**Submission No 301**

# MOBILE SPEED CAMERA ENFORCEMENT PROGRAMS IN NSW

**Organisation:** Centre for Automotive Safety Research, University of Adelaide

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THE UNIVERSITY of ADELAIDE

CENTRE FOR AUTOMOTIVE SAFETY RESEARCH

**Submission by the Centre for Automotive Safety Research (CASR) to the Joint Standing Committee on Road Safety (Staysafe) inquiry into mobile speed camera enforcement programs in NSW.**

7 July 2021

The Centre for Automotive Safety Research (CASR) welcomes this opportunity to make a submission in relation to what we regard as a critical part of safe road network management and operation.

CASR is a multidisciplinary research centre based at the University of Adelaide. The Centre has a history of road safety research that can be traced back to the 1960s and currently engages in core research activities that include in-depth crash investigation, statistical modelling, data analysis and the operation of a crash test laboratory. CASR has provided significant scientific evidence over the years that has contributed to the adoption of improved speed management practices both in Australia and internationally.

One of our most significant areas of research has been the quantification of the relationship between travelling speed and injury crash risk. This work ultimately highlighted that even small changes in travelling speed can result in large changes in trauma outcomes (*Kloeden et al* 1997, 2001 and 2002). Therefore, even small reductions in travelling speed across the network are likely to lead to considerable reductions in trauma from road crashes. CASR is therefore supportive of any enforcement practices that result in reductions in travelling speed and by implication, improved compliance with posted speed limits. Speed cameras are a proven means for reducing road trauma and the greater the scale of operation, the larger the likely effect and benefit to community safety.

In relation to some of the specific areas of focus of this inquiry, the following summary highlights what CASR has identified in the research literature through some of our recent activity. We hope that the information proves useful.

We would encourage the committee to also check research from the other road safety research centres in other jurisdictions.

**Associate Professor Jeremy Woolley and Simon Raftery**
Centre for Automotive Safety Research
The University of Adelaide

## Mobile speed cameras

The use of automated technology to address safety concerns associated with speed has been widely adopted throughout Australia and the world for more than 30 years. The first Australian speed cameras were introduced in Victoria in the 1980's. Consequently, there has been considerable interest in the efficacy of this approach to enforcement, which has given rise to a large body of literature seeking to quantify the effects of various types of speed cameras on speed ($85^{th}$ percentile speeds, average speeds, speeding behaviour) and crashes (total, injury, killed and seriously injured (KSI), and fatal). The use of mobile speed cameras has been widely adopted within Australia and internationally.

There is a large body of evidence regarding the effects of the various types of automated speed enforcement, including mobile speed detection, which has been summarised in several meta-analytical reviews, the most recent of which was undertaken by Steinbach (2016). This review synthesised the evidence from 55 studies of both fixed and mobile cameras that employed either randomised controlled trials, interrupted time series analysis, or controlled before and after design to assess the impact on speeding, crashes, and/or crashes resulting in injury or death. The included studies were from a range of countries/regions including Australia, New Zealand, Canada and the USA, Hong Kong, South Korea, and several European countries including, among others, the UK, Norway, Denmark, The Netherlands, and Germany. The results of Steinback's (2016) review with regard to mobile speed enforcement and covert and overt enforcement practices are summarised in Table 1. This includes 95% confidence intervals (CI) and suggests which intervals provide a range within which there is a 95% chance that the observed effect would be found. The tighter the range the better, and a range that exceeds "1" indicates an insignificant finding (i.e., for a significant effect both values within the 95% CI should either be below or above 1).

Table 1 shows that mobile speed enforcement and both overt and covert enforcement activity reduces average vehicle speeds, the proportion of speeding vehicles, crashes in general, injury crashes, and fatal crashes. Further, the effects of overt and covert enforcement are largely comparable, however, in the case of average speed and injury crashes, the effects observed for covert enforcement are not statistically significant.

The goals of mobile speed enforcement are to manage driver behaviour by broadly deterring speeding in general (general deterrence) and by punishing speeding drivers to deter them from speeding in the future (specific deterrence). In general terms, overt enforcement has been demonstrated to reduce speeding and crashes, although this is typically localised to area in which the speed camera is used Christie et al., 2003; Gunarta & Kerr, 2005; Jones et al., 2009; Keall et al., 2002; Newstead & Cameron, 2013). Covert enforcement has the potential to extend the potential area of effect for speed enforcement as, in theory, locations are unknown such that enforcement could be undertaken anywhere and at any time. While this may benefit the general deterrent effect of mobile speed enforcement it is important that the public are made aware that such enforcement is underway.

