Exceeding the Limit: How Excessive Speeding Fines May Undermine Community Engagement with Government Road Safety Policies

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Exceeding the Limit: How Excessive Speeding Fines May Undermine Community Engagement with Government Road Safety Policies

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Executive Director's Note

Welcome to the forty third issue of *Economic Issues*, a series published by the South Australian Centre for Economic Studies as part of its Corporate Membership Program. The scope of Economic Issues is intended to be broad, limited only to topical, applied economic issues of relevance to South Australia and Australia. Within the scope, the intention is to focus on key issues – public policy issues, economic trends, economic events – and present an authoritative, expert analysis which contributes to both public understanding and debate. Papers will be published on a continuing basis, as topics present themselves and as resources allow.

This paper considers the public discussion on speeding fines and the contribution of road traffic fines in reducing road fatalities. Penalties of this nature have a role to play as does driver training, driver behaviour and attitude to road safety, although on-board car safety features and improvements to the quality of our roads are also significant contributors to road safety. It is well to remember that reinforcement or reward is much more likely to lead to sustainable changes in behaviour than punishment. It is argued that an over-emphasis on traffic policing through the use of fines reinforces the public perception of revenue raising; potentially dilutes the road safety message; and, diminishes the authority of government.

The authors of this paper are Associate Professor Michael O'Neil (Executive Director) and Lauren Kaye (Research Economist) of the SA Centre for Economic Studies. The paper draws from a number of recent research papers prepared by SACES and our Research Associates. The views expressed in the report are the views of the authors.

Michael O'Neil
Executive Director
SA Centre for Economic Studies
June 2015

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Acronyms

ABS	Australian Bureau of Statistics
BITRE	Bureau of Infrastructure, Transport and Regional Economics (Commonwealth)
CASR	Centre for Automotive Safety Research, University of Adelaide
CPI	Consumer Price Index
DIER	Department of Infrastructure, Energy and Resources (Tasmania)
DPTI	Department of Planning, Transport and Infrastructure (South Australia)
km/h	kilometres per hour
ORS	Office of Road Safety (Western Australia)
RBT	Random Breath Testing
SACES	South Australian Centre for Economic Studies
SAPOL	South Australia Police
TAC	Transport Accident Commission (Victoria)

Overview

There is much public debate about the true purpose and the impact of fines for speeding. Despite the insistence that the purpose of speed and mobile camera fines is to reduce the commission of dangerous behaviours on our roads and, in turn, decrease the road toll, it seems there is an unshakeable public perception in many quarters that a significant part of road traffic policing reflects an over emphasis on revenue raising.

Since peaking in 1974 the number of road fatalities in South Australia (and Australia) has been on a downwards trend. That this is a national trend suggests the factors behind this trend are not jurisdiction specific. There have been a number of improvements in road safety and vehicle design over this period and these are outlined in the paper. Based purely on the ratio of total road fatalities to population, in 1974 in South Australia there was 1 road fatality for every 3,300 persons and in 2012 the ratio was 1 for every 17,682 persons.

Changes in driver behaviour can also have a positive impact on the road toll. These changes can be brought about through policies such as, positive reinforcement, punishments (demerit points, loss of licence, etc.) and the provision of information. However, Petroulias (2011) reported that 66 per cent of South Australians surveyed considered speeding fines to be revenue raising. The persistent and strong perception of "revenue raising" relative to "road safety objectives" carries a significant danger for government policy and the legitimacy of police efforts. It is time for a serious re-think of efforts to reduce the road toll that which is, in the final analysis, is likely to be critically dependent on driver training, driving behaviour and driver attitudes.

Public policy in seeking to influence behaviour is essentially based on the rational choice model of which one important element is the provision of information such that the individual/consumer/driver is then able to make a choice (in the face of rewards, punishments, sanctions, pleasure) that maximises their net benefit. Rewards are more likely to lead to sustainable changes in behaviour than punishment.

The provision of information has a role to play in the behaviour individuals chose to engage in (e.g. don't drink and drive as the likelihood of getting caught is high). There is every reason for example to provide information to drivers about the operation of mobile speed cameras as the object is to ensure motorists do not speed. However, given the high number of road fatalities on country and regional roads in areas where there are few speed cameras and the number of fatalities involving drivers aged over 70 years who are less prone to speeding, this suggests that approaches to road safety need to be rebalanced.

Suggestions for reform include:

- incentivising good driving begins with initial training and should be reinforced through rewards and penalties;
- two "new" offences – the use of mobile phones whilst driving and drug driving – should be vigorously and sensibly addressed similar to the drink driving campaign. Failure to wear a seatbelt is a known factor in road fatalities and should continue to attract high penalties;
- South Australian traffic fines should be indexed to inflation or changes in labour incomes;
- re-introduce visible signs to warn drivers that mobile speed detection devices are in use;
- the South Australian Government makes the basis for the calculation of fines public knowledge. This change would lead to a better public perception of the traffic fines system;
- information on demerit points should be readily available at no cost, so that the $22 fee can be abolished; and
- it is important in driver education that much greater information on driving to road and weather conditions, attentive driving, the wearing of seat belts and the danger of driving while under the influence of alcohol or drugs is provided through road safety campaigns. This would add, not dilute, the "speed can kill" message. One example of relevant information is that each year some 65 to 68 per cent of all road fatalities occur on regional and rural roads.

