



The Effectiveness of Speed Cameras

A review of evidence

Executive Summary

Richard Allsop
November 2010



RAC
Foundation

The Royal Automobile Club Foundation for Motoring Limited is a charity which explores the economic, mobility, safety and environmental issues relating to roads and responsible road users. Independent and authoritative research, carried out for the public benefit, is central to the Foundation's activities.

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About the author

Professor Richard Allsop has extensive experience of research, training and advisory work on road safety, traffic management and other aspects of transport policy. He has a first in Mathematics from Cambridge, and a PhD and DSc from UCL (University College London), where he is Emeritus Professor of Transport Studies, having been Professor since 1976 and Director between then and 1997 of what is now the Centre for Transport Studies.

He has a longstanding involvement in road safety research and policy, including being a Director of PACTS (the Parliamentary Advisory Council for Transport Safety). He is a Board Member of the European Transport Safety Council (ETSC) and leads its European road safety performance index programme PIN. He has also provided inputs to road safety policy in Australia, Hong Kong, Japan, New Zealand and Poland.

He was made an OBE in 1997 for services to traffic management and road safety, is a Fellow of the Royal Academy of Engineering and holds the IHT Award for professional excellence.

Please visit the RAC Foundation website at www.racfoundation.org and click on 'Research' to download a full copy of the report.

Foreword

If there is one subject which divides drivers like no other it is speed cameras. Are they a mechanism for saving life or a method of raising revenue? Have they, as some contend, actually increased the casualties on our roads?

What follows in the body of this report is a thorough, independent, statistical evaluation of the facts as we have them.

It is not a simple read, because this is not a simple subject to analyse, yet the conclusions of Professor Richard Allsop of University College London are strikingly clear: fixed and mobile speed cameras save lives; and a lot of them.



The current crisis in funding for speed cameras – and road safety in general – leaves road users at real risk. Put more starkly; the overwhelming evidence is that if speed cameras were to be decommissioned across Great Britain then about 800 more people per year could be killed or seriously injured. This country should be proud of the progress it has made in reducing deaths on the roads over recent years. However there is a real risk of this trend being reversed if we do not find the funds to continue operating cameras or some equally effective alternative.

Professor Allsop has no axe to grind and no vested interest in the success of speed cameras. He is a respected academic with many years of analytical experience in this field; hence the reason the RAC Foundation approached him to undertake this study.

Professor Allsop has looked at data from a range of speed camera efficacy studies. He has also examined previously unpublished information from a number of road safety partnerships. The findings are unambiguous. Cameras have historically saved lives. They continue to save lives. And should they be removed, speeds will rise and so will accidents.

Professor Allsop's work also demonstrates that cameras are not significant revenue raisers for the general Exchequer. In 2006-7 for example, from each £60 penalty notice, there was a mere £4 surplus after the cost of camera operations was met.

Other researchers looking at the efficacy of speed cameras have reached similar conclusions. In October 2010 the Cochrane Review of 35 studies into

their effectiveness worldwide said that while different methodologies meant an order of magnitude was impossible to deduce:

‘... the consistency of reported reductions in speed and crash outcomes across all studies show that speed cameras are a worthwhile intervention for reducing the number of road traffic injuries and deaths.’

While this report fully lays out the background to the introduction of speed cameras and the need for speed limits, its job is not to justify why the national limits are what they are; a review of speed limits to see whether they are soundly based is for another day. What it has done is show that at cameras sites, speeds have been reduced, and as a result, collisions resulting in injuries have fallen.

The government has said a decision on whether speed cameras should be funded must be taken at a local level. With the pressure on public funds there will be – indeed they already are – those who say that what little money there is can be better spent. This report begs to differ. The devices are already there; they demonstrate value for money, yet are not significant revenue raisers for Treasury; they are shown to save lives; and despite the headlines, most people accept the need for them.

Speed cameras should never be the only weapon in the road safety armoury, but nor should they be absent from the battle.



Professor Stephen Glaister
Director
RAC Foundation

Executive Summary

Background

Speed cameras were first used for enforcement in Great Britain in 1992 as recommended by a review of road traffic law in 1988. Their rollout was accelerated between 2001 and 2005 in a national safety camera programme under the 'safer speeds' theme of the road safety strategy 2000-2010. Speed camera partnerships – joint ventures between police forces, highway authorities and magistrates' courts – were formed to do this and have since taken on a wider role as road safety partnerships.

