**Submission No 378**

# MOBILE SPEED CAMERA ENFORCEMENT PROGRAMS IN NSW

**Organisation:** NSW Government

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# NSW Government submission

## Joint Standing Committee on Road Safety (Staysafe)

*Inquiry into mobile speed camera enforcement programs in NSW*

July 2021

# Contents

# Executive summary

Managing speed can stop crashes occurring, as well as reduce the degree of injury if a crash does occur. Effective speed enforcement by both police and camera systems, delivered in a best practice, complementary and co-ordinated way, is critical to reducing trauma. Speed related trauma is a network wide issue, and a network wide solution is needed to address it.

The purpose of mobile speed camera enforcement is to produce a sustained change in driver behaviour by reinforcing the message speeding can and will be enforced anywhere at any time. An overwhelming number of rigorous evaluation studies, carried out both in Australia and internationally, clearly show mobile speed cameras produce significant reductions in mean speeds, crashes, and casualties.

Mobile speed cameras can be moved around the network at various times and locations. This means drivers are less able to predict when and where the enforcement will occur, and so are more likely to change their behaviour across the whole network, rather than just at locations where they know enforcement will exist. Removal of signage and vehicle markings further enhances this effect by adding to the unpredictability associated with enforcement operations. The less predictable the enforcement, the more speed limit compliance can be achieved because it extends the safety benefits of enforcement beyond camera locations.

In November 2020, the NSW Government announced a number of changes to expand and optimise the mobile speed camera (MSC) program. These changes are being implemented by Transport for NSW (TfNSW) across an approximate 12-month period to support the NSW Government's commitment to reducing trauma on NSW roads.

Expert modelling indicates the MSC program changes, which will move NSW towards best practice, will save lives and reduce serious injuries compared to the previous, highly overt MSC program. Based on the research, the optimised program could be expected to save up to 43 lives and prevent more than 600 serious injuries per year.

There is evidence of community support for mobile speed cameras over time and acceptance the changes will likely change behaviour, save lives and align NSW with the practice of other jurisdictions across Australia.

All fines generated by the MSC program and other camera programs in NSW are being paid into the Community Road Safety Fund, which is reinvested to deliver a broad range of road safety initiatives committed to by the NSW Government. These include the delivery of life-saving infrastructure safety treatments across the road network, testing and rating of child restraints, high visibility police operations, road safety education programs, road safety advertising campaigns, school crossing supervisors, and the Driver Licensing Access Program.

TfNSW is currently developing the 2026 Road Safety Action Plan, which will set new strategic priorities and trauma reduction targets for NSW, as well as outline road safety actions for the next five years. An integrated and network-wide speed management approach will continue to be a key priority area in the future.

Measures are currently in place to support drivers in financial hardship to meet fine obligations, as well as enable drivers with a good driving record to seek a fine review. This is in addition to other targeted programs delivered by TfNSW to improve driver licence uptake by Aboriginal and disadvantaged customers.

# 1 Context

Transport for NSW (TfNSW) welcomes the inquiry into the mobile speed camera (MSC) program.

TfNSW, through the Centre for Road Safety, is responsible for developing road safety strategies to reduce trauma on NSW roads, including speed camera policy and behavioural research, community education and awareness, enhanced enforcement by the NSW Police Force, speed zoning guidelines and a broad range of complementary road infrastructure and vehicle safety measures.

TfNSW is also responsible for the operational delivery of speed and road safety camera programs across the NSW road network, including contract management where an outsourced model is used, as well as maintaining driver licence and vehicle registration records and administering licence sanctions which are authorised by legislation.

## *Road trauma in NSW*

Road trauma is estimated to cost the NSW community almost $9 billion every year[1]. Direct community costs include emergency services, hospital and health care and loss of productivity in the workplace.

In 2020, 297 people were killed on NSW roads (provisional figure as at 1 January 2021), a 16 per cent decline compared to 2019 when 353 lives were lost. In addition, 10,029 people were hospitalised during the 12 months ending September 2020. To date, the lower road toll trend in 2020 has continued in 2021.

Traffic volumes were impacted by the NSW bushfire crisis in late 2019 and dropped markedly in March and April 2020 in response to COVID-19 Public Health Orders. However, ongoing monitoring indicates road usage has returned to levels prior to these significant events.

Reducing trauma on rural roads remains one of TfNSW's biggest long term challenges. People living in regional and rural NSW make up only a third of the State's population, but deaths on rural roads make up around two-thirds of the NSW road toll. Between 2017 and 2019 in NSW, around 245 deaths per year occurred on rural roads.

Between 1 January and 31 May 2021, there have been 119 fatalities (preliminary figures as at 1 June 2021) which is 23 fewer than the three-year average. This is the lowest number of fatalities since monthly records started in 1936, despite a return to normal traffic volumes following the Covid-19 lockdown period in 2020.

## *Speed is a major contributor to road trauma*

Speeding is the single most significant contributor to road fatalities and serious injuries around the world. This includes both excessive speed (exceeding the posted speed limit) and inappropriate speed (travelling faster than the prevailing conditions allow).

In NSW, speeding consistently contributes to around 40 per cent of road fatalities and 20 per cent of serious injuries each year. This equates to around 140 deaths and more than 1200 people hospitalised each year (average/year across 2017-2019).

In 2020, speeding was a factor in 46 per cent of fatalities on NSW roads (137 deaths). This increase was particularly associated with the period in 2020 immediately around the strictest COVID-19 measures. Between March and July 2020, provisional data indicates speed was a

[1] Sourced from https://roadsafety.transport.nsw.gov.au/downloads/crashstats2018.pdf

factor in 54 per cent of fatalities, compared to 27 per cent of fatalities during the same period in 2019.

Speed related trauma is a network wide issue. Speed related crashes are dispersed across the network (refer to the map below). A network wide speed compliance strategy and speeding deterrence is critical to reducing trauma on our roads. Network coverage and unpredictability are key principles in the deployment of best practice speed management approaches and ensuring a broader deterrence effect[2].

The NSW road network is almost 185,000 kilometres in length and in 2020 there were 276 fatal crashes (provisional data) recorded on these roads. This equates to an average of around one fatal crash per 670 kilometres of roadway. However, there is very little overlap of fatal crashes at specific sites from year to year. The likelihood of a fatal crash at a particular location being a predictor of future fatal crashes at that same location is quite low. Only 21 out of 276 fatal crashes in 2020 overlapped with a previous fatal crash site in 2015-2019.

Improving speed compliance at a limited number of locations is relatively easy using visible fixed or targeted enforcement, but this map shows fatal crashes tend to be scattered across the whole road network. This data emphasises there are no locations where road travel is risk-free. Therefore, only focusing countermeasures at fatal crash locations each year would address very few of the fatal crash locations in subsequent years. Broader strategies employed across the entire road network are required to address the spread and lack of predictability of crash locations in NSW.

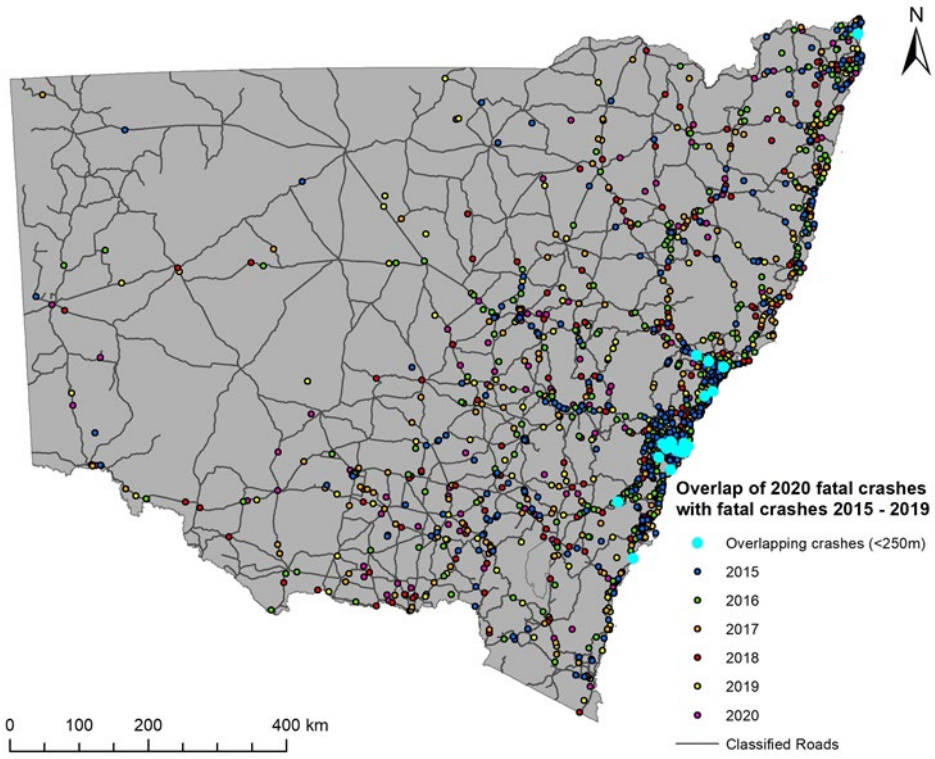


*Figure 1: Geographic dispersal of fatal crashes in NSW 2015-2020*

[2] OECD (2006). Speed Management. Paris, France: European Conference of Ministers of Transport Publications. https://www.itf-oecd.org/sites/default/files/docs/06speed.pdf

## *Road Safety Plan 2021*

Through the NSW Road Safety Plan 2021, the NSW Government has committed to achieving a 30 per cent reduction in deaths by 2021, compared with three year average levels between 2008 and 2010. This Plan also aims to achieve a 30 per cent reduction in serious injuries.

The Road Safety Plan 2021 is a sub-plan of the Future Transport Strategy 2056, which includes a target for zero deaths or serious injuries by 2056. Future Transport is a suite of strategies and plans which provides an integrated vision for transport in NSW.

The Road Safety Plan 2021 also commits to setting new road safety targets every 10 years to ensure NSW continues to move Towards Zero fatalities and serious injuries on the road network.

While NSW road safety strategies have been effective in reducing the fatality rate, additional measures were needed to achieve the targets. A mid-term enhancement of the Plan was announced by the NSW Government on 19 November 2020[3] which provided a refocus on priority areas. The Saving Lives Accelerated Package included changes to the mobile speed camera program which are the subject of the inquiry.

## *The Safe System approach to road safety*

The Safe System approach, comprising Safe Roads, Safe Vehicles, Safe People and Safe Speed, is a method of road safety management based on the principle that life and health should not be compromised by the need to travel. Originally developed in Sweden and the Netherlands, the Safe System approach has been adopted by all Australian jurisdictions to support road safety outcomes in jurisdictional and national road safety action plans.

It is an internationally proven approach which acknowledges:

- The human body has physical limits to withstanding the impacts of a crash
- People sometimes make mistakes or break the rules – but this shouldn't cost anyone their lives
- Roads, roadsides and vehicles need to be designed to minimise crashes or reduce forces if a crash happens
- Road safety is a shared responsibility – everyone needs to make decisions with safety in mind, from the design of roads and vehicles, investments, laws and education, to each road user acting safely every day.

## *Managing speed within the Safe System*

Speed is a critical factor within a Safe System and links closely to the other principles. Research across the last few decades has clearly and consistently demonstrated road crash frequency and severity are closely related to speed – the faster a driver travels, the more likely they are to crash and the greater the risk of serious injury or death. No matter what causes a crash, vehicle speed directly affects the force of the impact and the resulting trauma outcome.

As speed increases, there is an increase in the risk of a crash due to factors such as:

- Failure to anticipate and react to oncoming hazards
- Increases in the distance travelled when reacting to hazards

[3] Transport for NSW, Media release, Major changes to road safety laws (19 November 2020). Accessed at: https://www.transport.nsw.gov.au/news-and-events/media-releases/major-changes-to-road-safety-laws

- Distance required for reaction time and braking
- Reduction in vehicle control and stability
- Increased speed variability causing other road users to misjudge the speed of the vehicle.

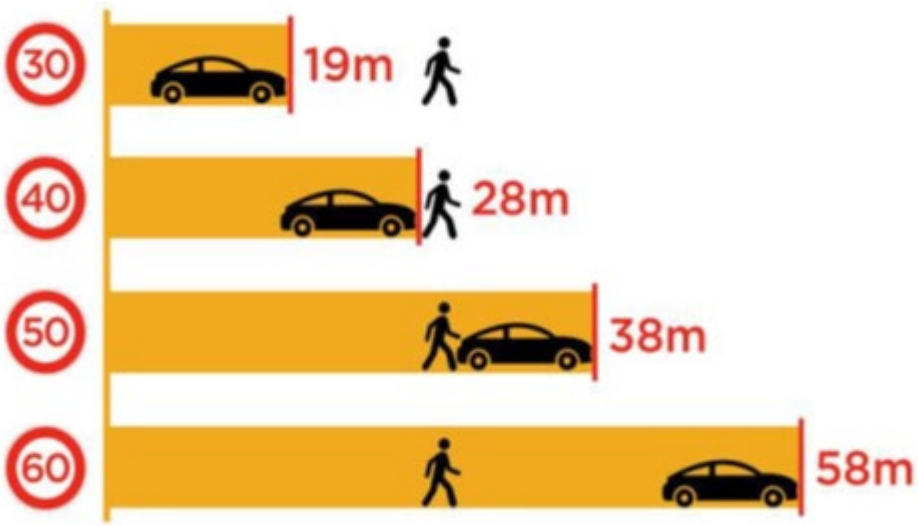


*Figure 2: Typical stopping distances when driving on a reasonable road surface (Source: https://roadsafety.transport.nsw.gov.au/speeding/index.html)*

## *Speed and injury severity*

Speed determines the severity of the impact when a crash occurs. With increased speed, the amount of energy which is released also increases and some of this energy is 'absorbed' by the human body. The human body can only withstand limited forces before injury or death ensues. While safe design of modern vehicles can help protect vehicle occupants from exposure to some forces, crashes at higher speed remain less survivable, even in the safest vehicle.

International studies have shown relatively small changes in travel speeds can result in substantial changes in death or injury in crashes (see Kloeden et al[4,5,6], Nilsson[7] and Elvik[8]). Any extra speed produces extra impact force, and the human body can only tolerate limited physical forces before death or serious injury will occur. This impact differs depending on the type of crash and road users involved.

Much of the rural road network includes undivided high speed roads. In these environments, head-on crashes in which a driver crosses over the centre line are likely to be catastrophic because drivers often have little or no time to react given the high-speed nature of the

[4] Kloeden, C. N., McLean, A. J., Moore, V. M. & Ponte, G. (1997). Travelling speed and the rate of crash involvement. Volume 1: findings. Report No. CR 172. Federal Office of Road Safety FORS, Canberra.
[5] Kloeden, C. N., Ponte, G. & McLean, A. J. (2001). Travelling speed and the rate of crash involvement on rural roads. Report No. CR 204. Australian Transport Safety Bureau ATSB, Civic Square, ACT.
[6] Kloeden, C. N., McLean, A. J. & Glonek, G. (2002). Reanalysis of travelling speed and the rate of crash involvement in Adelaide South Australia. Report No. CR 207. Australian Transport Safety Bureau ATSB, Civic Square, ACT.
[7] Nilsson, G. (2004). Traffic safety dimensions and the power model to describe the effect of speed on safety. Bulletin 221, Lund Institute of Technology, Lund.
[8] Elvik, R. (2009). The Power Model of the relationship between speed and road safety: update and new analyses. TØI Report ; 1034/2009. Oslo, Institute of Transport Economics TØI.

environment. Research shows the risk of a motor vehicle occupant being killed in a head-on crash dramatically increases as impact speeds increase above 70 km/h.

In regional areas, there are also many crashes involving a vehicle departing its lane to the left. In these circumstances, if the vehicle strikes a fixed object on the side of the road (e.g. a tree or utility pole) or rolls over, the crash is likely to result in serious injury or death of the driver. Effective speed management can reduce loss of control circumstances and misjudgement of curves in the roadway, which are common contributing factors in these crashes.