Re-inventing the Wheel

"Road crashes now kill 1.3 million people a year – 1.2 million in poor and middle income countries in 2011 compared with 99,000 in rich ones. For every 100,000 cars in the rich world, fewer than 15 people die each year.

Governments need to hammer home on billboards, radio and television that seatbelts and motorcycle helmets save lives – and to ensure that police and courts enforce laws against speeding and driving while drunk.

Higher vehicle standards (and other safety features in vehicles and in road design) are a big reason for falling death rates in the rich world."

Source: *The Economist*
25-31 January 2014, p. 10, 50

Why real police are needed to slow down speeders

Deterrents simply aren't deterring drivers from irresponsible behaviour and the number of unpaid fines just keeps mounting up.

… a speeding notice in the mail. But here's the thing – it does little to change driver behaviour and it does not have any effect on the carnage on our roads. Put a visible police presence on the roads and people change their behaviour.

There is no question that fines are a very ineffective deterrent to irresponsible road behaviour. They work for some, including governments, which enjoy the revenue.

… the number of unpaid infringement notices are in the billions … in Western Australia thousands of people owe more than $259 million, in South Australia the total is $215 million, Queensland $774 million, in Victoria $850 million.

Source: Paul Murrell, *The New Daily*
6 February, 2014

Four big factors

The decline in road fatalities in South Australia commenced in 1974 from a high of 382 to 94 in 2014; from a ratio of 1 road fatality for every 3,300 persons to 1 for every 17,682 persons. The four major contributing factors have been the compulsory wearing of seat belts, the introduction of random breath testing, improved vehicle design and safety features and improved road design including specific programs such as the black spot safety program.

Taken together they each illustrate the contribution of legislation, active policing, automotive engineering and civil construction engineering to improve road design.

SACES 2014

Google: the next development

Google has unveiled a self-driving car with no steering wheel or pedals. Instead, the electric-powered two-seat bubble car has start and stop buttons along with a touch-screen monitor that shows occupants where they are going. The vehicle does not have a steering wheel, accelerator pedal, or brake pedal as software and sensors do all the work.

Engineers have limited the car's top speed to 40 km/h, and the first trial versions have manual controls allowing passengers to take over in case things go wrong. Foam-covered bumpers help minimise damage if a mishap occurs.

http://www.drive.com.au/action/printArticle?id=60081068

1. Introduction

Government seek to influence human behaviour for a number of reasons and in a number of ways. Traditional policy tools include "legislation, sanctions, regulations, taxes and subsidies, the provision of public services and information to modify behaviour in the public interest".[1] The excessive consumption of alcohol, gambling, smoking, drugs, obesity, criminal behaviour and driving on our roads are public policy targets in the specific sense that if over-consumption and negative behaviours are moderated then economic and social benefits will flow to the community.

... public policy should seek to maximise benefits ...

In recent times as part of the policy armoury to influence behaviour, governments and private industry have swung the pendulum in favour of fines – fines for speeding, for a range of traffic infringements, for littering, for parking violations, and fines for late payment (e.g. Telstra, Energy Retailers, banking sector).

A fine, it is said, is designed to "register moral disapproval" (Sandel, 2013, p. 128). The essential characteristic of the fine is not on public display; it is not disciplinary nor carries any community sanction. Fines are an example of what Foucault (1975)[2] called regulatory power in the disciplinary society. O'Malley (2010) notes with respect to fines that:

> "individual identity and moral condemnation are of secondary importance in this process. With respect to the mass of traffic regulatory fines, the 'system' is almost totally anonymous − with offences being recorded, issued and often paid electronically. Many infringement notices are directed at what Deleuze (1995) calls 'dividuals', fragments of individuals frequently identified by binary codes for the purposes of control – the 'owner', the 'driver', the 'proprietor' and so on." (p. 367)

Fines for traffic offences have been reduced to largely a bureaucratic and administrative level; guilty as evidenced by the photograph (lawyers refer to this as reverse-onus) although an expiation notice is able to be contested in court. In the case of South Australia a fee (Victim of Crime Levy) has been included in addition to the actual fine. Revenue from traffic offences is partially subsidising victims of crime as adjudged through the criminal justice system.

... the term speeding is meaningless of itself ...

The term "speeding" has come to be an accepted term that underlies and justifies the policy of fines and penalties when in fact it is meaningless by itself with respect to road fatalities. "Excessive speed relative to the engineered capability of the road", "speed greater than the prevailing weather or road conditions would permit", "driving at a speed greater than the capabilities of the driver" describe and inform the reader and the authority as to one possible cause (as much as inattention, lack of concentration, falling asleep) of road accidents and fatalities. "Speeding" might tell you the recorded speed was 61 kilometres in a 60 kilometre zone or 100 kilometres in a 60 kilometre zone, the latter providing a more relevant insight into driving

behaviour and road safety. It is reasonable to both acknowledge that speeding in a motor vehicle can result in serious injury and road fatalities, but equally, it is reasonable to be sceptical of the oft-repeated "official statement" that speeding is the single most important factor in road fatalities.