Understanding the impact of speed enforcement on offenders (i.e., those that have been caught) is difficult as there is little research addressing this aspect of speed cameras. For example, Freeman et al. (2017) examined the deterrent effect of observing speed cameras on self-reported speeding and found that drivers who had been penalised for speeding were more likely to report higher frequency of speeding and also higher exposure to cameras. Such people may be more sensitive to speed enforcement and are more alert to the presence of enforcement (or what they think is enforcement)

in order to avoid it (Wundersitz et al., 2002), and also appear to be the least deterred by the presence of cameras, even after being penalised for previous offences. This aligns with other research showing those who receive a citation for speeding are twice as likely to receive a further citation (i.e., reoffend; Lawpoolsri et al., 2007). Despite greater exposure to speed cameras and having been penalised for speeding, speeding drivers did not differ from non-speeders in their perceived likelihood of detection (i.e., they perceived no greater risk) (Freeman et al., 2017).

*Table 1*
*Summary of findings from Steinbach (2016) for mobile, and overt or covert speed enforcement*

| Outcome measured | Enforcement type | Effect reduction | 95% CI | Consistency of findings |
|---|---|---|---|---|
| Average speed[a,b] | | 7% | 0.93 – 1.00 | H |
| | Overt | 6% | 0.93 – 0.94 | C |
| | Covert | 9% | 0.80 – 1.03 | H |
| Proportion of speeding vehicles[a] | | 59% | 0.33 – 0.50 | H |
| | Mobile | 41% | 0.34 – 1.02 | H |
| | Overt | 57% | 0.41 – 0.45 | C |
| | Covert | 56% | 0.24 – 0.82 | H |
| Crashes[a] | | 19% | 0.76 - 0.86 | H |
| | Mobile | 15% | 0.81 – 0.89 | C |
| | Overt | 19% | 0.75 – 0.87 | H |
| | Covert | 21% | 0.68 – 0.91 | C (2 studies) |
| Injury Crashes[a] | | 18% | 0.77 – 0.87 | C |
| | Mobile | 12% | 0.78 – 0.98 | C |
| | Overt | 20% | 0.75 – 0.85 | C |
| | Covert | 19% | 0.53 – 1.25 | 1 study |
| KSI crashes[a,b,c] | | 21% | 0.71 – 0.87 | C |
| | Mobile | 14% | 0.78 – 0.94 | C |

*Note.* CI = confidence interval; C = Consistent, H = Heterogenous; KSI = killed or seriously injured.
[a]Includes total effect of all types of automated speed enforcement (fixed, mobile, overt, covert, and urban, rural, and mixed locations. [b]All but one study of mobile cameras. [c]All studies of overt cameras and all of mixed urban-rural locations.

While the available evidence appears to indicate limited effectiveness of automated speed in terms of specific deterrence, the research in this area is insufficient to offer a definitive statement on this issue. Although specific deterrence may be lacking for some drivers, automated enforcement has other benefits in terms of the application of licence demerit points to habitual speeders. Research on the effects of demerit points has found that drivers who receive demerit points for driving offences are also more likely to accrue more demerit points in the future, but some drivers, when close to losing their licence due to accrual of demerit points, adjust their behaviour to avoid incurring more points (Sagberg & Ingebrigsten, 2018). Thus, it is possible that at some point the threat of further demerit points from an offence detected by automated technology may increase the specific deterrence of speed cameras. Additionally, the application of a licence sanction, such as suspension, due to the accrual of demerit points may prevent some from driving as has been observed for drink driving (Fell & Schere, 2017). The loss of licence due to demerit points also provides an opportunity for governing agencies to intervene and correct behaviour through appropriate rehabilitation programs (Klipp et al., 2013).

Determining the general deterrent effects of automated speed enforcement across the wider road network is problematic. While there is some possibility that mobile cameras, either overt or covert, may help create a general deterrent by instilling a belief that enforcement can occur anywhere at any time, it is difficult to measure this effect. The available literature assesses the effect of cameras at or near sites where cameras are used. While it is possible to measure speeds and analyse crash rates across the road network, the extent to which changes in these can be attributed to automated speed enforcement cannot be reliably determined as road safety can be influenced by a number of factors, such as traffic volumes, economic factors, other police activity (e.g., patrols, RBT), and public education/media campaigns.

Drawing on the evidence regarding the effectiveness of mobile speed enforcement identifies two clear approaches. First, overt enforcement is very successful at reducing speeds and associated harms where they are used. As such overt enforcement should be the primary strategy for locations and situations where it is important to slow vehicles and reduce crash risk, such as school zones, work zones, or locations with a high presence of vulnerable road users. Second, covert enforcement should be used to increase specific deterrence and target drivers who regularly speed. Where the public is aware that covert enforcement is in practise there is the potential to increase general deterrence across the road network as there is the potential for enforcement to be undertaken anywhere at any time.

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