Road users such as pedestrians, motorcyclists and cyclists are particularly vulnerable in a crash with a motor vehicle because they are unprotected, having no vehicle to absorb any of the impact force. The probability a pedestrian will be killed if hit by a motor vehicle increases dramatically with speed.

Research indicates pedestrians have a higher risk of dying at higher crash impact speeds, with the fatality risk at 50 km/h being more than twice as high as the risk at 40 km/h and more than five times higher than the risk at 30 km/h[9]. Older people and children are also more exposed to risk of harm in any type of crash. This is a key reason speed enforcement is used to ensure speed compliance in urban areas, including close to homes and where more vulnerable pedestrians are using the road.

Intersection crashes are particularly common in urban areas. In rural areas, or anywhere vehicle speeds are high, the consequence of crashes at intersections can be particularly severe. The chances of avoiding serious injury or death reduce dramatically above 50 km/h for side impacts for the most modern types of cars, and is far less than this for older vehicles and particularly for vulnerable road users.

Speeding at any level increases the risk of crashing and the likelihood of road trauma. Studies have shown that going just 5km/h over the speed limit in a 60 km/h zone doubles your risk of being involved in a crash where at least one person is killed or injured.[4,6]

## *Integrated speed management*

Key measures available for effective speed management include:

- Setting appropriate speed zones for safety and mobility
- Road design and road safety engineering treatments
- Enforcing speed limits
- Changing behaviour through community engagement and education
- Vehicle technologies to support compliance and limit speeding.

Speed limit setting aims to manage the risk of crashes and the force which road users are exposed to in order to minimise the risk of fatal or serious injuries in the event of a crash. For example, at locations where there is a significant level of pedestrian or cyclist activity, lower speed limits are appropriate. This is consistent with the NSW Government's Movement and Place Framework[10]. Similarly, where the potential for conflict is high, such as winding roads

[9] Kröyer. H. R. G., Jonsson, T., Varhelyi, A. (2014). Relative fatality risk curve to describe the effect of change in the impact speed on fatality risk of pedestrians struck by a motor vehicle. Accident Analysis and Prevention, 62, 143-152.

[10] Movement and Place Framework. Accessed at https://www.governmentarchitect.nsw.gov.au/guidance/movement-and-place

with no side or median barriers, speed limits are set at a level which minimises the risk of fatal or serious injuries in the event of a crash.

## *Key speed enforcement principles*

Research evidence from leading global road safety agencies shows effective speed enforcement activities should include the following key features: specific and general deterrence, complementary mix of high visibility and covert policing and speed cameras, frequent and random enforcement activities and variations in time and location[11] [12] [13] [14] [15] [16].

### Speed enforcement should use specific and general deterrence

**Specific deterrence** occurs when a driver who has been penalised for a speeding offence refrains from further speeding behaviour for fear of incurring additional punishment.

**General deterrence** occurs when a driver refrains from speeding as a result of being aware of others being apprehended for a speeding offence or is warned of the penalties for speeding or the likelihood of being caught. The threat of enforcement and its negative consequences influence the behaviour of drivers generally, whether or not they have ever been apprehended. The perception there will be consequences to the individual and a high likelihood of being caught creates the motivation for behaviour change.

Enforcement activity provides a tangible deterrence for road users, and the perceived certainty of enforcement and penalty is known to produce positive behaviour change. While actual enforcement of speeding offences is an important component of speed management, best practice speed enforcement programs should be designed to discourage all drivers from exceeding the speed limit at any time through a combination of specific and general deterrence.

### Police speed enforcement should complement speed cameras

There are two main methods of speed enforcement: police enforcement and automated enforcement through speed cameras. These can operate in a largely covert, high visibility, or mixed covert/overt mode.

**Police enforcement,** both high visibility and covert, is a powerful enforcement method which can be highly targeted to specific areas and during periods of increased travel and road trauma risk (such as double demerit point periods). While this enforcement provides lower rates of detection compared with speed cameras and is labour intensive, it has other benefits. Police officers are able to educate drivers at the roadside and target other illegal behaviours.

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[11] European Commission (2018). *Speed and Speed Management*, European Commission, Directorate General for Transport. Accessed at https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/ersosynthesis2018-speedspeedmanagement.pdf

[12] Global Road Safety Partnership. *Speed Fact sheet*. Accessed at https://www.grsproadsafety.org/wp-content/uploads/Speed-Fact-sheet_Last-version_April-14th.pdf

[13] Global Road Safety Partnership (2008). Sp*eed management: a road safety manual for decision-makers and practitioners*. Geneva. Accessed at https://www.who.int/publications-detail/speed-management-a-road-safety-manual-for-decision-makers-and-practitioners

[14] International Transport Forum (2018). *Speed and Crash Risk*. ITF Paris. Accessed at https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf

[15] World Bank (2019). Guide for Road Safety Opportunities and Challenges: Low- and Middle-Income Countries Country Profiles. Washington, DC., USA: World Bank. Accessed at http://documents.worldbank.org/curated/en/447031581489115544/pdf/Guide-for-Road-Safety-Opportunities-and-Challenges-Low-and-Middle-Income-Country-Profiles.pdf

[16] WHO (2004). World report on road traffic injury prevention. https://www.who.int/publications-detail/world-report-on-road-traffic-injury-prevention

**Speed camera enforcement** is one of the most effective, evidence-based and low-cost measures to reduce speeding as well as save lives and injuries. Speed cameras enable greater intensity of enforcement, more coverage of the network and are able to detect a larger proportion of offending drivers. This results in a higher cost-benefit ratio in reducing speed related trauma.

Different types of speed camera enforcement are used in NSW as part of the integrated NSW Speed Camera Strategy which has been in place since 2012.

This strategy outlines the key purposes and site selection criteria of the four types of speed cameras used to encourage drivers to comply with the speed limit:

- Mobile speed cameras intended for general network deterrence
- Red-light speed cameras to address high-risk intersections
- Fixed speed cameras to address black spot/high-risk locations
- Average speed cameras for route enforcement of heavy vehicles.

### Speed enforcement should be frequent, at random intervals and at different intensities

Speed enforcement activities are best repeated frequently, at random intervals and with different intensities (with higher intensities generally producing larger effects).

### Speed enforcement should vary in time and location

The randomness of enforcement is a major factor influencing a driver's assessment of the risk of being apprehended for speeding. Accordingly, the exact location and time of mobile speed enforcement should not be known to drivers.

### Speed enforcement should include overt and covert enforcement

Highly visible speed enforcement used in the same areas continually deters drivers from speeding only in specific areas. These are called 'halo' effects - where drivers reduce their speed temporarily and then speed up after going past the detection point. There is no significant lasting effect on behaviour beyond the specific location. While this is effective at specific locations with high rates of crashes, it is not an effective general deterrence to speeding across the network as drivers do not adjust their general driving behaviour.

On the other hand, operating a mix of visible and covert enforcement (through police and camera operations) increases the perception speed enforcement can happen anywhere and at any time. The unpredictability of when and where speed enforcement operations take place have a more general deterrent effect as this encourages drivers to drive within the speed limit no matter where or when they are travelling.

Studies (for example Diamantopoulou and Cameron[17]) have highlighted the effectiveness of covert speed camera operations, particularly when used to support overt operations (see Attachment A and Attachment B for further details). Operations which are intensive and scheduled at random locations across the road network have also been found to be highly effective.

[17] Diamantopoulou, K. & Cameron, M. (2002). *An evaluation of the effectiveness of overt and covert speed enforcement achieved through mobile radar operations.* Monash University Accident Research Centre - Report No. 187.

### Speed enforcement should be supported by communication and information

Enforcement measures are best implemented in conjunction with intensive communication programs designed to increase drivers' awareness of speed enforcement and the chances of apprehension which creates the general deterrence effect. In addition, campaigns can explain the reasons for speed enforcement and the benefits of compliance. Effective community engagement optimises opportunities to improve road user understanding of what travelling at safe speeds means. It fosters positive local government and community involvement in speed management activities and better acceptance of, and compliance with, speed limits.

# 2 Nature and timing of changes to the NSW mobile speed camera (MSC) program

## *Background*

The MSC program was reintroduced in NSW in July 2010 as a response to a significant increase in the road toll, especially speed related deaths, in 2009. A previous program was stopped in December 2008, just prior to an upward trend in trauma.

The main purpose of MSCs is to provide general network deterrence. The current program is managed by TfNSW in consultation with NSW Police, with operations outsourced to a private contractor. A similar outsourced model is also used in Victoria.

Mobile speed cameras are moved around the road network at various times and locations. This means drivers are less able to predict where enforcement will occur and hence are more likely to comply with the speed limit. The benefit of mobile speed cameras in reducing speeding is not limited to the locations or times when the camera is on site. They produce a sustained change in driver behaviour by increasing the real and perceived likelihood that speeding can be enforced 'anywhere, anytime'.

From June 2012 to November 2020 as part of the NSW Speed Camera Strategy, mobile speed cameras were approved to operate for 7000 hours per month and were being used at 1024 locations across NSW (as at November 2020).

## *Auditor General's findings*

In October 2018, the Audit Office of NSW completed a performance audit which found the NSW MSC program was not consistent with best practice[18]. It concluded:

> *"The mobile speed camera program requires improvements to key aspects of its management to maximise road safety benefits. While camera locations have been selected based on crash history, the limited number of locations restricts network coverage. It also makes enforcement more predictable, reducing the ability to provide a general deterrence. Implementation of the program has been consistent with government decisions to limit its hours of operation and use multiple warning signs. These factors limit the ability of the mobile speed camera program to effectively deliver a broad general network deterrence from speeding."*

In response, TfNSW implemented a number of changes to enhance program management and oversight of the contract (current measures are detailed in Chapter 6). The audit report also recommended a review of better practice in other jurisdictions, which has been completed and published on the TfNSW Centre for Road Safety website[19].

[18] Audit Office of NSW, Performance Audit, Mobile Speed Cameras (18 October 2018). Accessed at https://www.audit.nsw.gov.au/sites/default/files/pdf-downloads/Final%20report%20web%20version%20-%20Mobile%20speed%20cameras.pdf

[19] Transport for NSW, Centre for Road Safety (2020). *Mobile speed camera operations in other Australian jurisdictions*. Transport for NSW, Sydney.

## *MUARC research*

In 2019, Monash University Accident Research Centre (MUARC) was commissioned by TfNSW to estimate the road safety benefits of expanding the NSW MSC program along the lines of those operating in Queensland and Victoria[20].

MUARC found significant potential fatality and serious injury reductions from expanding and changing the operating parameters of the program based on best practice evidence. The analysis considered increased hours of operation, changing signage (on vehicles and the roadside) and extending the number of locations used for enforcement.

Chapter 4 outlines specific modelling outcomes including estimated benefits for NSW drivers associated with changes to the NSW MSC program.

The MUARC report is included as **Attachment C** and is also published on the TfNSW Centre for Road Safety website.

## *Comparison between jurisdictions prior to recent changes to the NSW program*

Changes to the MSC program were introduced in November 2020 because NSW was not aligned with other jurisdictions. The differences included limited program hours and deployment locations as well as the use of highly visible vehicle livery and multiple warning signs.

As highlighted by the Audit Office of NSW, these factors combined to make the NSW MSC program the most conspicuous and predictable of its type in Australia and relatively inflexible, limiting its potential to save lives.

NSW was the only jurisdiction which used advance warning signs. NSW and Queensland camera vehicles had markings, although Queensland has up to 30 per cent unmarked vehicles. NSW vehicles were brightly and distinctively marked. Queensland vehicle markings are not bright or particularly distinctive.

| NSW | QLD |
| --- | --- |
|   |   |

*Figure 3: NSW (prior to recent changes) and Queensland mobile speed camera vehicles with markings*

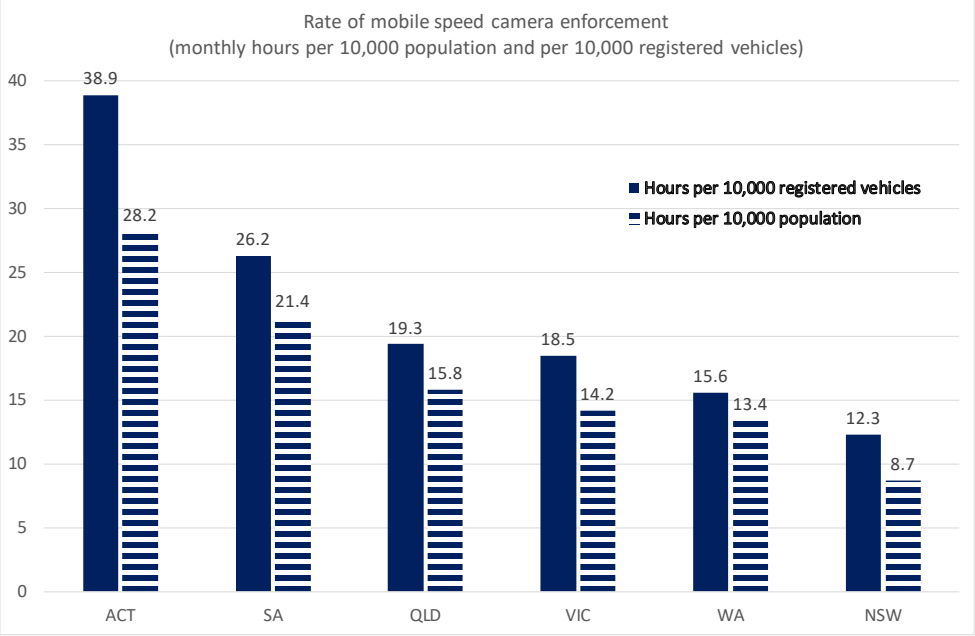
The table below compares jurisdictions in relation to key MSC program features as at 2019 (Note: Program increases have been announced or are underway in some jurisdictions).

[20] Newstead, S. (2019) *Analysis to estimate road safety benefits of expanding the NSW mobile speed camera program*. Analysis prepared for Transport for NSW. Monash University Accident Research Centre, Melbourne.

| Jurisdiction | Signs | Vehicle markings | Hours/month | Directions measured | No. of sites |
|---|---|---|---|---|---|
| **NSW** | 2 before, 1 after | Bright and distinctive | 7000 | Single | 1024 |
| **VIC** | None | None | 9300 *(plus 75 per cent increase announced, underway)* | Both | 2,000 |
| **QLD** | None | Yes (*see above*) | More than 8000 *(plus program increase underway)* | Both | More than 3500 |
| **WA** | None | None | 3500 | Both | 4000 |
| **SA** | None | None | 3750 | Both | Unknown |
| **ACT** | 1 on vehicle roof | None (sign on vehicle roof) | 1200 | Unknown | 1184 |

Prior to the changes announced in November 2020, NSW had the fewest mobile speed camera hours per registered vehicle and the fewest per head of population. NSW has many more vehicles and people than other jurisdictions. In the figure below, the number of hours of mobile speed camera operations (as at 2019) are shown as hours per 10,000 registered vehicles and hours per 10,000 population, to relate the intensity to the size of the jurisdiction.

Victoria has implemented a 75 per cent increase in program operations[21] which is around 16,300 hours per month, equivalent to 24.8 hours per 10,000 population. A program increase is also being implemented in Queensland, to around 10,800 hours per month which is 21.3 hours per 10,000 population.




[21] Road Safety Camera Commissioner, Victoria's Road Safety Strategy 2021-30 (December 23 2020) Accessed at https://cameracommissioner.vic.gov.au/publications/victorias-road-safety-strategy-2021-2030

*Figure 4: Comparison of mobile speed camera enforcement rates across Australian jurisdictions (Source: Hours: As per above table, as at 2019; Vehicle no. ABS Motor Vehicle Census 2019; Population: ABS Australian demographic statistics, March 2019)*

## *Program changes*

In November 2020, Minister for Transport and Roads, the Hon. Andrew Constance and Minister for Regional Transport and Roads, the Hon. Paul Toole announced changes to the NSW MSC program, which include increased enforcement hours as well as a reduction in high visibility markings on vehicles (with 70 per cent of the fleet marked and 30 per cent unmarked) and the removal of warning signs.