... speeding is one contributing factor in road fatalities ...

In fact, the official statistics reveal that in approximately one-third of fatal accidents,[3] speed is a contributing factor (not necessarily the cause!) so we can deduce that speeding is a lesser factor in the remaining two-thirds of road fatalities. The 'one-third/two-third' estimate is likely to be a reasonable estimate, but it is just that − an estimate − as in many cases other factors are also relevant so that the evidence is inconclusive. Correspondence from the Department of Planning, Transport and Infrastructure (DPTI) in fact stated that "in 2013 speeding was a contributing factor in 26 per cent of fatal crashes in South Australia".[4] Because the system of speed cameras (fixed and mobile) are focussed on incidents of speed – not necessarily driving dangerously or incautiously – the public debate and regulatory attention is almost exclusively focussed on "speeding".

There is much public debate about the true purpose and the impact of fines for speeding. Despite the insistence that the purpose of speed and mobile camera fines is to reduce the commission of dangerous behaviours on our roads and in turn decrease the road toll, it seems there is an unshakeable public perception in many quarters that a significant part of road traffic policing reflects an over emphasis on revenue raising. Multiple factors contribute to this public perception including that officials frequently refer to the amount of revenue raised or expected to be raised from a new traffic monitoring installation or policing/surveillance activity rather than an expectation that lives will be saved and injury avoided so that the benefits will exceed the costs. For example, officials frequently refer to the "revenue lost" when a camera is vandalised and out of action for a period of time. Speed cameras have also been found to be located in areas with high traffic volume, but where there have been relatively few previous traffic-related casualties.

There is considerable research and agreement around those factors contributing to the decline in the number of fatalities on our roads both in Australia and internationally and in this paper we summarise some of the literature. Of particular interest is the growth in road traffic surveillance relative to other factors known to contribute to road fatalities, and in particular, the increasing use of technology to record traffic infringements and the deterrent effect of the level of fines.

Australia decreased its road toll by 28.5 per cent between 2000 and 2012 (IRTAD, 2014) with one contributing factor being the increase in the installation of fixed speed and traffic light cameras and the use of mobile speed cameras. In comparison Spain, Denmark, Portugal

… regional South Australia accounts for two-thirds of road fatalities …

and 11 other countries decreased their road toll by over 50 per cent (Cleary, 2015). In itself, this suggests other factors than simply speed are "at play" in reducing the road toll. Given South Australia's concentrated urban population, the two-thirds of all fatalities occurring in regional South Australia (Dillon, 2015) poses a number of questions. Is it the case that more accidents occur as people drive on unfamiliar rural and regional roads; does the quality of the road contribute to higher accident/fatality rates; does driver fatigue/concentration contribute to more accidents? It is possible that Australia's vast outback road network is contributing to smaller reductions in the road toll.

Road safety is everyone's business …

Research at the Centre for Automotive Safety Research (CASR) at the University of Adelaide shows the risk of exceeding the speed limit.

We acknowledge that the purpose of fines and penalties is to reduce the frequency with which people engage in dangerous driving behaviours and ultimately to reduce the number of fatalities and serious injuries on our roads. However, it is not only traffic fines which have led to the long term downward trend in our road toll.

This investigative paper is structured as follows. We commence with a review of the cost of road fatalities to the South Australian economy and acknowledge the significant economic and social impact that road fatalities have. We then review the long-term decline in road fatalities. The basis of traffic fines in South Australia is outlined and a brief comparison with other States is discussed. Selected national and interstate data is examined including the relative impact of fines and penalties.

The paper concludes with several suggestions to balance the important objectives of public policy, namely improving road safety, the role of government in influencing driver behaviour and ways to ensure the relationship of citizen to government and authority is strengthened.

2. Economic cost of road fatalities

Road crashes impose a significant cost to the economy, to families and the wider community. This cost is composed of readily quantifiable components such as premature death, funeral expenses, coronial investigation costs, prosecution of offenders, vehicle repair costs and emergency services costs as well as other costs which are less easy to quantify such as pain and suffering and lost productivity in the workplace due to disability. The cost of road crashes has been estimated using a hybrid human capital approach as explained in various Bureau of Infrastructure, Transport and Regional Economics (BITRE) publications.

… cost of road fatalities (2012) was $266 million …

In 2005, the University of Adelaide's Centre for Automotive Safety Research (CASR) estimated the cost of each fatality on South Australian roads at $1.75 million (2004 dollars). BITRE updated the estimate of CASR in 2009 and put the cost of each road fatality in Australia at approximately $2.4 million (in 2006 dollars). Accounting only for inflation[5] SACES estimate the cost of each road fatality in Australia in 2012 at $2.82 million dollars. With 94 fatalities on South Australian roads in 2012, the total cost of road fatalities to the South Australian economy in 2012 is estimated at a little over $265.5 million.[6]

Box 1: Economic cost of each fatality, South Australia ($m)

2004	2006	2012
1.75	2.4	2.82

Source: CASR (2005), BITRE (2009) and SACES calculations.

The estimate of $265.5 million is for fatalities only.[7] The total cost of road crashes is much larger than this as it includes non-fatal crashes. Costs of this magnitude demand attention from government. Indeed, the Department of Planning, Transport and Infrastructure estimates that road crashes in South Australia cost the community $1.7 billion (DPTI personal communication).

