https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/Speed%20Camera%20Guidelines.pdf.

[95] National Transportation Safety Board, *Reducing Speeding-Related Crashes Involving Passenger Vehicles*, Safety Study NTSB/SS-17/01, July 25, 2017, p. 42, at https://www.ntsb.gov/safety/safety-studies/Documents/SS1701.pdf.