The changes announced to the MSC program are consistent with the *National Road Safety Action Plan 2018-20*, particularly Priority Action 7 which reads 'increase deployment of mobile cameras to achieve safe travel on Australia's road network'.

As at June 2021, mobile speed cameras operate at 1166 locations and TfNSW is working to expand the number of locations across NSW and increase enforcement hours to 21,000 hours each month. The changes announced in November 2020 are outlined in further detail below.

### Removal of warning signs

Mobile speed cameras have operated in NSW since June 2012, previously with three portable warning signs at each enforcement site.

The removal of all portable warning signs eliminates the very localised 'halo' effect, enables more flexible site selection, supports enforcement of speeding in two directions, reduces the time required to deploy the cameras and lessens the work health and safety risks to mobile speed camera operators.

### Reduction of livery on vehicles

Vehicles used in the MSC program in NSW have operated with high visibility markings. This is in contrast with other jurisdictions in Australia.

High visibility markings have been reduced on 70 per cent of enforcement vehicles and were completely removed from 30 per cent of enforcement vehicles in January and February 2021. This is consistent with the approach taken across Australia, positive road safety improvements from covert cameras in a range of research studies and the advice from MUARC's analysis. The reduction also reinforces the 'anywhere, anytime' strategy of mobile speed enforcement.

### Increase in enforcement hours

Hours of enforcement are being increased from 7000 per month to 21,000 hours per month.

A small increase in active enforcement hours, which could be delivered within the current operator contract to June 2021, occurred from early 2021. This increase was possible as the removal of external signs saved the operator time which was otherwise spent deploying the signs for each enforcement period.

The majority of the additional hours (up to 21,000 hours/month) are expected to roll out from July 2021 along with the operation of bi-directional enforcement (as is the case in other jurisdictions such as Victoria, Queensland, Western Australia and South Australia) as part of new MSC operator contracts which start in July 2021.

The number of enforcement hours per month will increase periodically to maintain a consistent rate of enforcement per population (26 hours per month/ 10,000 population), increasing alignment with mobile speed camera programs in Victoria and Queensland.

## Communication enhancements

The program changes were communicated, and continue to be promoted, across different channels.

Education, communication and promotion, in combination with enforcement, provides drivers with the opportunity to modify their behaviour and potentially reduce the number of speeding infringements received.

The NSW Centre for Road Safety continues to develop public education campaigns to support speed enforcement and raise awareness of the types of enforcement being used in NSW. Changes to the mobile speed camera program are supported through:

- The Speed Cameras Save Lives advertising campaign on TV, radio and billboard messages
- Changes to the Mobile Speed Camera Program published on the Towards Zero Road Safety website, Centre for Road Safety website
- A range of social content including personal stories, stopping distances, Intelligent Speed Assist and the Community Road Safety Fund
- Statewide messages on all Variable Message Signs
- A stakeholder toolkit with resources and speed fact sheets distributed to more than 80 key stakeholders and partners
- The continued publication of all speed camera locations on the TfNSW Centre for Road Safety website.

# 3 Research, modelling and the evidence base of fatality and serious injury reduction arising from the MSC program

## *Background*

As outlined in Chapter 1, drivers will be more likely to choose to obey the speed limit if they perceive they would be likely to receive a penalty for non-compliance. Mobile speed cameras are an effective enforcement tool because, with cameras moved from site to site at different times, drivers cannot anticipate where a mobile speed camera will be, or when.

Since 2010, NSW has increased the number of MSC vehicles and locations to enhance the 'anywhere, anytime' effect of the program.

However, NSW has had fewer mobile speed camera operating hours than the majority of Australian jurisdictions, based on the number of registered vehicles, and operated the program in a highly visible manner which limited the program's ability to address speeding beyond enforcement sites. The use of warning signs meant mobile enforcement in NSW more closely resembled 'fixed' camera enforcement, which has a defined 'halo' effect on driver behaviour for a short distance around a camera.

The changes announced in November 2020 are intended to align NSW with other Australian jurisdictions, in particular Victoria and Queensland, in the deployment of mobile speed cameras to maximise their road safety benefit.

## *Evidence of effectiveness*

There is overwhelming evidence for the effectiveness of mobile speed cameras from Australian and international evaluation studies. Best practice programs with sufficient hours, a high number of enforcement sites, and random deployment can deliver consistent reductions of 20 to 30 per cent in casualty crashes across the road network[22].

Analysis from a 2010 Cochrane review – a policy institute which provides summaries and analyses of the best available research in health-related fields -- provided strong evidence for camera effectiveness (both fixed and mobile). Decreases in average speed, percentage of vehicles speeding and crashes are consistently reported across studies from a range of countries[23]. In 2016, the 2010 review was updated and extended, reinforcing the results of the earlier review[24].

The purpose of mobile speed cameras is to produce a sustained change in driver behaviour by creating a perception speeding can be enforced 'anywhere, anytime'[25]. Mobile speed cameras can be moved around the network at various times and locations. This means drivers are less able to predict when and where the enforcement will occur, and so are more likely to modify their behaviour across the whole road network, rather than just at locations where they know enforcement will be present.

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[22] Newstead S, Budd, L. and Cameron, M. H. (2017), *Evaluation of the Queensland Camera Detected Offence Program (CDOP): 2013-2015*, Monash University Accident Research Centre, Victoria

[23] Wilson C, Willis C, Hendrikz J K, Le Brocque R, Bellamy N (2010) *Speed cameras for the prevention of road traffic injuries and deaths*, Cochrane Database of Systematic Reviews, Issue 11. Art. No.: CD004607

[24] Steinbach R, Perkins C, Edwards P, Beecher D, Roberts I (2016) Speed cameras to reduce speeding traffic and road traffic injuries, *What works: crime reduction systematic review series*, No. 8, College of Policing, London UK

[25] Austroads (2001). *Speed enforcement in Australasia*. Austroads Publication No: AP-R189; Cameron, M. & Delaney, A. (2006). Development of strategies for best practice in speed enforcement in Western Australia. Final Report No: 270. Monash University Accident Research Centre: Victoria, Australia.

Covert mobile speed cameras further enhance this general deterrence effect by adding to the unpredictability associated with enforcement operation. The less predictable the enforcement, the more speed limit compliance can be achieved. Research has demonstrated the use of covert enforcement is the most effective model to achieve longer term widespread road safety benefits. This approach, combined with an increase in enforcement hours, is likely to achieve significant reductions in injuries and fatalities on NSW roads.

**Attachment A** provides a summary of findings from key evaluation studies related to Australian mobile speed camera programs, in addition to the findings outlined below.

**Attachment B** provides a summary of key evaluation studies with regard to covert enforcement in New Zealand.

In summary, based on decades of research worldwide, it is clear:

- Speed management is crucial for the prevention of death and serious injury on the road network
- Speed cameras are an effective tool in managing speed
- Speed camera program settings (such as how visible enforcement is and how much of the road network is covered) can influence the level of trauma savings (lives saved and injuries avoided) achieved.

## *The impact of warning signage*

Regarding the efficient and effective deployment of speed cameras, evaluations provide clear evidence for the need to limit the visibility of specific mobile speed camera operations. Camera locations with warning signs improve driver behaviour at specific locations but do not produce sustained behaviour change across the network.

A study investigating the current NSW fixed speed camera program found drivers decrease speed on approach to, and on passing, the cameras then increase speed again on departure from the cameras[26]. This is because motorists know the precise location of fixed speed cameras, largely due to the three warning signs provided in advance of each fixed speed camera in NSW.

The chart below shows the deterrent value and safety benefits of speed cameras with significant signage are limited to a small total length of approximately 1000 metres (the ‘halo effect’) around each camera, and the graph highlights the largest speed reductions are observed for the closest 500 metres around the camera (around 250 metres before and after the camera) and highest compliance localised within around 100 metres of the camera.

This demonstrates the effects of enforcement only last for as long as drivers perceive a high risk of being detected. Thus, fixed speed cameras appear to be effective in addressing site-specific risk on the road at specific locations, but less effective in reducing speeding more broadly across a whole road network as large as NSW.

Warning signage remains in place for fixed speed cameras as these devices are designed for specific deterrence at high-risk locations rather than general deterrence, and warning signage contributes to the desired compliance at these locations.

[26] Centre for Road Safety (2011). *Crash analysis of the NSW fixed speed camera program*. Transport for NSW, Sydney.

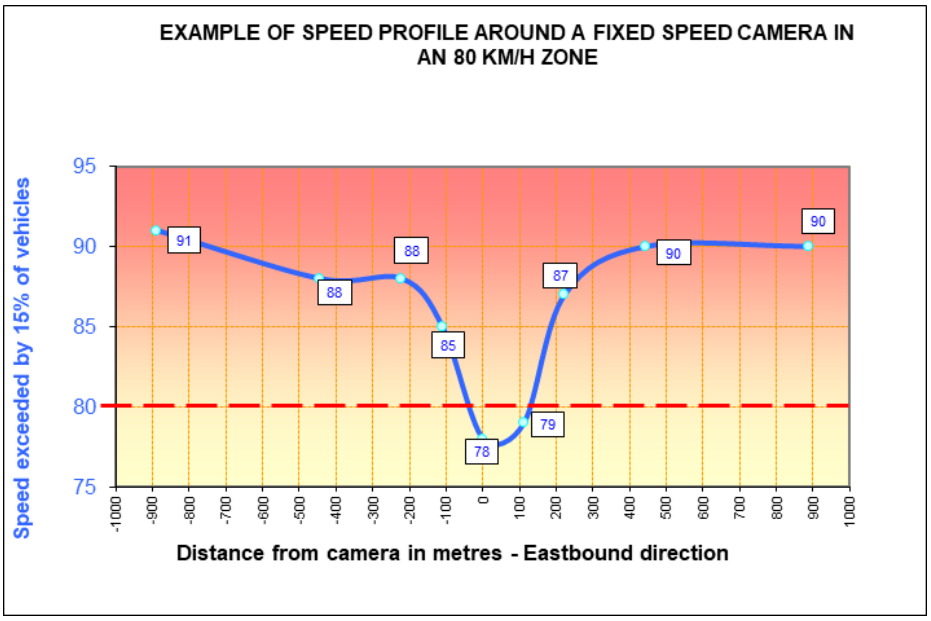


*Figure 5: Speed profile around fixed speed camera in an 80 km/h zone*

The existence of a 'halo effect' around specific camera locations highlights the limitation of overt speed enforcement methods, and reinforces the need for a speed management approach which results in greater general deterrence of speeding. Covert enforcement methods (removing signage and vehicle markings) allows for further general deterrence effects to be achieved by extending the road safety benefits of enforcement beyond camera locations. Site-specific warning signage associated with mobile speed camera locations means programs of this nature operate similar to a fixed speed camera program, and the opportunity is lost to extend these safety benefits and achieve network-wide speed and trauma reductions.

## *Estimated benefits from changes to the MSC program*

As outlined in Chapter 4, MUARC provided expert analysis in 2019 on the potential road safety benefits of expanding the NSW mobile speed camera program, in line with deployment models used in Queensland and Victoria. The table below shows estimated annual fatality and serious injury savings associated with expansion of the NSW mobile speed camera program under various scenarios, compared to the program as it existed prior to the Government's announced changes.

MUARC found the value of estimated trauma savings across the scenarios explored ranged from $44 million to $984 million[27]. The value of the trauma savings from the scenario which reflects the enhanced NSW program (once changes announced in November 2020 are fully implemented) is estimated to be $665 million per year.

[27] Newstead, S. (2019) Analysis to estimate road safety benefits of expanding the NSW mobile speed camera program. Analysis prepared for Transport for NSW. Monash University Accident Research Centre, Melbourne.

| Deployment Model | Estimated Annual Savings | 7000 hours | 10,500 hours | 13,000 hours | 21,000 hours |
|---|---|---|---|---|---|
| **New South Wales** *(Overt – signage at 50 metres and 250 metres from camera, highly marked vehicle, crash effects within signed area)* | Annual Fatality Savings | | 3 | 4 | 8 |
| | Annual Serious Injury Savings | | 43 | 63 | 115 |
| **Queensland** *(Largely overt - no signage but marked vehicle, crash effect with 1 kilometre of camera)* | Annual Fatality Savings | 19 | 29 | 33 | 43 |
| | Annual Serious Injury Savings | 265 | 422 | 492 | 669 |
| **Victoria** *(Covert, crash effect across whole of enforced road length)* | Annual Fatality Savings | 28 | 39 | 44 | 55 |
| | Annual Serious Injury Savings | 520 | 764 | 869 | 1128 |

## *Monitoring and evaluation*

Monitoring and evaluation activities are planned to determine the road safety, community and stakeholder impacts of the MSC changes consistent with good practice and the NSW Government Program Evaluation Guidelines.

TfNSW will continue to monitor the impact of the recent MSC changes to investigate changes in driver behaviour and community sentiment over time, to ensure the program continues to contribute to a reduction in fatalities and serious injuries as intended.

A comprehensive, independent evaluation of the recent MSC changes will be carried out when sufficient data is available. This will consider whether key program changes have been implemented as planned, how well the program is working, whether it is achieving its aims, and what impact it is having on road safety. The results of the evaluation will be used to guide any refinements to the scope and nature of the program.

# 4 Views of key road user groups including community views toward the changes to the MSC program

## *Background*

The TfNSW Centre for Road Safety regularly commissions attitudinal research on issues which contribute to the road toll including speeding. Surveys consistently show most NSW drivers support all types of cameras used in NSW to enforce speeding and reduce loss of lives on NSW roads, and are satisfied they are an effective tool to detect, deter and penalise drivers (see graphs below).

Research carried out in 2019 on speeding attitudes and behaviours also showed[28]:

- Speeding is a common and normalised behaviour. There is a widespread perception 'everyone speeds' at some level. This finding is supported by observations of actual speeding behaviour. For example, 48 per cent of drivers were detected exceeding the speed limit in 50 km/h speed zones (based on the latest NSW annual speed surveys)
- 'Acceptable' speeding is broadly seen as 'safe' speeding, when a driver is felt to be in control, while 'unacceptable' speeding is often identified as 'unsafe' speeding or reckless, where a driver is not in control
- Many drivers claim to consciously adapt their speed to what they deem to be acceptable at the time. Speed choice is influenced by a variety of factors including traffic conditions, presence of other road users, and the perceived likelihood of getting caught
- Many drivers adjust their speeding behaviour to be far more vigilant about their speeds when outside NSW
- Many drivers believe the only way to stop speeding is through enforcement. However, many also believe a large proportion of drivers are not caught speeding
- Drivers are aware of speed camera locations and are highly attuned to slow down on approach to a camera and then speed back up once past a camera.

When asked specifically about potential changes to the mobile speed camera program size, signage, location coverage and overall visibility, research found:

- 'Overall, there is reluctant acceptance toward the potential changes to speeding enforcement. There are varying degrees of attitude toward them, from loath acknowledgement to outright anger, with the majority of drivers seeming to sit attitudinally somewhere in the middle of this spectrum. Regardless of attitude, most believe that many of the changes have potential to reduce driving speeds at a broader level (rather than just temporarily).'[21]

This indicates that while compliance with speed enforcement remains an issue of concern among some motorists, these concerns relate more to the increased likelihood of being caught than the acceptability of speeding and demonstrates that there is a broad understanding that the changes introduced to the MSC program will reduce speeding and the inherent risks associated with this behaviour across the network.

[28] Snapcracker (2019). *Speeding: Qualitative Research*. Report prepared for Transport for NSW.

## *Support for mobile speed cameras*

TfNSW has monitored levels of community support and confidence in speed cameras for more than ten years[29].

The most recent results from February 2021 show 69 per cent of drivers support mobile speed cameras and 69 per cent are satisfied they are an effective tool to detect, deter and penalise drivers. Results for fixed speed cameras are provided in Figure 7 as a comparison.