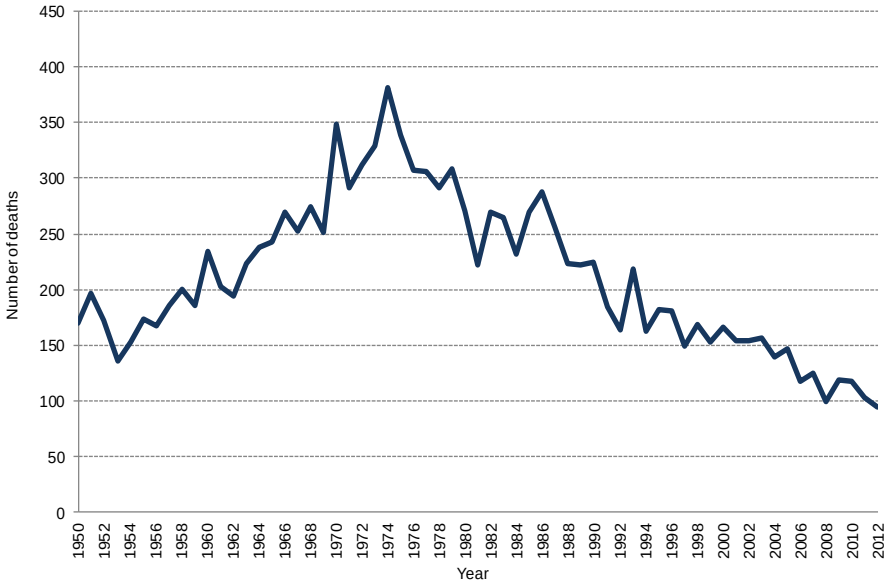
3. Long term decline in fatalities

… 382 fatalities in 1974; 94 in 2012 …

Figure 1 shows the trend in the road toll for South Australia from 1950 to 2012. The increase in the number of road fatalities in the period from 1950 to the mid-1970s corresponds with the expansion of vehicle ownership ("the age of the motor vehicle"), the surge in private relative to public transport and the congestion which came along with it. Since peaking at 382 in 1974 road fatalities have been trending downwards. Based purely on the ratio of total road fatalities to population, in 1974 in South Australia there was 1 road fatality for every 3,300 persons and in 2012 the ratio was 1 for every 17,682 persons. The significant reduction in road fatalities is a great achievement.

Table 1 lists legislated public policy initiatives including alcohol and drug driving testing and the use of speed detection devices. It includes only one improvement in vehicle safety requirements, the introduction and compulsory wearing of seat belts. The improvements to vehicle safety features such as braking systems and stability control, airbags and the change-over of vehicle stock are not shown in Table 1 but certainly have contributed to the long-term trend decline in road fatalities.

Figure 1: Road fatalities, South Australia, 1950-2012



Source: DPTI (2012a).

Box 2 summarises those factors contributing to the reduction in road fatalities.

Box 2: Factors which have reduced the road toll

In their road safety strategy to 2020, the Department of Planning, Transport and Infrastructure (DPTI) lists the following factors as having contributed to road fatality reductions over the last 30 years:

- graduated licencing schemes for young drivers;
- static and mobile driver testing for alcohol and drugs;
- increased use of seatbelts and child restraints;
- mandatory alcohol interlock program;
- the introduction of a 50 km/h default speed limit in urban areas;
- increased and better targeted enforcement;
- a network of safety cameras at high risk intersections;
- black spot programs to improve sites with poor crash histories;
- infrastructure safety programs such as road shoulder sealing;
- increased numbers of 4 and 5 star safety rated vehicles that provide better protection for occupants; and
- more vehicles fitted with Electronic Stability Control (ESC) to assist drivers to avoid crashes.

Factors contributing to the reduction in the road toll identified by the Centre for Automotive Safety Research (CASR) at the University of Adelaide include:

- seatbelts;
- random breath testing (RBT);
- speed management;
- vehicle protection;
- advanced technologies (i.e. anti-lock braking system, electronic stability control);
- graduated licencing scheme (in particular hours of driving practice);
- road side barriers; and
- give way laws.

Source: DPTI (2011a) and discussions with CASR, University of Adelaide.

A casual "eye inspection" of Table 1 suggests that achieving high wearing rates of seatbelts contributed significantly to a decline in road fatalities. Fatalities actually increased when RBTs were first introduced and fatalities declined when speed cameras were first introduced.

