

Speed cameras

Fixed and mobile cameras used to enforce speed limits, detect speeding vehicles and reduce road traffic collisions and injuries.

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Effect scale	Quality of evidence				
	Effect Impact on crime	Mechanism How it works	Moderator Where it works	Implementation How to do it	Economic cost
 Overall reduction	 Very strong	 Low	 Moderate	 Low	

Focus of the intervention

Both fixed and mobile speed cameras are used to enforce traffic speed limits, detect speeding vehicles, and reduce road traffic collisions and injuries that result from them.

Many countries have seen an increase in the use of automatic speed enforcement, using speed detection devices such as cameras. These may be monitored or unmonitored, mobile or fixed, and overt or covert.

Speed cameras mostly use speed sensors to trigger a camera to capture an image of any vehicle (and its number plate) travelling above a pre-set speed.

Modern systems use digital and video cameras and are able to transmit information over data networks.

Once the evidence has been reviewed and an offence verified, a notification is sent to the registered owner of the vehicle.

Sanctions for committing an offence can include licence points, driving bans, fines and driver awareness courses.

The focus of this review is on the use of speed cameras to prevent speeding, road traffic collisions, and injuries and fatalities resulting from road traffic collisions.

This narrative is based on one meta-analytic review covering 51 primary studies. Nine of the primary studies in the review were carried out in the UK, 11 from Australia and five from the USA. The remaining studies were carried out across a number of other countries, including Denmark, Finland, Germany, Spain, Hong Kong, Belgium, South Korea, Netherlands, New Zealand, Canada, Norway and Italy.

Effect – how effective is it?

Overall, the evidence suggests that the intervention has reduced crime.

The meta-analysis found that when compared to sites with no speed cameras, speed cameras led to reductions in:

- average speed (7%)
- proportion of vehicles exceeding the speed limit (52%)
- collisions (19%)
- collisions resulting in injury (18%)
- severe or fatal collisions (21%)

How strong is the evidence?

The review was sufficiently systematic that most forms of bias that could influence the study conclusions can be ruled out.

The evidence is taken from a systematic review covering 51 studies, which demonstrated a high-quality design in terms of having a transparent, and well-designed search strategy, featuring a valid statistical analysis, sufficiently assessing the risk of bias in the analysis and giving due consideration to the way outcomes were measured and combined.

The review did not explore the issue of publication bias.

Mechanism – how does it work?

Speed cameras are suggested to reduce crime through deterrence. This may operate in one of two ways.

- General deterrence – the threat of being caught and punished as a result of speed cameras discouraging potential offenders in the general population from speeding.
- Specific deterrence – the act of being caught and punished as a result of speed cameras discouraging active offenders from reoffending.

Two primary studies in the review reported diffusion of benefits (positive spill over or halo effects) from sites where the cameras were operating to the wider area.

One study reported a significant 21% reduction on a motorway without camera enforcement. The second reported significant crash reductions one kilometre upstream and downstream of camera locations.

One further primary study found some evidence that the crime reduction effects were concentrated within a short distance of camera sites.

Authors suggest that the diffusion of benefits might be indicative of general deterrence in operation.

Authors report one study speculated that covert cameras may increase the detection rate (due to drivers being unaware of their presence and driving at faster speeds) and therefore increase the specific deterrence effect. Increased fines were also assumed to increase specific deterrence.

The review authors note that it would be possible in principle to explore these mechanisms further, but that the original studies did not provide the necessary information to empirically test.

Moderators – in which contexts does it work best?

Suggested moderators included:

- road type
- speed limits
- setting (urban or rural)
- time of day
- weather

Primary studies only provided enough information to allow the review to empirically test one of these, which was whether an urban or rural setting influenced how effective speed cameras were.

The review notes that there was no evidence that the effects of speed cameras differed between urban and rural areas.

The review found some evidence of greater reductions in crashes when cameras were operating in rainy and wet conditions (one study).

Two primary studies reported that speed cameras had greater reductions on crashes during the day than at night and on weekdays than at weekends.

Implementation – what can be said about implementing this initiative?

The review noted that different methods of implementation might alter the way in which speeding behaviour is modified. For example, whether cameras are obviously visible (overt versus covert, and whether cameras are yellow or grey), whether they are fixed or mobile, and the levels of enforcement (operational hours and penalties issued).

Meta-analysis found no evidence that the effect of speed cameras on speeding behaviour or collisions differed by whether speed cameras were covert or overt.

The review notes that there was some evidence to suggest that fixed cameras had a greater effect on all road traffic crashes (from the meta-analysis of 15 studies) and those resulting in fatalities or severe injuries (from meta-analysis of 5 studies) than mobile cameras.

There was little information on further implementation factors in the primary studies.

Economic considerations – how much might it cost?

All of the primary studies that reported economic analyses conveyed positive outcomes, although their details were not comparable and could not therefore be synthesised in the review.

One primary study estimated a cost-benefit ratio alone, two estimated costs savings alone and three estimated both.

Primary studies typically collected data on crash costs, overall capital costs of scheme implementation, annual operating and maintenance costs, fine costs and ticketing revenue. Detailed costs such as costs per unit, personnel costs and administration of sanctions were not widely reported.

The cost of treatment saved (from casualties prevented) was reported in one primary study evaluating 56 mobile safety cameras in the UK Northumbria Police area. In this, an estimation of around £30,000 was saved in treatment costs alone over the two years of the study.

Cost-benefit ratios estimated that the benefits exceed the estimated costs of speed camera programmes by at least 3:1 and were larger when the time horizons were five years or more.

Comparisons of costs between speed camera programmes are difficult to make however, due to large variations in implementation.

General considerations

- The review notes that the primary studies differed widely in terms of quality, study periods, settings, length of follow-up, types of cameras evaluated and importantly, unreported factors (such as other road safety interventions occurring concurrently). Due to this variability, the exact size of the effects of speed cameras on speeding and crash outcomes must be interpreted with a degree of caution. However, there is good evidence that overall, the implementation of speed cameras is associated with reductions in speeding, collisions and associated injuries.

Summary

Overall, the evidence suggests that speed cameras can reduce traffic speed and road traffic collisions.

When compared to sites with no speed cameras, the meta-analysis found that speed cameras led to reductions in all measured outcomes. These measured outcomes were:

- average speed
- proportion of vehicles exceeding the speed limit
- collisions
- collisions resulting in injury
- severe or fatal collisions

There was some evidence that effects differed by type of speed camera (fixed or mobile) and no evidence for difference of effect between overt or covert cameras or between cameras in urban and rural areas.

There was some evidence that effects were greater within a short distance of camera sites compared to the wider areas.

Comparisons of costs between speed camera programmes were difficult to make. However, all primary studies that reported economic analyses conveyed positive outcomes.

Reviews

Reference

- Steinbach, R., Perkins, C., Edwards, P., Beechers, D., Roberts, I. (2016) [Speed cameras to reduce speeding traffic and road traffic injuries](#)

Summary prepared by

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