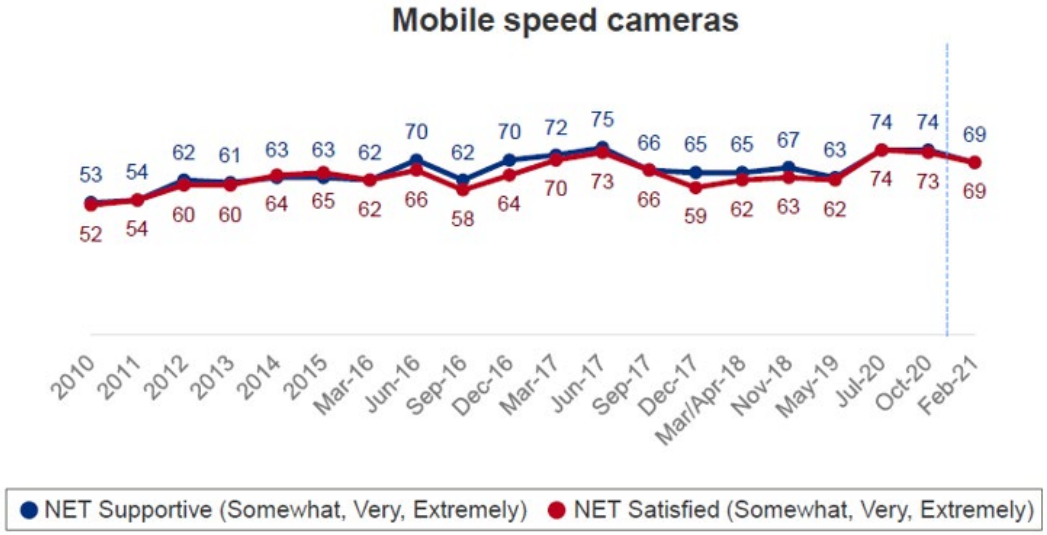


*Figure 6: Survey results regarding customer satisfaction with mobile speed cameras (Note: 'Satisfied' relates to respondents' satisfaction mobile speed cameras are an effective tool to detect, deter and penalise drivers)*

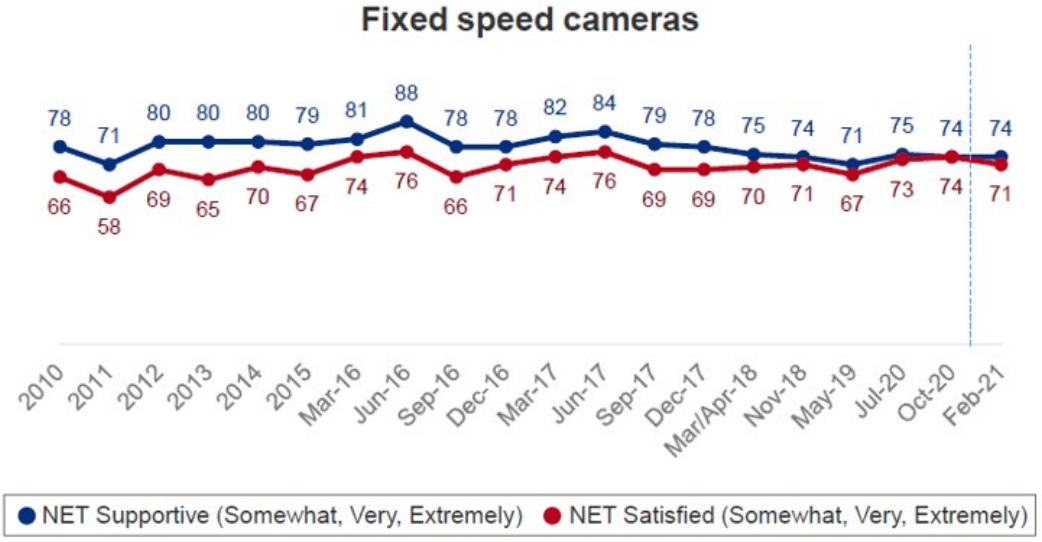


*Figure 7: Survey results regarding customer satisfaction with fixed speed cameras*

Research has also been completed to obtain community feedback about a range of road safety countermeasures to help inform development of the 2026 Road Safety Action Plan. Community research was carried out in March and April 2021 among a representative sample of more than 1200 NSW residents. The findings showed the perceived importance of mobile speed cameras in improving road safety is high – 66 per cent of respondents believe mobile

[29] KANTAR Colmar Brunton (2021). *Customer Satisfaction with Camera Enforcement*. Prepared for Transport for NSW.

speed cameras are an important measure in making NSW roads safer. This is consistent with the level of community support found in the same survey carried out in 2017 to help inform the Road Safety Plan 2021.

# 5 Nature and oversight of compliance or enforcement contracts with government and private companies

## *Background*

The MSC program is managed by TfNSW in partnership with the NSW Police Force and Revenue NSW. The operation and maintenance of mobile speed cameras and vehicles is outsourced to a third-party private contractor. This outsourced model has been in place since 2010.

Technicians employed by the contractor drive the vehicles to the enforcement locations, set up the cameras and ensure they are operating correctly.

TfNSW schedules and approves the location and times for mobile speed cameras operation. As required by law, TfNSW also oversees certification of the speed measuring devices and cameras to ensure their accuracy and reliability.

Speed enforcement is an automated process carried out by the camera. Active involvement by the contractor is not required. A vehicle's speed is detected using an approved speed measurement device such as a radar. When a vehicle is detected speeding, digital images of the vehicle are recorded from which details about the vehicle can be extracted.

Following initial quality checks carried out by the contractor, images are sent through a secure connection using a Secure File Transfer Gateway (SFTG) to TfNSW and Revenue NSW. Revenue NSW is responsible for processing images and issuing infringement notices to ensure a third party will not be able to obtain or use the personal details of drivers and riders.

Outsourcing the vehicle logistics and roadside operation of the cameras, with strong oversight and management by TfNSW, helps to limit NSW Government exposure to costs, such as ageing camera and vehicle assets. This also ensures police resources can be used for hands-on policing tasks, including drug and alcohol testing and targeting other high risk behaviours.

The service provider is contracted to deliver a number of enforcement hours. There is no link between the payment for services and the level of compliance, or non-compliance, detected by the MSC vehicles.

## *Procurement process for MSC services*

To deliver on the NSW Government's commitment to enhance and expand the MSC program, TfNSW released a Request for Proposal (RFP) to the market in December 2020.

The submissions received were assessed against a range of criteria including:

- Organisational, financial and strategic capability to perform the services
- Demonstrated ability to satisfy the TfNSW requirements as well as to perform the services and experience in delivering services of a similar nature
- Resource capability and availability including quality of transition, implementation, and management of program, materials, environmental management
- Project management approach
- Whole of life cost and overall value for money.

## *Contract performance /*

TfNSW is actively engaged in the oversight of the delivery of services supplied to ensure compliance with contractual requirements and to ensure community confidence in the program. Key elements of the oversight include:

- A Services Control Group consisting of representatives from both parties meets regularly to monitor the services
- WHS Audits are carried out by TfNSW to review the performance of the services including ensuring appropriate risk mitigation strategies are in place
- TfNSW has the right to require the service provider to meet with TfNSW to freely discuss any issues
- TfNSW may require the service provider to develop an action plan to address any issues
- The contract provides TfNSW with audit and inspection rights in order to verify contract compliance.

## *Data security*

There are additional requirements regarding data security. The service provider's data security plan must be approved by TfNSW, who has the right to carry out security testing on the service provider's systems. All data is owned by TfNSW and the service provider is not permitted to use the data for other purposes. The service provider must comply with the Australian Privacy Principles in the *Privacy Act 1988* (Cth).

These provisions are in place to ensure compliance with privacy laws and ensure community confidence any data captured by the cameras is appropriately handled, stored and deleted.

# 6 Projected impact on revenue generated by changes to the MSC program

## *Saving Lives Accelerated Package*

Enhancements to the mobile speed camera program were announced in November 2020, as one component of the Saving Lives Accelerated Package. This package included a number of evidence-based road safety initiatives to reduce road fatalities and injuries on NSW roads, including:

- The expansion and enhancement of the mobile speed camera program
- The ongoing rollout of red-light speed cameras at high priority locations
- The introduction of a combined drink and drug driving offence (Four Angels Law)
- Additional spending on delivering audio tactile line markings and safety infrastructure for rural roads.

The total additional revenue from the Saving Lives Accelerated Package was outlined in the 2020-21 NSW Budget and estimated at $298 million across the four years from 2020-21 to 2023-24[30].

This cost included a strategic estimate of contract amounts, noting actual MSC delivery costs are subject to a procurement process. TfNSW is committed to ensuring transparency regarding contract disclosure and will release the estimated contract value in line with *Government Information (Public Access) Act 2009* requirements.

The net funds from the MSC program, all of which will be reinvested in road safety through the Community Road Safety Fund, was therefore estimated at approximately $32 million across the forward estimates.

Based on the experience in other NSW camera programs and interstate programs, it is expected infringements will decline over time as drivers respond to enforcement and education and reduce their speeding behaviour.

In the NSW Budget Papers, overall NSW Government revenue is projected to be $353 billion across the four years from 2020-21 to 2023-24. Revenue from fines, regulatory fees and other revenue is projected to be $12.054 billion across the four years from 2020-21 to 2023-24.

The net revenue increase from the changes to the MSC program are therefore projected as an increase of 0.01 per cent of overall NSW Government revenue and 0.3 per cent of revenue from fines, regulatory fees and other revenue when taking into account the cost to deliver the program.

The power to avoid a speeding fine remains with each motorist.

[30] NSW Budget 2020-21. Accessed at https://www.budget.nsw.gov.au/sites/default/files/2020-11/4.%20Revenue-BP1%20Budget%202020-21.pdf

# 7 Ongoing funding of road safety and the Community Road Safety Fund, both through fines and enforcement activity

## *Background*

The Community Road Safety Fund was established by the NSW Government in 2013 to ensure fines from camera detected speed and red-light offences were redirected to road safety programs and increase transparency and enhance community confidence in camera programs. This measure was expanded in 2018 to include fines from camera-detected mobile phone use offences.

Under the *Transport Administration Act 1988*, all hypothecated fines paid into the Community Road Safety Fund must be used to deliver the road safety functions of TfNSW. The NSW Government's core road safety program, managed by TfNSW and partners, is outlined in the Road Safety Plan 2021.

The Plan includes a broad range of measures including the introduction of the world's first mobile phone detection cameras, delivery of life-saving infrastructure safety treatments across the road network, testing and rating of child restraints, high visibility police operations, road safety education programs, road safety advertising campaigns, and school crossing supervisors. It also includes the roll out of a number of other programs and policies which help keep NSW road users safer, including drink driving reforms and the Driver Licensing Access Program.

## *Current funding commitment*

In establishing the Community Road Safety Fund, the NSW Government committed to an ongoing investment in road safety, indexed for inflation each year.

The Community Road Safety Fund includes two parts:

1. All hypothecated fines, which must be paid into the Fund, and
2. Any additional amount paid from the TfNSW Fund – which is a 'top-up' amount, above the amount from camera fines alone and meets the NSW Government's commitment to a 'baseline' level of road safety funding, plus any other announced commitments.

In 2018-19, an additional $600 million was committed across five years as part of the Road Safety Plan 2021 to deliver new measures[31].

Since the launch of the Plan in February 2018, further road safety initiatives have been announced, including the mobile phone detection camera program[32] and Saving Lives Accelerated Package[33].

In 2019-20, the total expenditure from the Fund was $344 million, which included $155.9 million in fines paid into the Fund. In 2020-21, the total budgeted expenditure is $488 million and as at February 2021, the camera fines paid into the Fund was $160.4 million.

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[31] Transport for NSW, Media release, *NSW Budget 2018: A record boost to deliver safer roads* (10 June 2018). Accessed at https://www.transport.nsw.gov.au/news-and-events/media-releases/nsw-budget-2018-a-record-boost-to-deliver-safer-roads

[32] Transport for NSW, Media release, *Cracking down on drivers using mobile phones illegally* (22 September 2019). Accessed at https://www.transport.nsw.gov.au/news-and-events/media-releases/cracking-down-on-drivers-using-mobile-phones-illegally

[33] Transport for NSW, Media release, *Major changes to road safety laws* (19 November 2020). Accessed at: https://www.transport.nsw.gov.au/news-and-events/media-releases/major-changes-to-road-safety-laws

## *Future funding*

TfNSW is currently developing the 2026 Road Safety Action Plan which involves detailed trauma analysis, review of best practice countermeasures, and extensive and ongoing community and stakeholder consultation.

This plan is expected to include road safety actions for delivery across the five-year period of 2022-26. Further NSW Government investment in road safety, aside from hypothecated camera fines which must be paid into the Fund, will be informed by this planning process.

## *Reporting*

The Community Road Safety Fund is included in the TfNSW Financial Statements which is audited by the Audit Office of NSW annually. Additionally, a progress report outlining the core road safety activities in NSW which are funded from the Community Road Safety Fund is published on the Centre for Road Safety website annually[34].

[34] https://roadsafety.transport.nsw.gov.au/downloads/road_safety_strategies.html

# 8 Enforcement activities including the balance between direct police enforcement and camera enforcement

## *Background*

A mix of police and automated camera enforcement activities (both fixed and mobile) is essential to achieve road safety outcomes. Police enforcement is important in the overarching enforcement of road rules. Automated camera enforcement complements this by ensuring efficient enforcement of high risk behaviours such as speeding and red light running where appropriate and feasible. The MSC program schedule is currently closely co-ordinated with NSW Police and cameras are used to support police operations.

Options to increase speed enforcement by expanding police presence are unlikely to deliver the same efficiency and cost benefits as an expanded mobile speed camera program. Moreover, the use of automated camera enforcement frees up police resources to focus on the enforcement of drink and drug driving and other high risk behaviours which cannot be enforced using cameras.

## *Police enforcement*

TfNSW provides NSW Police with additional funding through the Enhanced Enforcement Program (EEP). The aim of the program is to extend the level of visible police enforcement in order to target road user behaviour known to contribute to road trauma, such as speeding, drink driving and drug driving, as well as other safety risks like fatigue, mobile phone distraction and non-use of seatbelts.

The extra on-road time funded through the EEP is additional to the ongoing enforcement and presence police provide on NSW roads every day.

In 2019-20, almost $18.8 million in funding was committed to additional on-road enforcement through the EEP. Initiatives funded included seven State-wide operations which were generally carried out across long weekends and holiday periods and often complemented double demerit point periods.

In recognition of the important role of police enforcement in improving road safety outcomes, the NSW Government has committed, as part of Road Safety Plan 2021, an additional $115 million across five years from July 2018 for enhanced enforcement. This included funding for additional mobile drug testing, 50 additional highway patrol officers and training for up to 1000 general duties officers in speed enforcement.

## *Camera enforcement programs*

The NSW Speed Camera Strategy provides an integrated framework for speed enforcement in NSW and aims to improve the transparency of NSW speed camera programs[35]. The Strategy was developed in consultation with the NSW Police Force and NRMA, and reinforces the NSW Government's commitment to reducing fatalities and serious injuries on NSW roads.

The MSC program has been discussed in the background to Chapter 3, further information about the types of camera enforcement programs operated by TfNSW is included in **Attachment D**.

[35] https://roadsafety.transport.nsw.gov.au/aboutthecentre/strategies/nswspeedcamerastrategy/index.html

Overall, data provided by the Department of Infrastructure, Regional Development and Cities shows NSW drivers receive a lower rate of speed camera fines (all camera types) compared with those in other major Australian jurisdictions in terms of speed camera fines issued per 10,000 licence holders (see Figure 8)[36].