Table 1: Legislative changes in road safety

Policy change	Year	Road toll in year introduced
Seatbelt legislation	1971	292
RBT	1981	222
Doubling of RBT	1987	256
Red light camera introduced	1988	223
Speed camera introduced	1990	226
.05 BAC limit introduced	1991	184
Laser guns introduced	1995	182
Laser guns tripled and RBT doubled	1996	181
Advanced speed cameras introduced	1999	153
Mobile RBT implemented	2003	156
Dual speed and red light cameras implemented	2003	156
50 km/h speed limit in built-up areas introduced	2003	156
24 hour mobile RBT introduced	2005	147
Hoon legislation	2005	147
Immediate loss of licence drink driver offenders	2005	147
Driver drug testing introduced	2006	117
Hoon legislation includes clamping	2007	125
Driver drug testing expanded state-wide	2008	99

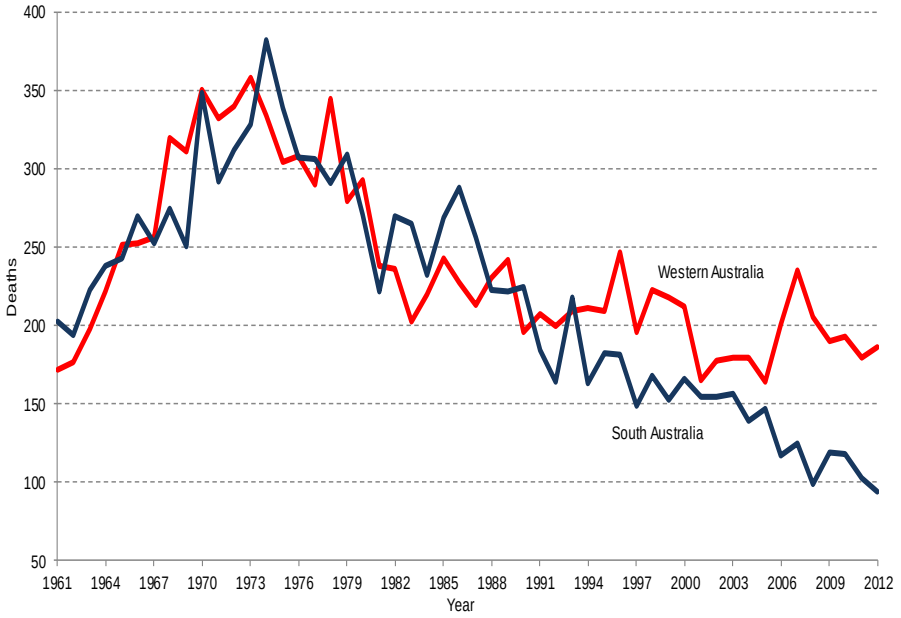
Source: Dillon, M. (2015), 'Tragic road toll is worst in four years', *The Advertiser*, 2 January 2015.

... a national trend in reduction in road fatalities

Figure 2 presents a comparison of South Australian road fatalities with Western Australian road fatalities from 1961 onwards illustrating that both States experienced a peak in fatalities in the mid-1970s, and thereafter a very welcomed long-term decline. It is also worth noting that although the South Australian number of fatalities is now lower than that of Western Australia, the South Australian peak was higher indicating that South Australian road authorities have had greater success in reducing fatalities.

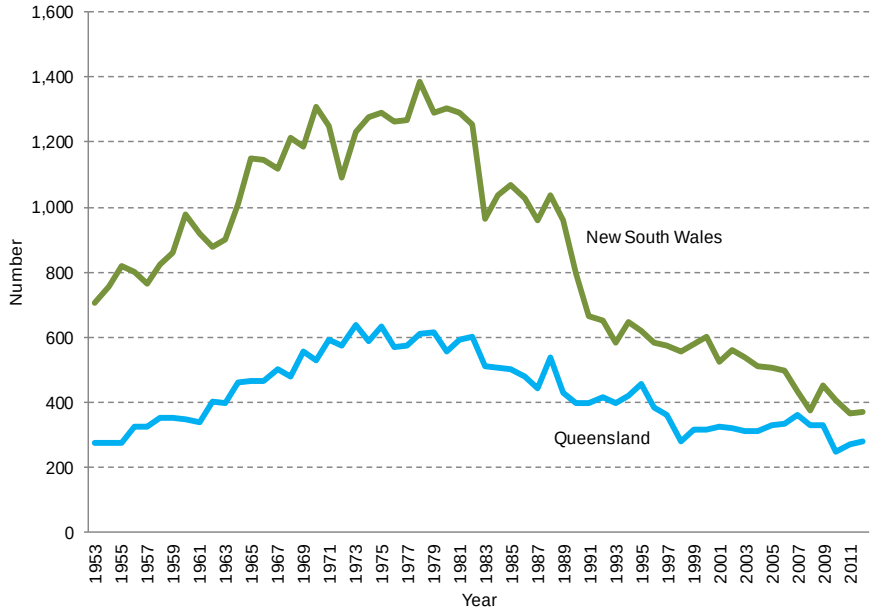
What we observe is in fact a national trend, with similar patterns for New South Wales and Queensland – refer Figure 3. The fact that this long-term decline is a national trend indicates that safety features in the national vehicle stock and similar policy approaches (i.e. the introduction of seatbelts and random breath testing) to reduce the road toll have occurred across the country at different times but with the same effect.

Figure 2: Road crash fatalities, South Australia and Western Australia, 1961-2012



Source: DPTI (2012) and Data Analysis Australia (2014).

Figure 3: Road crash fatalities, New South Wales and Queensland, 1953-2011



Source: BITRE (2013a), Centre of National Research on Disability and Rehabilitation Medicine (CONROD) (2012), and Centre for Road Safety New South Wales (2013).