Sources of information

This report pulls together a range of analyses on the effectiveness of speed cameras, and some more recent data, to provide a considered and comprehensive assessment of their contribution to road safety. The sources of information include the four-year camera evaluation report published in December 2005; related work by Mountain, Hirst and Maher; studies in London; national statistics on traffic speeds, collisions and casualties and international research on relations between them; and recent figures from road safety partnerships.

Changes in speed

The four-year evaluation report mentioned above looked at 2000 sites (urban and rural, using fixed and mobile cameras) where speed measurements were taken both before and after camera deployment. Analysis showed that once the cameras were operational there was:

- a substantial improvement in compliance with speed limits;
- a particular reduction in extreme speeding;
- a marked reduction in average speed at fixed sites; and
- an appreciable, though more modest, reduction at mobile sites

Casualty reduction at speed camera sites

But these changes in speed are not an end in themselves. The laws of motion imply that lower speeds just before and at the instant of collisions are associated with more time for drivers to take avoiding or mitigating action, lesser exchange of energy and momentum during the collisions, and consequently lower forces imposed on the bodies of people involved and lower severities of injury.

It is clear that collisions and casualties decreased substantially at the more than 4000 sites covered by the four-year evaluation. However, not all of the decrease can be attributed to the speed cameras.

Some decrease would have been expected because of the downward national trend in casualty numbers. Another part of the reduction is likely to have resulted from the phenomenon of Regression to the Mean (RTM). This is because many cameras were installed at sites which had just previously had untypically high numbers of casualties, and this would have happened partly by chance and only partly because of inherently dangerous conditions at those sites. The numbers of casualties would therefore have been expected to fall anyway due to the effect of RTM. Allowance for RTM is important but hard to estimate.

Some of the reduction might also have been attributable to drivers diverting to avoid cameras, but the overall reduction might well have been greater had it not been for some collisions being caused by drivers suddenly braking and then accelerating in the vicinity of cameras.

But after working in all these factors, the judgement can be made that in the year ending March 2004, camera operations at more than 4,000 sites across Great Britain prevented some 3,600 personal injury collisions (PIC), saving around 1,000 people from being killed or seriously injured (KSI):

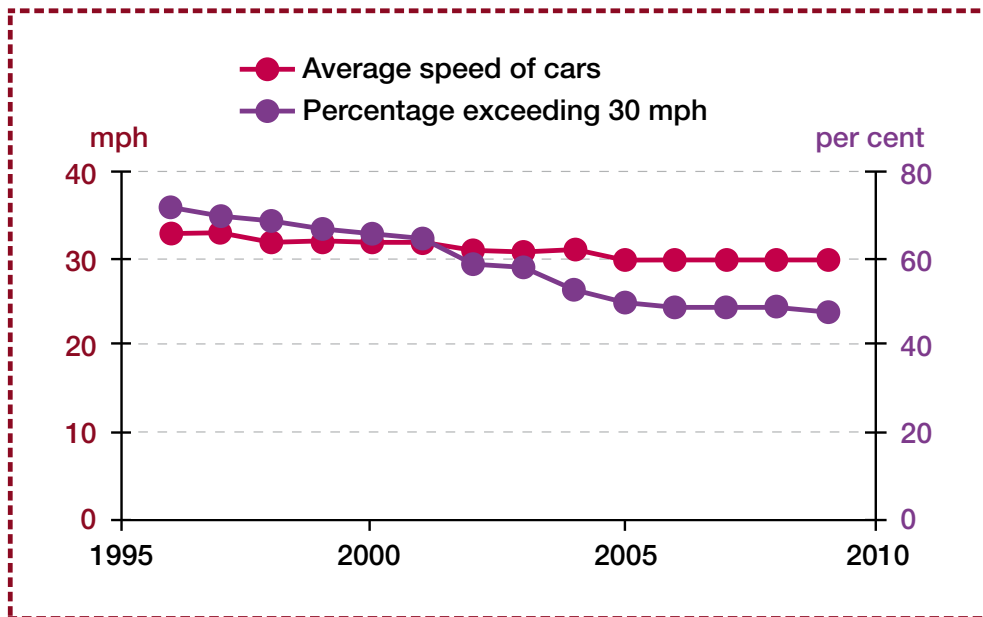
Type of site	Number prevented in year ending March 2004	
	PIC	KSI
Fixed urban	Between 1700 and 2200	Between 500 and 560
Fixed rural	Between 170 and 300	Between 60 and 140
Mobile urban	Between 1000 and 1400	Between 150 and 400
Mobile rural	Between 180 and 300	Between 90 and 200
All sites	Between 3050 and 4200	Between 800 and 1300