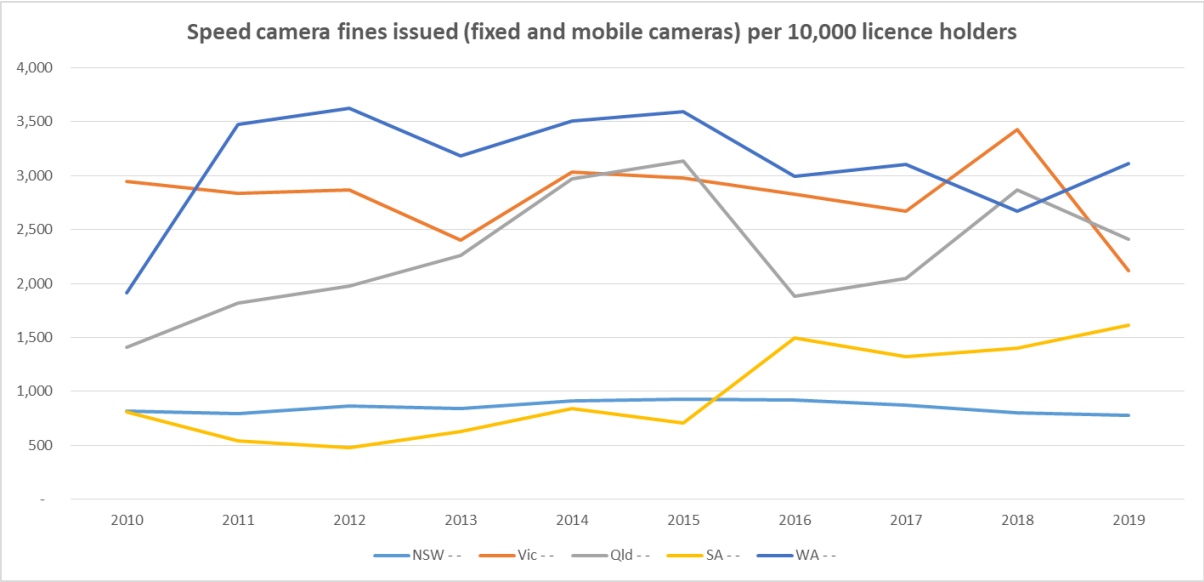


*Figure 8: Comparison of speed camera fines per 10,000 licence holders across Australian jurisdictions (Source: Department of Infrastructure, Regional Development and Cities)*

## *NSW infringement data*

Figure 9 represents speeding penalty notice data from January 2019 to April 2021. NSW Police issue around 24 per cent of all speeding infringements and around 10 per cent of speeding infringements were generated from mobile speed cameras. As Figure 9 demonstrates, most penalty notices are generated by fixed speed cameras.

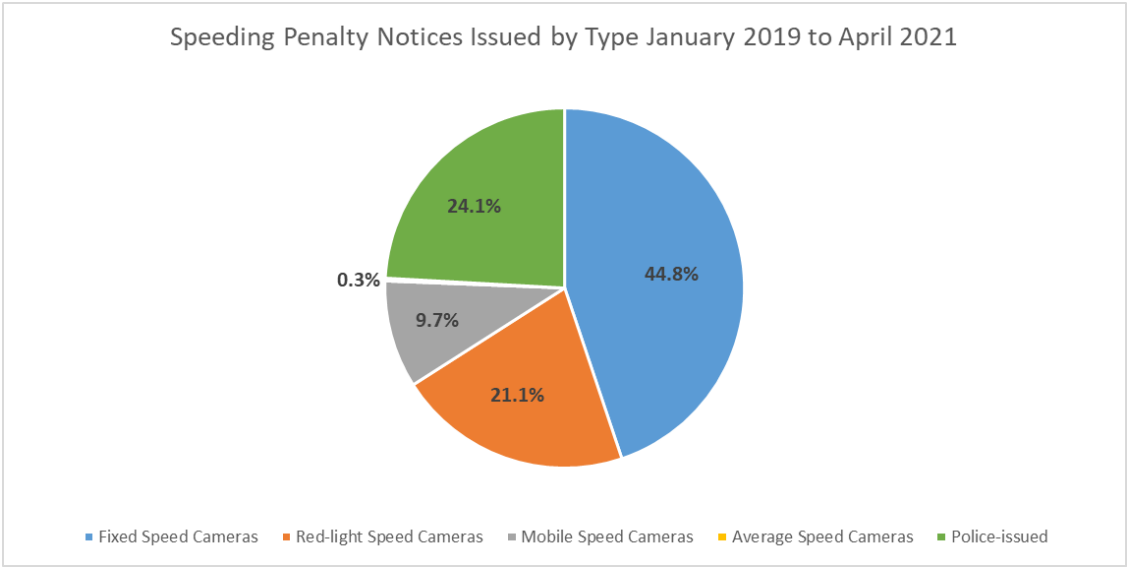


*Figure 9: NSW speeding penalty notices by type between January 2019 and April 2021 (Source: Revenue NSW)*

[36] Data supplied by Department of Infrastructure, Regional Development and Cities - Bureau of Infrastructure, Transport and Regional Economics

Figure 10 demonstrates the trend in speeding penalty notices issued by enforcement type.

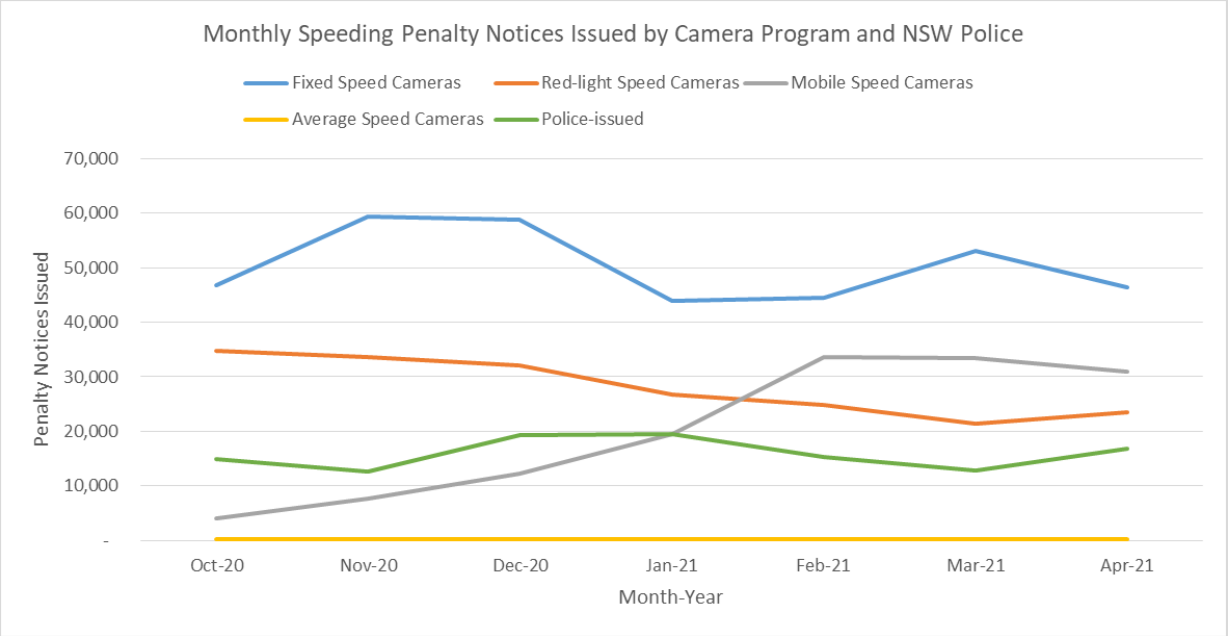


*Figure 10: NSW monthly speed penalty notices by type between October 2020 and April 2021 (Source: Revenue NSW)*

# 9 Impact of the MSC program on people living in regional and rural areas

## *Background*

As outlined in Chapter 2, regional and rural residents are overrepresented in road trauma in NSW. Two-thirds of all deaths and around 45 per cent of serious injuries occur outside of Sydney. To provide context, in 2019 the NSW fatality rate from road crashes was 4.4 per 100,000 people overall, however the fatality rate for country residents was 8.5 per 100,000 people. This was four times the rate in metropolitan NSW.

## *Re-investment of net fines in delivering safer rural roads*

Safety infrastructure programs which aim to maximise the installation of proven countermeasures across the network are funded through the Community Road Safety Fund and hypothecated fines.

These safety programs consistently deliver trauma savings and return on investment. Protective safety infrastructure features, such as flexible safety barriers, audio-tactile line marking (ATLM), wide centre lines, curve treatments, and traffic calming measures, are not in place across large parts of the NSW road network.

The current Towards Zero Infrastructure Program, funded across five years ($500 million from 2018-19 to 2022-23) and targeted to Saving Lives on Country Roads as part of Road Safety Plan 2021, is estimated to save 347 lives and prevent 2657 serious injuries across the life of the treatments, with a benefit cost ratio (BCR) of 5.6[37]. Continued investment, including of fines, into the existing Towards Zero Infrastructure Program delivers strong trauma savings. There is also strong community support for infrastructure measures.

## *MSC program on rural and regional roads*

In line with fatal road crash trauma data, around two-thirds of mobile speed camera enforcement is allocated to areas outside of Sydney.

An analysis of mobile speed camera infringement data indicates while infringement rates per hour of enforcement have increased as the program parameters have changed, these rates are lower outside Sydney. From October 2020 to April 2021, 50 per cent of mobile speed camera penalty notices were issued from sites located outside of Sydney.

Figure 11 demonstrates hourly infringement rates for the mobile speed camera program[38].

[37] Infrastructure NSW, Towards Zero Business Case Summary. Accessed at: https://www.infrastructure.nsw.gov.au/media/1726/towards_zero_business_case_summary_summary.pdf
[38] Data sourced from Revenue NSW. Accessed at https://www.revenue.nsw.gov.au/help-centre/resources-library/statistics

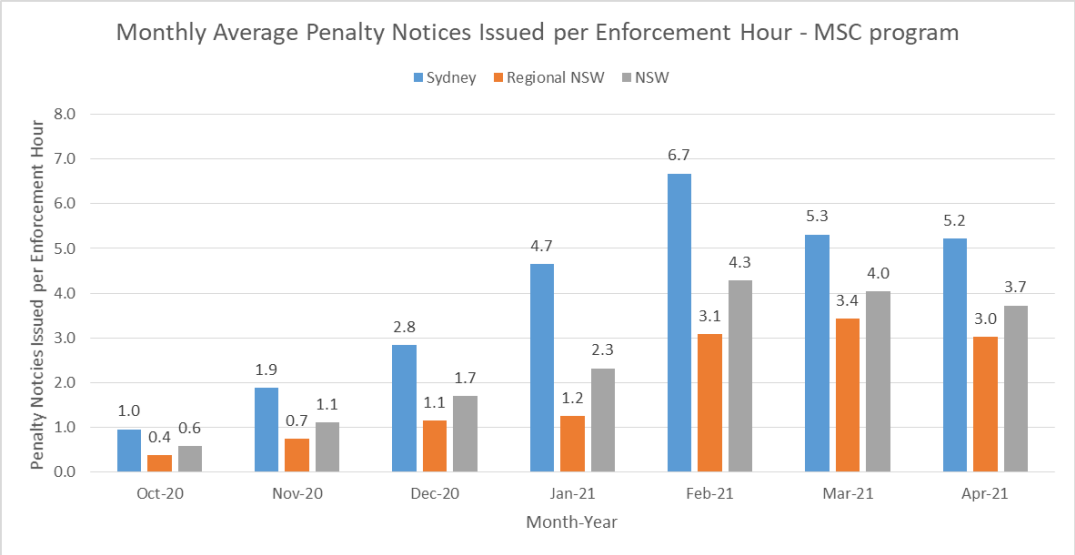


*Figure 11: NSW monthly average penalty notices per enforcement hour for MSC program between October 2020 and April 2021 (Source: Revenue NSW)*

It should be noted the majority of speeding infringements issued from speed camera enforcement come from fixed and red-light speed cameras. The proportion of speeding penalty notices issued from cameras in rural and regional areas of NSW from January 2019 to April 2021is 26 per cent. Figure 12 demonstrates the regional breakdown in speeding penalty notices issued from all camera types.

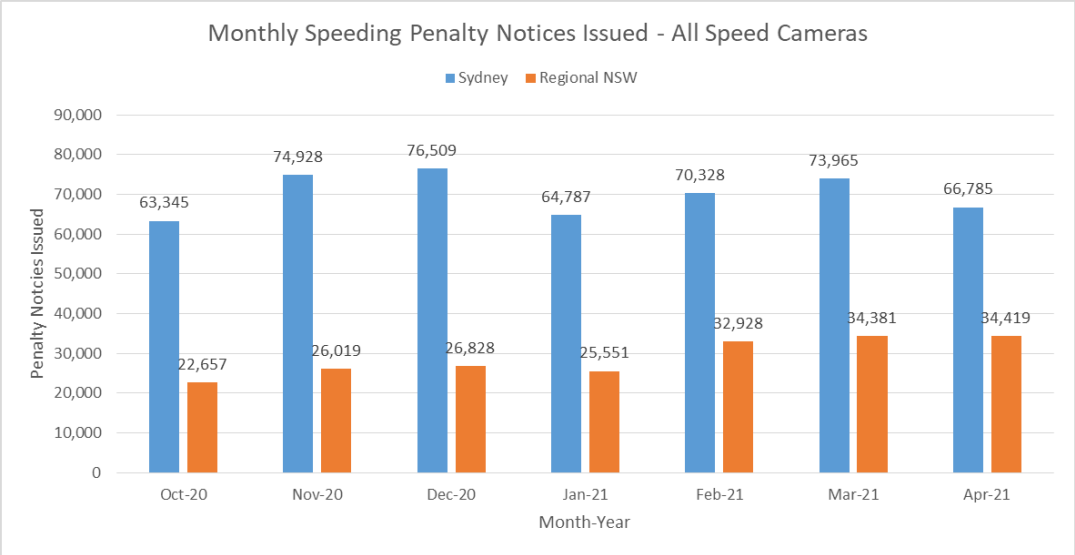


*Figure 12: Monthly speeding penalty notices issued across NSW between October 2020 and April 2021 (Source: Revenue NSW)*

# 10 Impact of the MSC program on people from low socio-economic background and Indigenous people

## *Background*

Across the five year period from 2015 to 2019, 3073 Aboriginal people were killed or seriously injured on NSW roads. A higher proportion of Aboriginal motor vehicle controller (driver/rider) serious casualties involved speed as a key behavioural factor compared with non-Aboriginal motor vehicle controller serious casualties (38.1 per cent compared with 25.3 per cent).

Parallel to this overrepresentation in road trauma, particular groups have been identified as facing particular disadvantage in terms of access to licensing. These include Aboriginal people, people from Culturally and Linguistically Diverse (CALD) backgrounds (especially refugee communities and recent migrants) and people from low socio-economic backgrounds.

In response to this, TfNSW routinely considers vulnerable groups in the design of its programs to ensure they are culturally competent, have appropriate financial hardship provisions, and affected stakeholders (or representative bodies) are engaged.

Key actions to increase access to the licensing system include:

- Establishing and resourcing the Aboriginal Driver Licensing Interagency Committee and implementing actions under the cross-government work plan
- Expanding the Driver Licensing Access Program, including the investment of $20 million across five years from July 2020 to June 2025 (a key commitment of the Road Safety Plan 2021)
- Helping people to retain and regain drivers licences by supporting financial hardship provisions including the whole-of-government Hardship Support Program led by Revenue NSW and Work Development Order scheme.

## *Aboriginal Driver Licensing Interagency Committee*

The Terms of Reference (ToR) of the Aboriginal Driver Licensing Interagency were aligned with the Road Safety Plan 2021 in March 2019 in recognition that driver licensing rates remained low for Aboriginal people, while licensing offences and road trauma remained high.

The ToR acknowledge the initial program of work completed by the Interagency in response to the NSW Auditor General's 2013 report Improving Legal and Safe Driving Among Aboriginal People and committed the Interagency to develop a work plan which set out priorities aligned with the NSW Road Safety Plan 2021.

The Interagency Committee meets quarterly to consider and progress whole-of-government responses to increase access to the driver licensing system. Key actions include:

- Enhancing and expanding the Driver Licensing Access Program
- Reducing fine debt as a barrier to obtaining a licence by improving responses to vulnerable clients
- Targeting delivery of Mobile Service Centres
- Ensuring driver licensing and fines management are embedded in NSW Police RISEUP programs
- Establishing a Service NSW portal with up to date information on driver licensing and registration information.