The data in Table 2 for 1983 to 2012 shows the relative performance of each State in reducing road fatalities. A 53 per cent decrease in national fatalities represents a decrease from 2,755 people killed on Australian roads in 1983 to 1,303 in 2012. More detailed econometric analysis would be required to assess the impact of specific policy changes and adoption of vehicle safety features on reducing the road toll.

… South Australia outperforming the national average …

The data show that up to the year 2000 South Australia generally followed the national trend of a consistent decrease in road fatalities; in more recent times has exceeded the average, while over the 30 years covered by Table 2 South Australia outperformed the national decline in road fatalities. These years saw the introduction of many safety programs including *inter alia* the Black Spot program, Shoulder Sealing program, 50 km/h default urban speed limit, dual purpose red light and speed cameras, demerit points for speeding offences and drug driver testing.

Table 2: Change in road fatalities (per cent)

	1983-1990	1990-2000	2000-2012	1983-2012
New South Wales	-17.5	-24.3	-38.8	-61.8
Victoria	-17.5	-25.7	-30.7	-57.5
Queensland	-21.8	-20.6	-11.7	-45.1
South Australia	-15.0	-26.5	-43.4	-64.7
Western Australia	-3.4	+8.2	-12.7	-8.9
Tasmania	+1.4	-39.4	-23.3	-52.9
Northern Territory	+41.7	-25.0	-5.9	0.0
Australian Capital Territory	-7.1	-30.8	-33.3	-57.1
Total	-15.4	-22.1	-28.3	-52.7

Source: BITRE (2013b) and SACES calculations.

… high number of road fatalities involving older drivers …

The distribution of road fatalities has been relatively unchanged over recent years. From 2010 to 2014, 70 per cent of road fatalities were male, 66 per cent were in regional areas, 18 per cent were aged between 16 and 24 despite comprising approximately 11 per cent of our State's population and 20 per cent were 70 or over well above their population share. A further 21 per cent were aged between 50 and 69 – (see Tables 3, 4 and 5). Some 11 per cent were pedestrians, 30 per cent of drivers and passengers killed were not wearing a seatbelt. Alcohol and/or drugs were recorded as contributing factors in 40 per cent of fatal crashes and 27 per cent of all fatal crashes involved speeding or driving in a dangerous manner (SAPOL, 2013). On publicly available data it is not possible to econometrically test for any relationship between age and the cause of road fatalities but it would be very instructive to do so.

Table 3: Total road fatalities by gender (2010 – 2014)

	Number	Per cent of total
Female	154	29.6
Male	366	70.4

Source: SA Police (2015a, 2015b).

Table 4: Total road fatalities by age group (2010 – 2014)

	Number	Per cent of total
0 to 15	25	4.8
16 to 19	40	7.7
20 to 24	51	9.8
25 to 29	35	6.7
30 to 39	66	12.7
40 to 49	100	19.3
50 to 59	58	11.2
60 to 69	43	8.3
70 and over	101	19.5

Source: SA Police (2015a, 2015b).

Table 5: Total road fatalities by metro/regional (2010 – 2014)

	Number	Per cent of total
Metro	179	34.4
Regional	341	65.6

Source: SA Police (2015a, 2015b).

3.1 Evidence to date

Wilson C, *et al* (2011) in a meta-analysis of research studies examined 'before and after trials' with controls or comparison areas and interrupted time series studies relating to the introduction of speed cameras. The objectives of the study were to measure whether speed enforcement devices lower the percentage of drivers speeding; the absolute speeds above the speed limit; and the rate and severity of crashes resulting in injury.

... cameras have a "calming effect" ...

The individual studies examined in the review reported a reduction in the mean and median speeds following interventions (i.e. introduction of speed cameras). In addition, all studies examined by the review reported reductions in crashes in general and crashes resulting in injuries following the introduction of speed cameras.

The review stated that research has consistently shown that speed cameras are an effective intervention for reducing road traffic injuries and deaths. Despite these findings, the authors concluded that only 12 out of 35 studies examined were of high quality.

A report published by the Centre for Automotive Safety Research (CASR) at the University of Adelaide, examined the number of infringements per week for 12 months following the start of issuing of infringements for dual-purpose speed and red light traffic cameras at 21 intersections in metropolitan Adelaide.

Intersections that were included experienced short periods of stoppage or non-operation (defined as less than three weeks by the authors). CASR noted that infringement data is an underestimate of the true number of vehicles photographed either running a red light or speeding, as some photos taken cannot identify the infringing vehicle.

The report featured no data prior to the installation of cameras and, as a result, was not able to conduct a before and after analysis. In addition, infringements were not generally issued immediately following the installation of cameras and this may affect the results in that some drivers could have already adjusted their behaviour by the time authorities began issuing infringements.

In the 12 months following the issuing of infringements, the number of infringements issued for running a red light, speeding by 10 kilometres per hour or more and speeding by 15 kilometres per hour or more all decreased over time. Additionally the number of infringements issued for speeding by 20, 25 and 30 kilometres an hour or more decreased rapidly following the issuing of infringements and continued to decline but slowed over time. These findings suggest that there may be some learning by drivers after they receive an infringement notice.

... a reduction in actual crashes ...