These figures are broadly consistent with what one might expect to see at sites like these in light of the internationally accepted Power Model of the relationships between changes in numbers of collisions and casualties on a stretch of road and changes in the average speed of traffic.

Wider changes in speed and numbers of casualties on all roads

National speed surveys show that in free-flowing traffic on all roads with a 30 mph limit, the average speed of cars fell from 33 to 30 mph between 1997 and 2005. The proportion exceeding the limit also fell. While there have been other moderating influences on speed such as traffic calming and public information campaigns, the period of steepest decline (between 2001 and

2005) in the proportion of drivers exceeding the 30 mph limit coincided with the rollout of camera enforcement:



Trends in average speed of cars and percentage exceeding the speed limit in free-flowing traffic on roads with a 30 mph limit

There is no evidence of counterpart reductions in speed between 1997 and 2005 on roads with speed limits higher than 30 mph. However, numbers of casualties fell similarly on both urban and rural roads. A major contributor to casualty reduction in both cases has been improved car occupant protection. Whilst car drivers and passengers made up two-thirds of casualties on rural roads they made up only one-third on urban roads. So a bigger reduction might have been expected on rural than on urban roads because of improved occupant protection. The decrease in speeds and speeding on 30 mph roads may well have helped the fall in casualties on urban roads to match that on rural roads.

The key findings of this report

- Deployment of speed cameras leads to appreciable reductions in speed in the vicinity of the cameras and substantial reductions in collisions and casualties there over and above the likely effects of regression to the mean.
- Reductions in collisions and casualties differ between fixed and mobile, and between urban and rural camera sites. Judging from the evidence, the operation of cameras at over 4,000 sites of all types resulted in around 1,000 fewer people being killed or seriously injured in the vicinity of cameras in the year ending March 2004.
- National surveys indicate clear and sustained falls in the average speeds of cars on 30 mph roads, and in the proportion of cars exceeding the limit, which are likely to have contributed to concurrent reductions in collisions and casualties on built-up roads.

- The evidence from a study in West London is that speed cameras led to a reduction in casualties not only at camera sites, but across the wider road network.
- Majority public acceptance of cameras was widespread at the height of the national camera safety programme. Subsequent annual surveys by the AA indicate that it has remained so, with three-quarters of those questioned in October 2010 regarding the use of cameras as acceptable.
- Increases in speeds and speeding at various sites where cameras were visibly out of action have been recorded over the years since 2004.
- Data for 2007-2009 supplied by a number of road safety partnerships, while not covering the whole country, suggests that big falls in fatal or serious casualties at camera sites have persisted over time.
- National decommissioning could result in about 800 extra people across Great Britain being killed or seriously injured each year.
- In the year ending March 2004 the benefit/cost ratio of camera enforcement was about 2.3. Data for 2006-07 shows the cost of camera enforcement was being covered by penalties paid by detected offenders with only a modest surplus to the Exchequer of less than £4 out of each £60 penalty paid.

This review is confined to the British experience of speed camera enforcement, but a recently updated *Cochrane Review* of 35 speed camera studies worldwide concluded:

‘...the consistency of reported reductions in speed and crash outcomes across all studies show that speed cameras are a worthwhile intervention for reducing the number of road traffic injuries and deaths.’

The findings of this review for the RAC Foundation, though reached independently, are essentially consistent with the Cochrane Review conclusions. They are also broadly consistent with the findings of a meta-analysis reported in the respected *Handbook of Road Safety Measures*, of 16 studies, not including the four-year evaluation report, of the effects of fixed cameras on numbers of collisions and casualties.



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