## *Driver Licensing Access Program*

The Driver Licensing Access Program (DLAP) was launched in July 2015. Since 2015 and with $9.89 million funding from the Community Road Safety Fund, it has helped participants obtain 4280 learner licences, 3222 provisional licences and more than 17,000 log book hours.

The NSW Government has committed to invest $20 million across five years (July 2020 to June 2025) for the expanded DLAP from the Community Road Safety Fund. This more than doubles the funding for the program across the previous five years. Expansion has been informed by a program review and new procurement process to increase geographic coverage, enhance value for money, expand provider coverage and standardise service packages.

It is projected the program will deliver around 2000 learner licences and 1000 provisional licences each year as well as a significant increase in log book hours through an expansion of the learner driver mentor component of the program.

The program now offers four core service packages designed to overcome barriers to the licensing system including:

- Achieving learner licences
- Gaining on road driving experience
- Progressing to a provisional licence
- Regaining a licence.

## *Revenue NSW Hardship Policy and Review Guidelines*

Revenue NSW has a Hardship Policy which applies to customers experiencing economic hardship, including as a result of domestic violence or when affected by a natural disaster. This policy also applies to customers considered vulnerable due to a mental illness, an intellectual disability or cognitive impairment, homelessness, or serious addiction to drugs, alcohol or volatile substances. Customers can access a range of options including:

- Flexible payment options
- Postpone repayment
- Satisfy debt through a Work Development Order.

In addition to specific hardship measures, drivers who receive a fine for certain offences and have an otherwise good driving record can apply to Revenue NSW for a review of an infringement. The review is carried out in accordance with established and public Review Guidelines. Depending on circumstances, this can result in a caution being issued instead of the penalty, meaning the driver does not have to pay a fine or lose demerit points and the caution is recorded on the driving history. Information about a review is included on penalty notices.

## *Hardship Support Program*

TfNSW actively supports the whole-of-government Hardship Support Program Steering Committee chaired by Revenue NSW. The purpose of the steering committee is to:

- Share information on the implementation of the Fines Amendment Act 2019
- Plan and implement responses to alleviate the issues experienced by Aboriginal people and young people in general
- Share insights and updates on the expansion of the Work and Development Order scheme.

The committee will co-design programs and oversee their implementation and evaluation. This provides an ongoing forum for TfNSW and other issuing authorities to engage on the impacts of fines on vulnerable customers.

# 11 Impact of the MSC program on P-plate drivers

## *Background*

Younger and novice drivers face many challenges when learning the complex task of driving a vehicle. With their relative inexperience, they also face a higher risk of being involved in a crash. Despite making up only about 15 per cent of all licence holders, the crashes which involve younger drivers (aged under 26 years) account for almost a quarter of annual road fatalities.

Graduated licensing schemes are one of the most effective ways to reduce youth road trauma. These evidence based schemes help reduce the number of young drivers involved in crashes. They provide a staged approach to driver licensing and reduce the impact of risk taking behaviour associated with younger drivers.

In the last five years, there has been a 44 per cent reduction in Provisional P1 drivers involved in fatal crashes and a 38 per cent reduction in Provisional P2 drivers. This compares with a 24 per cent reduction in similar crashes for unrestricted licence holders. However, speeding is more likely to be a factor in crashes involving Learner, Provisional P1 and Provisional P2 drivers than for unrestricted drivers involved in crashes.

## *Graduated Licensing Scheme*

Younger and novice drivers face many challenges when learning the complex task of driving a vehicle. With their relative inexperience, they also face a higher risk of being involved in a crash. Despite making up only about 15 per cent of all licence holders, the crashes which involve younger drivers (aged under 26 years) account for almost a quarter of annual road fatalities.

Special licence conditions apply for young and novice drivers within NSW. These include speed restrictions, passenger numbers, vehicle types and the use of mobile phones. The conditions and restrictions which apply to learner or provisional licence holders do not change when they travel outside NSW. The Graduated Licensing Scheme (GLS) aims to maximise the development of safe driving skills of novice drivers, via staged learning and practice across a period of time. The GLS takes drivers from their learner licence to full licence with restrictions and conditions which are designed to ensure they build their skills and knowledge so they understand risks and build low risk safe driving behaviours.

### Speed restrictions

The GLS mitigates the risk of speed for novice drivers through the gradual increase in overall limits and a strict approach to speeding penalties. The following restrictions apply to novice drivers:

- Learner and Provisional P1 drivers must not drive faster than 90 km/h
- Provisional P2 drivers must not drive faster than 100 km/h
- Learner or Provisional drivers who speed by more than 30km/h over the limit face immediate suspension and licence confiscation by police
- Learner and Provisional P1 drivers penalised for speeding (four demerit points) will lose their licence for at least three months
- Provisional P2 drivers will lose their licence for at least three months if they are penalised twice for speeding.

Learners and Provisional licence holders whose licence is suspended due to loss of demerit points have the right to appeal the suspension.

## *MSC program and novice drivers*

The MSC program is a broad population based measure which is intended to address speeding behaviour across the road network. It does not specifically target novice drivers but could be expected to contribute to positive behaviour change and trauma reductions among young drivers.

## *Speed camera penalty notices and Provisional drivers*

The majority of speeding offences issued from speed cameras are issued to unrestricted licence holders.

An analysis of speeding penalty notices issued from speed cameras[39] demonstrates across 2019 and 2020, Provisional P1 drivers or riders were issued 15,577 penalty notices (representing 1.5 per cent of all speeding penalty notices from speed cameras) and Provisional P2 drivers or riders were issued 32,633 penalty notices (representing 3.2 per cent of all speeding penalty notices from speed cameras).

[39] Transport for NSW (2021) Analysis of penalty notice data in DRIVES.

# Attachment A – Findings from key evaluation studies related to Australian mobile speed camera programs

## Mobile speed cameras in other Australian jurisdictions

Speed cameras are used in all Australian states and territories. The following information describes the mobile speed camera programs in key Australian jurisdictions – specifically Victoria, Queensland, Western Australia, South Australia and ACT. While an outcome evaluation for the South Australian program could not be found, the other programs have been evaluated.

## Victoria

Cameron and Delaney[40] describe what a covert mobile speed camera operation means in Victoria. The camera is car-mounted. The car is one of a variety of popular makes and models and the car is unmarked. There are no warning signs. When there is enough natural light, the camera does not flash. The intention is that the driver should not notice the speed camera operation.

In Victoria, the mobile camera operating hours per month have continued to increase. D'Elia *et al*[41] reported the target per month had increased from 4200 hours in August 2001 to 6000 hours in February 2002. In 2019, mobile speed cameras operated approximately 9300 hours per month[42]. The camera can detect speeding vehicles in one or both directions andthere are around 2000 approved locations for mobile camera operation.

In Victoria, covert mobile speed camera operations began in 1989. Cameron *et al*[43] briefly summarise evaluations of 1990s operations, which showed them to be very effective and included a 41 per cent reduction in fatal crash outcome associated with very high camera activity.

### Evaluation of Overt and Covert Mobile Speed Enforcement in Victoria

Development of an automated speed surveillance system led to the first large scale mobile speed camera program in Victoria operating in a covert manner. Combined with an intensive state-wide mass media campaign, the camera program significantly reduced casualty crashes and their severity, particularly across arterial roads in Melbourne and on 60 km/h roads in rural Victoria where the majority of camera operations occurred[44].

Diamantopoulou and Cameron[45] evaluated the effectiveness of overt and covert speed enforcement in rural Victoria from July 1995 to June 1997 in conjunction with publicity of the

[40] Cameron M. H., and Delaney A (2008) *Speed enforcement – effects, mechanisms, intensity and economic benefits of each mode of operation*. Monash University Accident Research Centre, Victoria
[41] D'Elia A, Newstead S, and Cameron M. H. (2007) *Overall impact during 2001-2004 of Victorian speed-related package*. Monash University Accident Research Centre, Victoria, Report number 267
[42] Department of Justice and Community Safety (2019) Victoria, *Cameras Save Lives* (URL: https://www.camerassavelives.vic.gov.au, accessed 2 November 2019)
[43] Cameron M. H., Newstead S, Diamantopoulou K, and Oxley P (2003) *The interaction between speed camera enforcement and speed-related mass media publicity in Victoria,* Monash University Accident Research Centre, Victoria, Report number 201
[44] Cameron, M. H., Cavallo, A. & Gilbert A. (1992). *Crash-based evaluation of the speed camera program in Victoria 1990-1991, Phase 1: General effects, Phase 2: Effects of program mechanisms*. Report for Monash University, https://www.monash.edu/__data/assets/pdf_file/0004/216904/muarc042.pdf.
[45] Diamantopoulou, K. & Cameron, M. (2002). *An evaluation of the effectiveness of overt and covert speed enforcement achieved through mobile radar operations.* Monash University Accident Research Centre - Report No. 187.

operations, in terms of casualty crash reductions. Mobile radar was used on two-way, undivided, 100 km/h speed limit roads from a moving police patrol car, which can intercept any vehicle which records a speed in excess of the posted speed limit. The type of vehicle used was either a marked patrol car (overt operation condition) or an unmarked patrol car (covert operation condition).

The evaluation of mobile radar enforcement and supporting publicity found evidence of casualty crash reductions, particularly when the speed enforcement operations were either covert or a combination of overt and covert. The strongest effects on casualty crashes occurred when a mix of overt and covert enforcement was accompanied by high awareness levels of mobile enforcement publicity during the treatment period. Under these circumstances, a 71.3 per cent reduction was found for casualty crashes occurring on the *same day or up to four days* after the enforcement was present. This effect was strongest on the *day* when there was a mix of overt/covert mobile radar enforcement in operation.

Modelling of estimated reductions in trauma of increasing MSC enforcement in Victoria[46] has shown mobile speed cameras and random drug tests represent the best return on investment in traffic enforcement in Victoria. Compared to mobile speed cameras, the research concluded fixed types of camera-based enforcement appears to provide more modest returns, due to the limited 'halo' effect or coverage of these enforcement methods.

## Queensland

Queensland mobile speed camera operations started in May 1997. The mobile speed camera program originally operated only from marked vehicles. There had been signs after the vehicle to inform drivers they had passed the camera but since July 2015 there have been no signs. Since April 2010, Queensland has deployed up to 30 per cent of urban operations from a variety of unmarked vehicles, without signs (Newstead et al 2018, p 1). There are more than 3500 mobile speed camera sites[47] and the cameras can detect speeding in either direction[48].

The most recently reported evaluations of the Queensland speed camera program are those of Newstead *et al*[49,50]. The 2017 evaluation relates to three years of operations: 2013, 2014 and 2015. The 2018 evaluation relates to operations in 2016. Some details were changed for the 2018 evaluation but the evaluation framework continued to be that described by Newstead and Cameron[51].

Crash effects of the Queensland mobile camera program were assessed by comparing time series trends in the treatment areas with those in the corresponding comparison areas. Treatment areas were those within a 1 kilometre radius of the centre of the speed camera zone in speed limits up to 80 km/h. Where the speed limit was higher than 80 km/h, the radius was 4 kilometres (for the 2017 evaluation) or 5 kilometres (for the 2018 evaluation). Comparison areas were areas outside the defined radius of the speed camera zone centres. Treatment and comparison were matched for analysis using the same broad speed zone categories and by police region of operation[51].

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[46] Cameron, M., Newstead, S. & Diamantopoulou, K. (2016). A resource allocation model for traffic enforcement. *Journal of the Australasian College of Road Safety, 27*(2), 23-36.
[47] Queensland Government Open Data Portal *Active mobile speed camera sites* (URL: https://www.data.qld.gov.au/dataset/active-mobile-speed-camera-sites/resource/f6b5c37e-de9d-4041-8c18-f4d4b6c593a8, accessed 4 November 2019)
[48] Queensland Audit Office (2015) *Road safety - traffic cameras*, Brisbane
[49] Newstead S, Budd, L. and Cameron, M. H. (2017), *Evaluation of the Queensland Camera Detected Offence Program (CDOP): 2013-2015,* Monash University Accident Research Centre, Victoria
[50] Newstead S, Budd, L. and Cameron, M. H. (2018), *Evaluation of the road safety benefits of the Queensland Camera Detected Offence Program (CDOP) in 2016,* Monash University Accident Research Centre, Victoria
[51] Newstead S, and Cameron, M. H. (2013) Crash effects of the Queensland Camera Detected Offence Program, *Proceedings of the 2013 Australasian Road Safety Research, Policing and Education Conference*, Brisbane

The evaluations included other types of speed camera, and also red-light cameras. Nevertheless, the evaluations found 98 per cent of the savings were associated with the mobile speed camera program. Newstead *et al*[49,50] explained this is because mobile speed cameras cover a much greater proportion of Queensland's crash population than other types of camera.

The 2017 evaluation found overall, the Queensland Camera Detected Offence Program was associated with an overall reduction in serious casualty crashes of between 26 per cent and 30 per cent from 2013 to2015. This represents a reduction of between 1660 to 2000 serious casualty crash reductions (defined as those which result in death or hospitalisation). The number of serious casualty crashes saved due to the mobile speed camera program was 1948 in 2013, 2001 in 2014 and 1643 in 2015.

## Western Australia

Western Australia (WA) had at least 4000 mobile camera sites by 2013[52]. Most mobile camera sessions were in metropolitan areas. In 2013, the average monthly hours were 2640 hours in metropolitan areas and 540 hours in regional areas. Newstead[53] reported higher target operational hours of 3500 per month.

There had been signs to draw drivers' attention to the camera operation. The use of signs was discontinued in 2011[52]. The locations of operations are published on the WA Police Force website. Rearward facing operation commenced in 2010.

The most recently reported evaluation of the WA speed camera program is Newstead *et al*[52] which included the years 1995 to 2013. Newstead et al[52] related monthly variation in observed crashes at camera sites, to the monthly number of camera sessions undertaken. The evaluation reported the "vast majority" of camera sessions ran between 6am and 8pm, and so other times of the day were used as a control. The effects were measured within 500 metres and within 1 kilometre of the camera. The mobile speed camera program resulted in a large reduction in fatal crashes, with the average reductions across the years of between 20 per cent and 25 per cent.

## South Australia

The South Australia (SA) mobile camera program uses unmarked vehicles and no signs; cameras can enforce in both directions (South Australian Police). Maxwell[54] indicates mobile cameras operated for an average of 3750 hours per month in 2014. There is no readily available information on the number of sites.

## Australian Capital Territory

The Australian Capital Territory program does not use advance warning signs. The speed camera vehicle is an unmarked van with a sign on top. There are no other signs.

In 2017, mobile cameras were operated for an average of 1200 hours per month[55]. Justice Safety and Emergency ACT[56] list 1184 sites where mobile cameras could be used. The ACT

[52] Newstead S, Diamantopoulou K, Lawrence, B., Clark, B. and Palamara, P (2015), *An evaluation of automated traffic enforcement operations in Western Australia, 1995-2013*, Curtin-Monash Accident Research Centre, Bentley WA

[53] Newstead S (2016) *Outcomes of a workshop to determine criteria for placement of fixed speed cameras and red light speed cameras under the automated traffic enforcement program in Western Australia*, Monash University Accident Research Centre, Victoria

[54] Maxwell P (2015) Review of South Australia's fixed and mobile speed camera programs, *Proceedings of the 2015 Australasian Road Safety Conference, Gold Coast*

[55] Clark B, Budd L, Thompson L, Cameron M. H., and Newstead S (2019) *Evaluation of the ACT Road Safety Camera Program,* Monash University Accident Research Centre, Victoria

[56] Justice Safety and Emergency ACT Traffic speed camera locations (URL: https://www.data.act.gov.au/Justice-Safety-and-Emergency/Traffic-speed-camera-locations/426s-vdu4/data, accessed 8 November 2019)

mobile speed camera program was associated with an average 19.7 per cent reduction in casualty crashes in areas within 500 metres of a mobile speed camera site since program implementation[55].

# Attachment B – Summary of key evaluation studies regarding covert enforcement in New Zealand

## Effectiveness of covert Mobile Speed Cameras in New Zealand

Keall, Povey and Frith[57,58] showed evidence for the effectiveness of covert mobile speed cameras over and above the effects of overt camera operations in their evaluation of a covert mobile speed camera trial in New Zealand and associated publicity campaign.