A study published by the Monash University Accident Research Centre, on the effects of fixed digital speed and red light cameras on crash numbers in Victoria, used a comparison of intersections with cameras and those without cameras to determine if the cameras had an effect on the number of crashes at intersections. The study found a statistically significant 47 per cent reduction in crashes of all casualty levels on monitored legs of intersections. The same study found a 69 per cent decrease in the frequency of crashes involving a vehicle entering intersections from the location of the camera.

There was a 44 per cent reduction in the frequency of crashes of the type targeted by the cameras (i.e. right angle and right turn crashes) involving all casualty levels. When fatal and serious injury crashes of this type were examined, the reduction was 37 per cent. Overall, the report found a 26 per cent reduction in crashes on all legs of intersections with fixed digital speed and red light cameras. Additionally, the study found no increase in rear end crashes, notwithstanding that other studies have reported an increase in rear end crashes.

The study found that the 87 cameras examined prevented 56 casualty crashes per annum, 17 of which would have involved either severe or fatal injuries, delivering a total cost saving of $8 million. That there were reductions in accidents does not necessarily mean that there were fewer accidents overall, the cameras may have simply shifted the risk to other non-monitored intersections.

Average Speeds

Based on speed surveys conducted by the Centre for Automotive Safety Research average free[8] speeds in both rural and metropolitan areas[9] have decreased. In 2007, the average free speed in the Adelaide metropolitan area was 57.35 km/h and in rural areas, it was 103.37. In 2013, these averages were 55.6 km/h and 102.4 km/h, respectively.

Table 6: Average free speeds (km/h) on metropolitan 60 km/h speed limit roads and rural 110 km/h Speed Limit Roads

	2007	2008	2009	2010	2012	2013
Metropolitan 60 km/h roads	57.4	56.6	56.4	56.1	56.2	55.6
Rural 110 km/h roads	103.4	103.1	103.0	103.2	102.2	102.4

Source: Department of Planning, Transport and Infrastructure (2014a), and Kloeden, C.N. and J.E. Woolley (2012, 2013).

... confirmation of the "calming" effect ...

The percentage of vehicles exceeding the speed limit in these surveys had decreased from 23.6 per cent in 2010 to 20.7 per cent in 2013.

Overall, the conclusion is that the reported results confirm that changes in driver behaviour result from awareness of the positioning of red light and speed cameras and this leads to a reduction in crashes and hence potential fatalities and serious and minor injury. That is to say, they contribute to the larger objective of 'improvements in road safety'.

4. Basis for setting of penalties

State Governments are increasingly relying on the use of fines and other penalties as a policy tool to reduce the road toll. Financial penalties are directed at speeding but also driver behaviour such as failure to wear a seatbelt, use of a mobile phone and drink and drug driving.

The basis for the setting of financial penalties is rarely publicly defined (and we submit there would be advantages in doing so).

In Victoria a certain number of penalty units are allocated for each traffic offence. The value of a penalty unit is indexed to increase each year. It can increase by more than the rate of inflation (Victoria Legal Aid, 2012) if a case is made to reflect a growing incidence of the offence (e.g. use of a mobile telephone).

Tasmania uses a slightly different approach in the setting of penalties to that of Victoria. The basis of defining a certain number of penalty units for each offence is the same; the difference is in how the value of a penalty unit is classified in Tasmania. In Tasmania the value of a penalty unit increases by ten dollars if the increase in the CPI pushes the value of a penalty unit into the next ten dollar bracket (Tasmanian Government (undated)).

Obtaining the basis for the calculation of the dollar value of speeding fines/red light traffic fines in South Australia was somewhat more complex. Our understanding is as follows based on feedback from the Attorney-General, the Department for Planning, Transport and Infrastructure (DPTI) and SAPOL.

The Attorney-General advised that:

> "the penalty amounts are generally contained in the *Motor Vehicle Act 1959* and the *Road Traffic Act 1961*. New offence penalties are set with regard to penalties for other offences of a similar seriousness within the legislation concerned, and to a lesser extent, to offences in other legislation. The expiation of offences is a scheme designed to enable less serious matters to be dealt with outside of the courts so that the court resources are directed to more serious offences. The expiation fees are set at a level in relation to the maximum court imposed penalty to encourage expiation, rather than elect to be prosecuted, while still acting as a deterrent to offending".[10]

The *Road Traffic Act 1961 – Section 47B and 47BA* describe the penalties for driving 'having a prescribed concentration of alcohol in blood and driving having prescribed drug in oral fluid or blood'. The *Road Traffic Act 1961* also described an additional fee of $600 (over and above the expiation fee) for a red light offence and a speeding offence or $300 in any other case for a vehicle where the owner is a body corporate.

SAPOL correctly advise that they do not set fees or levy for the expiation notice process but that fees are prescribed by Act or Regulation and referred the authors to Section 5 of the Expiation of Offences Act (1996) Section 5. The Victim of Crime Levy is imposed via Section 32 of the Victim of Crime Act.

The *Expiation of Offences Act 1996 – Section 5* states

> an alleged offence may be expiated if the maximum fine prescribed for the offence is expressed as a divisional fine[11] or in any other case $315 or 25 per cent of the maximum fine prescribed for the offence.

DPTI advised the following:

> "as per Section 176 of the Road Traffic Act 1961 (RTA) the maximum penalty for offences against the RTA regulations or rules is $5,000 and as such the maximum expiation fee for alleged offences against the RTA is $1,250".