At the time of the trial, mobile speed cameras already operated in a highly visible manner in New Zealand, and were used solely on large numbers of road lengths which demonstrated a clear speed-related crash history. These road lengths were designated as speed camera areas which were clearly signposted 'Speed Camera Area' at the entry point. The speed cameras were mobile (mounted on police cars) and were not allowed to be hidden[57]. An evaluation of the existing overt camera effectiveness demonstrated a significant reduction of 11 per cent in all injury crashes in speed camera areas but failed to detect any general effect across the broader road network[59]. Mara *et al* stated the speed camera program should be tailored to generalise the effect to areas where cameras were not in operation, particularly in rural areas. Recommendations included the use of less visible camera operations to increase the uncertainty about the location of speed cameras, thus generalising the effect to areas where cameras were not in operation.

The objective of the covert mobile speed camera evaluation was to assess the potential benefits of cameras with no visible cues such as warning signs in comparison with the existing overt speed camera operation. All open roads (100 km/h speed limit zones) in one specified police region were chosen as the trial area, while all open roads in the rest of New Zealand were chosen as the matched control area. The trial and control areas were matched in terms of:

a) similar types and degrees of road safety enforcement and road safety advertising (apart from that associated with the hidden cameras)

b) similar quality of roads

c) similar absolute speeds and trends in speeds on open roads in speed camera areas and on roads generally prior to the trial (as measured by speed surveys)

d) similar road use in terms of vehicle kilometres travelled.

The trial also involved the use of public opinion surveys to examine social acceptance toward the program.

Findings demonstrated the covert speed cameras resulted in an estimated 2.6 per cent mean speed reduction in speed camera areas during the first two years of the trial, while there was also a 1.6 per cent reduction in all open road areas. The reduction in mean speeds on all roads, not just in speed camera areas, indicates the use of speed cameras which are less visible from cues such as warning signs (as opposed to visible cameras) produces a general deterrence effect beyond the areas of actual speed camera enforcement. This is likely because motorists cannot rely on being able to see a visible speed camera to warn them to moderate their speeds as they approach a camera enforcement site, which would lead to greater cautious driving more generally[57]. Moreover, it was estimated at speed camera areas, injury crashes dropped by 22

[57] Keall, M. D., Povey, L. J. and Frith, W. (2001). The relative effectiveness of a hidden versus a visible speed camera programme**.** *Accident Analysis & Prevention*, 33(2):277-84.
[58] Keall, M. D., Povey, L. J. and Frith, W. (2002). Further Results from a Trial Comparing a Hidden Speed Camera Programme with Visible Camera Operation. *Accident Analysis & Prevention*, 34(6):773-7.
[59] Mara, M. K., Davies, R. B. & Frith, W. J. (1996). *Evaluation of the effect of compulsory breath testing and speed cameras in New Zealand*. Proceedings from the Combined 18th ARRB Transport Research Conference and Transit NZ Land Transport Symposium, Christchurch, New Zealand.

per cent and casualties by 29 per cent, while on all open road areas crashes dropped by 11 per cent and casualties by 19 per cent. Importantly, the trial also demonstrated evidence for a growing acceptance regarding the use of covert speed camera operations, as well as recognition that drivers were not speeding as much as before.

Importantly to reiterate, prior to this study an evaluation of the existing overt speed camera program demonstrated a significant reduction of 11 per cent in all injury crashes in speed camera locations, but failed to detect any general effect across the broader road network[59].

# Attachment C – Monash University Accident Research Centre (MUARC) report

Provided as a separate file

# Attachment D – Types of camera enforcement programs operated by Transport for NSW

## Camera enforcement in NSW

In addition to mobile speed cameras, there are three types of speed camera used in NSW. An outline of each, as well as mobile phone detection cameras (which do not detect speeding offences, but fines are paid into the Community Road Safety Fund), is included below.

### Fixed Speed Cameras

Fixed speed cameras are applied at specific locations with a known crash history or which have been identified as high risk. Transport for NSW currently operates 111 fixed speed camera locations across the State. Seven of those locations, however, operate in warning mode following reviews by the Centre for Road Safety and safety concerns expressed by the community. A 'three strike' scheme applies at those locations where the responsible person for the vehicle receives an infringement notice on the third speeding offence. Nevertheless, where a vehicle is detected exceeding the speed limit by more than 30 km/h, the responsible person receives a court attendance notice and may face significant penalties.

At fixed speed camera locations, there has been a 36 per cent reduction in casualty crashes, a 74 per cent reduction in fatalities and 41 per cent reduction in injuries since the cameras were installed.[60]

### Red-Light Speed Cameras

Red-light speed cameras are applied at signalised intersections, where drivers are vulnerable to right angle crashes and there is a higher risk of a pedestrian casualty. These cameras detect and deter speeding and red-light running both of which can result in severe injuries even where crashes occur at lower speeds.

TfNSW currently operates 201 red-light speed camera locations across the State. At these camera locations, there has been a 23 per cent reduction in fatal and serious injury crashes, a 73 per cent reduction in fatalities, a 24 per cent reduction in serious injuries and a 52 per cent reduction in pedestrian casualties since the cameras were installed.[61]

### Average Speed Cameras

The average speed camera program addresses heavy vehicle speeding along routes including the Pacific Highway, the New England Highway, the Hume Highway, the Newell Highway, Mount Ousley Road and Picton Road. These roads are over-represented in heavy vehicle crashes.

Average speed enforcement works by measuring the amount of time it takes a heavy vehicle to drive between two points and then calculates the average speed of the vehicle. If the vehicle's average exceeds the speed limit for the length of road, the driver will receive a penalty for speeding. All average speed enforcement lengths are certified by a registered land surveyor to ensure the accuracy of average speed calculations. The distance used when calculating a vehicle's average speed across an average speed enforcement length will be the shortest practicable distance, which ensures there is no possibility a driver's speed can be overestimated.

[60] https://roadsafety.transport.nsw.gov.au/aboutthecentre/strategies/nswspeedcamerastrategy/index.html

[61] https://roadsafety.transport.nsw.gov.au/speeding/speedcameras/2019-review.html

Average speed enforcement is not intended to replace police enforcement on heavy vehicle routes and police may issue speeding infringements and suspensions regardless of whether the driver also receives a speeding infringement from the average speed enforcement camera.

Average speed cameras operate along 25 lengths of known heavy vehicle routes in regional NSW and TfNSW is working to expand heavy vehicle average speed enforcement into metropolitan areas which will increase enforcement lengths to 37.

Across average speed enforcement lengths, there has been a 27 per cent reduction in casualty crashes involving a heavy vehicle, a 45 per cent reduction in fatalities from crashes involving heavy vehicles and a 10 per cent reduction in serious injuries from crashes involving heavy vehicles since the cameras were installed.[62]

**Mobile Phone Detection Cameras**

Fixed and transportable mobile phone detection cameras have been deployed since 1 March 2020 to detect and deter illegal mobile phone use across NSW. Cameras operate day and night and in all weather conditions to achieve 'anywhere, anytime' enforcement. The mobile phone detection camera program includes both fixed location cameras at five sites and trailer-mounted transportable camera units. TfNSW is expanding the program so it delivers more than 135 million annual vehicle checks by 2022-23.

TfNSW has begun an evaluation of the program. Initial data suggests it may be highly effective at reducing illegal mobile phone use. During a six-month trial of the technology in Sydney in 2019, TfNSW found one in every 82 drivers was detected using their phones illegally. Between March 2020 and 31 January 2021, the offending rate had dropped to an average of one in every 453 drivers.

[62] https://roadsafety.transport.nsw.gov.au/speeding/speedcameras/2019-review.html

MONASH University

ACCIDENT RESEARCH CENTRE

RESEARCH NOTE

# ANALYSIS TO ESTIMATE ROAD SAFETY BENEFITS OF EXPANDING THE NSW MOBILE SPEED CAMERA PROGRAM

Stuart Newstead

# BACKGROUND AND OBJECTIVES

The New South Wales Centre for Road Safety (NSW CRS) has approached the Monash University Accident Research Centre (MUARC) to provide expert analysis on the potential road safety benefits of expanding the NSW mobile speed camera program.

Mobile speed cameras in NSW are currently used in a highly overt manner which is different from other jurisdictions in Australia. Sections of road are chosen for enforcement, presumably based on both road safety and camera operational criteria, and sites within these road lengths are chosen for enforcement. According to data provided by the NSW CRS, there are 1,024 road segments on which mobile speed cameras can be operated and 2,493 specific sites on these road segments where cameras can be placed for operation. The average length of an enforced road segment is around 13.1km with the average number of sites enforced per road length being around 2.5 although up to 23 sites are used in some segments. Since 2012, enforcement operations are scheduled at enforced sites for 7,000 hours per month with the sites chosen for enforcement in each time period understood to be allocated using a randomised scheduler.

Under current practice in NSW, mobile speed camera enforced sites are signed clearly 250m and 50m before the location of the camera as well as 50m after the camera. The camera vehicle is also extensively marked. Similar signage is also used at NSW fixed mid-block speed camera sites. Evaluation of the NSW fixed mid-block speed camera program (ARRB 2005) showed that crash effects of the program were localised to the area bounded by the signage either side of the camera consistent with the highly overt nature of the signage. It is likely that crash effects at the mobile camera sites are also likely to be localised to within 250m of the camera site reflecting the placement of the signage for identifying the sites.

Other jurisdictions in Australia have also implemented extensive mobile speed camera programs albeit with quite different operational practices to NSW, based on different proposed mechanisms of deterring drivers from exceeding the speed limit. Programs in Victoria and Queensland perhaps provide the greatest contrast in operation principles. The effectiveness of both programs has also been evaluated to allow contrast of their relative effectiveness.

The mobile speed camera program in Victoria operates cameras completely covertly with no signage advising of camera locations. The objective of the covert operation is to generalise the effects of the program in both time and space to create the perception amongst drivers that the camera can be ‘anywhere, anytime’ to encourage network wide compliance with speeds. Due to the covert nature of the cameras, the primary measure of deterrence generated by the program is specific deterrence facilitated through the detection and infringement of large number of motorists. Evaluation of the Victorian mobile speed camera program has confirmed the geographic spread of program reach well beyond the enforced sites. It has also confirmed the specific deterrence mechanism of the project with trauma reductions being highly correlated to the number of infringements issued from the camera operations (Cameron, Cavallo et al. 1992, Rogerson, Newstead et al. 1994).

Operation of the Queensland mobile speed camera program has taken a different philosophical approach to Victoria. In Queensland, mobile cameras have been operated largely overtly from the commencement of the program. Signage in Queensland is not as extensive as in NSW. Early in the program only a single sign was used being placed at the site of operation of the camera. For around the last 4 years, no sign has been used although the vehicles used for the program remain identified. In more recent years, Queensland has also moved to scheduling a percentage of covert mobile camera operations. Evaluation evidence has showed that the number of hours of deployment of the mobile cameras in Queensland has the strongest association with the road trauma reductions

associated with the program (Newstead and Cameron 2003). Evaluation evidence also showed that program crash effects were highly localised to the site of operation of the camera with the largest crash effects occurring within 2km of the camera site but with some effects extending up to 4km. In order to maximise the road safety benefits of the program across the state, sites for operation of the cameras have been carefully selected to cover the location of police reported crashes in Queensland with over 75% of crashes located within 4km of one of over 2,500 operational camera sites. Furthermore, Queensland also utilise a randomised process (run by an automated scheduler) for allocating mobile camera operations across operation sites with research evidence showing greater compliance with the scheduler by police being associated with greater crash reductions.

The objectives of the current analysis were to estimate the potential road safety benefits of expanding the NSW mobile speed camera program. Expansion was considered both in terms of the hours of operation of the cameras as well as changing the mode of operation of the program with respect to signage to increase the geographical area of influence impacted by each camera site. In terms of increasing the hours of operation of the program, expansion of the current 7,000 hours per month of camera deployment to 10,500, 13,000 and 21,000 hours per month has been considered. This component of the expansion has been considered not as additional enforcement at existing camera sites but as a proportionate expansion of the locations used for enforcement assuming the same average enforcement density (enforcement hours per site). Three different modes of operation of the program with respect to signage were considered. The first is expansion using the current NSW signage regime (overt operations) assuming crash effects are contained to within 250m of the camera site. The second considers using the Queensland model for signage, still largely overt but with identification of the camera vehicle, assuming crash effects are contained to within 1km of the camera site. The final scenario considers the benefits of moving to a covert program with no signage or other identification of camera locations paralleling the Victorian program. For this final scenario, rather than assuming crash effects spread across the whole state, it has been assumed instead that effects spread across the entire road length chosen for enforcement as distinct from only sites where cameras are placed within the road length.

In summary, the expansion scenarios considered are as follows:

| **Deployment Model** | **Hours of deployment (per month)** |
|---|---|
| New South Wales (overt, signage at 50m & 250m from camera, crash effects within signed area) | 7,000 (current program)<br>10,500<br>13,000<br>21,000 |
| Queensland (largely overt, identified vehicle, crash effect within 1000m of camera site) | 7,000<br>10,500<br>13,000<br>21,000 |
| Victoria (covert, crash effect across whole of enforced road length) | 7,000<br>10,500<br>13,000<br>21,000 |

## DATA

NSW CRS provided data on the NSW mobile speed camera program including the road lengths enforced, the date from which they were first enforced and the crash populations which existed at the enforced sites before they were enforced. For sites first enforced prior to 2017, data on the full

set of 640 enforced lengths was provided. These lengths covered a total of 8,401km of the NSW road network with an average enforced road segment length of 13.1km. From 2017, the NSW mobile camera program geographical coverage was expanded to cover 1,024 road lengths. No individual or total road lengths were available for the new sites added from 2017. Of the total 1,024 road lengths on which mobile cameras were operated, 296 were in metropolitan Sydney whilst the remaining 728 were in the remainder of the state. Within the 1,024 road lengths enforced by mobile speed cameras in NSW, there are 2,493 sites at which cameras are placed for operation, an average of 2.4 operational sites per enforced road length.

Crash data on each enforced road segment was provided by TfNSW CRS covering the 5 years prior to enforcement of each road length. Fatalities and serious injuries on these segments were the primary focus of the analysis. Across the 1,024 enforced road segments, an average of 119.4 fatalities and 2,134 serious injuries a year occurred on the road lengths. TfNSW CRS also provided data on crashes within 250m of the camera sites, the parts of the enforced road segments covered by the camera signage. Within these areas an average of 22.4 fatalities per year and 310.4 serious injuries per year occurred.

Estimating the road safety benefits of the NSW mobile speed camera program requires the use of estimated crash reductions associated with program outputs. The most robust estimates of likely crash effects associated with the NSW mobile speed camera program as it is currently implemented and that are likely to be achieved under the proposed expansion scenarios come from robust evaluation evidence of the impacts of mobile speed camera programs operational in other jurisdictions. The mobile speed camera program most similar to NSW that has been comprehensively evaluated is that in Queensland. Specifically, results from the most recent evaluation of the Queensland mobile speed camera program have been used (Newstead 2017) which give average estimated crash reductions associated with the Queensland program over the years 2014-15 along with statistical 95% confidence limits. It should be noted in this study that crash effects were estimated for fatal and serious injury crashes combined and not separately so the same effect has been assumed for fatal and serious injury crashes as well as for fatalities and serious injuries resulting from these crashes. Estimates of crash reductions from the Queensland study are summarised in Table 1.

*Table 1: Crash Reduction from Queensland mobile camera evaluation 2014-2015*

| | % Crash Reduction | Lower 95% CL | Upper 95% CL |
|---|---|---|---|
| Fatal | 28.5% | 22.4% | 33.3% |
| SI | 28.5% | 22.4% | 33.3% |
| Casualty | 28.5% | 24.4% | 32.0% |

# METHODOLOGY

To estimate the road safety benefits of various expansion options for the NSW mobile speed camera program, a number of assumptions regarding the nature of the expansion needed to be made to establish a viable methodology. Key assumptions made were:

- Any expansion of the program would involve the enforcement of additional road segments, with the increase in the number of road segments enforced proportionate to the increase in the number of hours enforced. This means that the enforcement density in terms of hours enforced per road segment remains constant.

- Any increase in geographical area influenced by the mobile speed cameras through either changing the signage policy or including additional enforced road lengths in the program would achieve the same crash reduction benefits on the newly enforced areas as given in Table 1.
- The proportionate coverage of fatalities or serious injuries of the total NSW fatal or serious injury population from road crashes per area covered by enforcement will remain the same for any additional road lengths chosen to enforce in any expansion of the program (the current program covers around 6% of the NSW fatality population and 2.9% of the serious injury population.

Data provided gives the coverage of the fatal and serious injury crashes by the NSW mobile speed camera program under the current signage regime (250m from a camera site - known as the NSW method) and on the whole enforced road length (known as the Victorian method). Crash coverage of the program assuming a 1000m halo of influence form the camera site (known as the Queensland method) was not available in the data so was assumed to be 4 times the NSW method coverage.

The following methodology was used to estimate the fatal and serious injury reductions associated with both changing the enforcement method of the current NSW mobile camera program to either the Queensland or Victorian methods, and expanding the geographical coverage of the program at the same enforcement density by increasing the operation hours from the current 7,000 per month to 10,500 per month, 13,000 per month or 21,000 per month. For each enforcement method considered, the incremental benefits of increasing monthly enforcement hours between *a* and *b* was estimated by the following equation:

$$S_b = CRF \; x \; COV \; x \; POOL_b \; x \; \frac{(H_b - H_a)}{H_a}$$

In the equation, *CRF* is the crash reduction factor from Table 1, *COV* is the proportion of the crash population covered by the program (estimated from the NSW method at the current 7,000 hours per month), $POOL_b$ is the remaining crash pool at enforcement level *b* after subtracting the crash pool already covered at enforcement level a (= $POOL_a - S_a$) and $H_a$ and $H_b$ are the hours of enforcement at levels *a* and *b*. To estimate the total fatality or serious injury savings at an enforcement hour level, the incremental benefits across all levels from 7,000 hours per month to that level are added. For example, the total benefits at 21,000 hour per month will be the sum of incremental benefits from steps 7,000 to 10,500, 10,500 to 13,000 and 13,000 to 21,000 hours. Incremental benefits have been used to sum to the total benefits rather than estimating a single increase from 7,000 hours to reflect the diminishing potential of the program in absolute savings as it expands.

## RESULTS

Using the methodology described above, the incremental benefits of expanding the NSW mobile speed camera program from the current 7,000 hours per month to 10,500, 13,000 and 21,000 hours per month have been estimated. The current NSW method of enforcement (signs 250m before the camera site) has been considered along with the Queensland method (single sign at camera site) and the Victorian method (no signage, covert cameras). All incremental benefits are expressed relative to the current NSW method at 7,000 hour per month (hence the zero benefit estimate in this cell). Estimated incremental benefits for fatalities are presented in Table 2. Measures presented in Table 2 for each level of enforcement include the fatality pool covered by the incremental expansion of the program, the residual total fatality pool across the state, the percentage of the residual pool covered

by the incremental camera expansion and the fatality savings in the residual pool coverage based on the estimated camera effectiveness with 95% confidence limits.

*Table 2: Incremental fatality savings associated with expansion of the NSW mobile speed camera program under various operational scenarios*

| | | | **Incremental benefits above current practice (7,000 hours NSW method) with each increase** | | | |
|---|---|---|---|---|---|---|
| | | | Monthly Hours | | | |
| Deployment Model | Distance from camera on enforced road length impacted | Measure | 7,000 | 10,500 | 13,000 | 21,000 |
| NSW (overt, signage at 50m & 250m from camera, crash effects within signed area) | 250m | Fatality Pool Covered | 22.4 | 10.5 | 4.9 | 12.4 |
| | | Total Fatal pool (residual) | 372 | 349.6 | 339.07 | 334.21 |
| | | % Total Residual Covered | 6.02% | 3.01% | 1.43% | 3.71% |
| | | Fatal Savings | 0.00 | 3.00 | 1.39 | 3.53 |
| | | *Lower Bound* | 0.00 | 2.36 | 1.09 | 2.77 |
| | | *Upper Bound* | 0.00 | 3.51 | 1.62 | 4.12 |
| QLD (largely overt, identified vehicle, crash effect within 1000m of camera site) | 1,000m | Fatality Pool Covered | 89.6 | 34.0 | 14.2 | 34.7 |
| | | Total Fatal pool (residual) | 372 | 282.4 | 248.39 | 234.15 |
| | | % Total Residual Covered | 24.09% | 12.04% | 5.73% | 14.82% |
| | | Fatal Savings | 19.15 | 9.69 | 4.06 | 9.89 |
| | | *Lower Bound* | 15.05 | 7.62 | 3.19 | 7.77 |
| | | *Upper Bound* | 22.38 | 11.33 | 4.74 | 11.56 |
| VIC (covert, crash effect across whole of enforced road length) | Whole Rd Length | Fatality Pool Covered | 119.4 | 40.5 | 16.2 | 38.7 |
| | | Total Fatal pool (residual) | 372 | 252.6 | 212.06 | 195.86 |
| | | % Total Residual Covered | 32.10% | 16.05% | 7.64% | 19.75% |
| | | Fatal Savings | 27.65 | 11.55 | 4.62 | 11.03 |
| | | *Lower Bound* | 21.73 | 9.08 | 3.63 | 8.67 |
| | | *Upper Bound* | 32.30 | 13.50 | 5.40 | 12.88 |

Table 3 presents the corresponding cumulative benefits obtained by summing the incremental additional benefits across all incremental increases up to the enforcement hours of interest. The black boxes show the estimated fatality savings below which are the 95% confidence limits on the estimates. For example, expanding the NSW mobile speed camera program to 21,000 hours of enforcement per month using the current NSW method of signage is estimated to save 7.92 fatalities per annum with 95% confidence limit (6.22, 9.25).

*Table 3: Cumulative fatality savings associated with expansion of the NSW mobile speed camera program under various operational scenarios*

| | | | Cumulative benefits with each increase | | | |
|---|---|---|---|---|---|---|
| Deployment Model | Distance from camera on enforced road length impacted | Measure | 7,000 Hours | 10,500 Hours | 13,000 Hours | 21,000 Hours |
| NSW (overt, signage at 50m & 250m from camera, crash effects within signed area) | 250m | Fatality Pool Covered | 22.40 | 32.93 | 37.79 | 50.17 |
| | | Total Fatalities | 372 | 372 | 372 | 372 |
| | | % Total Fatalities Covered | 6.02% | 8.85% | 10.16% | 13.49% |
| | | Annual Fatalities Saved | 0.00 | 3.00 | 4.39 | 7.91 |
| | | *Lower Bound* | 0.00 | 2.36 | 3.45 | 6.22 |
| | | *Upper Bound* | 0.00 | 3.51 | 5.12 | 9.25 |
| QLD (largely overt, identified vehicle, crash effect within 1000m of camera site) | 1,000m | Fatality Pool | 89.60 | 123.61 | 137.85 | 172.56 |
| | | Total Fatalities | 372 | 372 | 372 | 372 |
| | | % Total Fatalities Covered | 24.09% | 33.23% | 37.06% | 46.39% |
| | | Annual Fatalities Saved | 19.15 | 28.84 | 32.90 | 42.80 |
| | | *Lower Bound* | 15.05 | 22.67 | 25.86 | 33.64 |
| | | *Upper Bound* | 22.38 | 33.70 | 38.45 | 50.00 |
| VIC (covert, crash effect across whole of enforced road length) | Whole Rd Length | Fatality Pool | 119.40 | 159.94 | 176.14 | 214.83 |
| | | Total Fatalities | 372 | 372 | 372 | 372 |
| | | % Total Fatalities Covered | 32.10% | 42.99% | 47.35% | 57.75% |
| | | Annual Fatalities Saved | 27.65 | 39.20 | 43.82 | 54.84 |
| | | *Lower Bound* | 21.73 | 30.81 | 34.44 | 43.10 |
| | | *Upper Bound* | 32.30 | 45.80 | 51.20 | 64.08 |

Tables 4 and 5 provide the analogous estimates to Tables 2 and 3 for serious injuries. Interpretation of Tables 4 and 5 is the same as for Tables 2 and 3. It should be noted that the serious injury data is based upon that resulting from crashes reported to police and recorded in Crashlink. Serious injuries from unreported crashes are not included in the tables.

*Table 4: Incremental serious injury savings associated with expansion of the NSW mobile speed camera program under various operational scenarios*

| | | | **Incremental benefits above current practice (7,000 hours NSW method) with each increase** Monthly Hours | | | |
|---|---|---|---|---|---|---|
| Deployment Model | Distance from camera on enforced road length impacted | | 7,000 | 10,500 | 13,000 | 21,000 |
| NSW (overt, signage at 50m & 250m from camera, crash effects within signed area) | 250m | SI Pool Covered | 310.4 | 150.8 | 70.8 | 181.7 |
| | | Total SI pool (residual) | 10,868 | 10,557.6 | 10,406.83 | 10,336.06 |
| | | % Total Residual Covered | 2.86% | 1.43% | 0.68% | 1.76% |
| | | SI Savings | 0.00 | 42.97 | 20.17 | 51.77 |
| | | *Lower Bound* | 0.00 | 33.77 | 15.85 | 40.69 |
| | | *Upper Bound* | 0.00 | 50.21 | 23.57 | 60.49 |
| QLD (largely overt, identified vehicle, crash effect within 1000m of camera site) | 1,000m | Pool Covered | 1241.6 | 549.9 | 246.9 | 620.8 |
| | | Total SI pool (residual) | 10,868 | 9,626.4 | 9,076.52 | 8,829.63 |
| | | % Total Residual Covered | 11.42% | 5.71% | 2.72% | 7.03% |
| | | SI Savings | 265.39 | 156.72 | 70.36 | 176.92 |
| | | *Lower Bound* | 208.59 | 123.17 | 55.30 | 139.05 |
| | | *Upper Bound* | 310.09 | 183.11 | 82.21 | 206.71 |
| VIC (covert, crash effect across whole of enforced road length) | Whole Rd Length | Pool Covered | 2134 | 857.5 | 368.2 | 907.3 |
| | | Total SI pool (residual) | 10,868 | 8,734 | 7,876.51 | 7,508.27 |
| | | % Total Residual Covered | 19.64% | 9.82% | 4.68% | 12.08% |
| | | SI Savings | 519.73 | 244.38 | 104.95 | 258.57 |
| | | *Lower Bound* | 408.49 | 192.08 | 82.49 | 203.23 |
| | | *Upper Bound* | 607.26 | 285.54 | 122.62 | 302.12 |

*Table 5: Cumulative serious injury savings associated with expansion of the NSW mobile speed camera program under various operational scenarios*

| Deployment Model | Distance from camera on enforced road length impacted | | Cumulative benefits with each increase | | | |
|---|---|---|---|---|---|---|
| | | | 7,000 Hours | 10,500 Hours | 13,000 Hours | 21,000 Hours |
| NSW (overt, signage at 50m & 250m from camera, crash effects within signed area) | 250m | SI Pool | 310.40 | 461.17 | 531.94 | 713.60 |
| | | Total SI | 10,868 | 10,868 | 10,868 | 10,868 |
| | | % Total SI Covered | 2.86% | 4.24% | 4.89% | 6.57% |
| | | Annual SI Saved | 0.00 | 42.97 | 63.14 | 114.91 |
| | | *Lower Bound* | 0.00 | 33.77 | 49.62 | 90.32 |
| | | *Upper Bound* | 0.00 | 50.21 | 73.77 | 134.27 |
| QLD (largely overt, identified vehicle, crash effect within 1000m of camera site) | 1,000m | SI Pool | 1,241.60 | 1,791.48 | 2,038.37 | 2,659.12 |
| | | Total SI | 10868 | 10868 | 10868 | 10868 |
| | | % Total SI Covered | 11.42% | 16.48% | 18.76% | 24.47% |
| | | Annual SI Saved | 265.39 | 422.11 | 492.47 | 669.39 |
| | | *Lower Bound* | 208.59 | 331.76 | 387.06 | 526.11 |
| | | *Upper Bound* | 310.09 | 493.20 | 575.41 | 782.12 |
| VIC (covert, crash effect across whole of enforced road length) | Whole Rd Length | SI Pool | 2,134.00 | 2,991.49 | 3,359.73 | 4,266.99 |
| | | Total SI | 10868 | 10868 | 10868 | 10868 |
| | | % Total SI Covered | 19.64% | 27.53% | 30.91% | 39.26% |
| | | Annual SI Saved | 519.73 | 764.11 | 869.06 | 1127.63 |
| | | *Lower Bound* | 408.49 | 600.56 | 683.05 | 886.28 |
| | | *Upper Bound* | 607.26 | 892.80 | 1,015.43 | 1,317.54 |

# CONCLUSIONS

Analysis presented in this paper has estimated the potential road safety benefits in terms of reduced fatalities and serious injuries from expanding the NSW mobile speed camera program. Expansion has been considered firstly in terms of the number of road lengths enforced under the program at the current hours of enforcement per site, increasing the coverage up to 3-fold by trebling the number of hours the cameras are used. It has also considered the potential injury savings from increasing the actual proportion of the enforced road lengths which are influenced by camera operations through changing signage used to identify the cameras from the current highly visible signage 250m and 50m from the camera currently used in NSW, to the Queensland model of an identifiable camera vehicle to a fully covert program such as used in Victoria.

Based the analysis methodology developed and overlaying the crash effects estimated from rigorous evaluations of mobile speed camera programs in other jurisdictions, the following potential fatality and injury savings were estimated for the NSW mobile speed camera program relative to the current program benefit using signage at 250m and 50m with 7,000 hours of camera enforcement per month:

| Deployment Model | | Number of camera enforcement hours per month | | | |
|---|---|---|---|---|---|
| | | 7,000 Hours | 10,500 Hours | 13,000 Hours | 21,000 Hours |
| Current NSW (overt, signage at 50m & 250m from camera, crash effects within signed area) | Annual Fatality Savings | 0.00 | 3.00 | 4.39 | 7.91 |
| | Annual SI Savings | 0.00 | 42.97 | 63.14 | 114.91 |
| | F + SI cost savings | $0 | $44,563,815.45 | $65,306,357.11 | $118,344,046.39 |
| Queensland (largely overt, identified vehicle, crash effect within 1000m of camera site) | Annual Fatality Savings | 19.15 | 28.84 | 32.90 | 42.80 |
| | Annual SI Savings | 265.39 | 422.11 | 492.47 | 669.39 |
| | F + SI cost savings | $280,082,350.08 | $432,938,697.08 | $499,304,214.70 | $663,715,409.21 |
| Victoria (covert, crash effect across whole of enforced road length) | Annual Fatality Savings | 27.65 | 39.20 | 43.82 | 54.84 |
| | Annual SI Savings | 519.73 | 764.11 | 869.06 | 1,127.63 |
| | F + SI cost savings | $472,044,379.49 | $682,799,064.19 | $770,647,824.09 | $984,342,026.49 |

In addition, the potential crash savings given in the above table have been converted into community cost savings based on the accepted per person cost estimates used by the NSW Government in valuing road trauma. The per person costs used have been estimated using the willingness to pay methodology being $7,752,786 per fatality and $495,874 per serious injury. As shown in the table, the value of estimated trauma savings across the scenarios explored range from $44M to $984M.

Whether these potential savings are ultimately realised through expansion of the program depends on a number of factors including the validity of the modelling assumptions and the way in which the program expansion is implemented. Implementation factors critical to realising benefits under the expansion include appropriate selection of new road lengths to enforce and the selection of actual sites within these to place the cameras. Adoption of the Victorian model will also likely involve the selection of additional sites for camera operations on the currently enforced road lengths. Appropriate scheduling of operations across existing and expansion sites using randomised scheduling within time and location is likely to be required to fully realise program benefits.

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