That is to say, 25 per cent of the maximum fine prescribed for the offence as above.

DPTI further advise that:

> "A range of factors are taken into account when expiation fees and demerit points for road traffic offence penalties are set. These include the demonstrated road safety risk and parity of the existing penalty and the proposed penalty with other penalties (both in traffic offences and generally) in South Australia and other Australian jurisdictions".

A 'range of factors' are not further specified but we would anticipate they should at least include a cost base for providing service and installation costs and a CPI or some other inflation based indexation factor. In addition, the number and classification of offences is likely to expand over time, including and because, improvements in the sophistication of surveillance technology enables greater refinement in classifications of speeding.

Improvements in technology no doubt supported the decision on 1 September 2012 to increase the number of speed offence penalty brackets from four to five. DPTI advised the following:

> "The speed penalty offence structure introduced 10 km/h brackets instead of 15 km/h brackets for speeding up to 30 km/h over the limit, creating an extra offence bracket to better reflect the relationship between increasing travel speed and increasing crash risk. The expiation fee for speeding by less than 10km/h over the limit was reduced from $252 and the demerit point penalty was increased from 1 to 2 points. Penalties for higher level speeding offences were also increased at that time.
>
> The five tier South Australian speed offence penalty structure aligns with the current speed offence penalty structure in New South Wales and Western Australia and is similar to the speed offence penalty structures that apply in other Australian jurisdictions".

The Department advised the change in a brochure outlining changes to the demerit point system and expiation fees (see Table 8).

Table 8: Speeding penalties from 1 September 2012

Exceeding the speed limit	Demerit Points	Expiation Fees[a] ($)	Expiation Fees[(a)] (Road Trains) ($)
By less than 10km/h	2	150	400
By 10km/h but less than 20km/h	3	330	500
By 20km/h but less than 30km/h	5	670	770
By 30km/h but less than 45km/h	7	800	900
By 45km/h or more (excessive speed)	9	900	1,000

Note: (a) $60 victim of crime levy also applies.
Source: Department of Planning, Transport and Infrastructure (2012b).

Due to general price inflation one would expect that government fines, fees, levies and charges would gradually rise in order to retain their real value. Since 2000, the majority of traffic fines in South Australia have increased much more than can be explained by general price

inflation. Significantly, the relative increase in actual fine levels between 2000 and 2012 has in almost all cases, exceeded the relative change in labour incomes over this period as measured by the Wage Price Index – an important consideration given that trends in incomes ultimately determines individuals' capacity to pay.

… fine levels have increased well above CPI level and change in labour incomes …

Table 9 compares for selected offences fines for the base year 2000, projected increases based on the Adelaide CPI and then the actual level of fine in 2012. The projected percentage increase and the actual percentage increase are shown in the last two columns. For example, the fine for "increasing speed whilst being overtaken" increased from $136 in December 2000 to $263 in December 2012; had the fine increased in line with the Adelaide CPI the fine would be approximately $192.

A second example: "proceeding through a red light". In December 2000 this offence incurred a fine of $205. If the level of fine was based on inflation it would be approximately $290 in December 2012 but was in fact $404. The year by year changes for selected offences are summarised in Table 10.

… impact of fines is regressive for persons on lower incomes …

It is clear from Tables 9 and 10 that fine levels have increased well above the CPI indexation factor for reasons that are unknown. It may be that the level of fines at the lower end of speeding (i.e. less than 10km/h, 15km/h) were "capturing" large numbers of people and imposing financial hardship so that the amount of unpaid fines and cost of recovery has increased over time. The impact of fines is undoubtedly regressive for persons on lower incomes. Recently the Victorian Sentencing Advisory Council has recommended that people aged under 18, the unemployed and some welfare recipients should have fines from police, public transport officers and parking inspectors cut by 50 per cent in an effort to deal with the 'growing problem of unpaid infringements and court fines'.

Table 11 presents a comparison of traffic fines in South Australia with Western Australia, Tasmania, Victoria and New South Wales. Generally it is the case that for lower level speeding offences South Australia and Victoria have higher levels of fines. Recall also that there is an additional $60 Victim of Crime Levy in South Australia.

Out of the five States South Australia has a higher fine for running a red light. New South Wales (along with Queensland not shown in the Table) has a very high fine for drink driving while that for Western Australia is relatively low. Similar penalties for "using a handheld phone" suggest a uniformity in the assessment of the danger in doing so; on the other hand, there appears to be no consistent logic in regard to the financial penalty for speeding at no more than 9km/h, between 10-19km/h and between 20 and 29km/h nor driving whilst "having a prescribed concentration of alcohol in blood."

Table 9: Comparison of Fines and Inflation: South Australia

	2000 fine ($)	Projected 2012 fine based on Adelaide CPI ($)	Actual 2012 fine ($)	Projected percentage increase (%)	Percentage increase in actual fine level (%)
Driving whilst having prescribed concentration of alcohol in blood Contravention involving less than 0.08 grams of alcohol in 100 millilitres of blood	125	176.77	532	41	326
Proceeding through red traffic light or arrow	205	289.90	404	41	97
Overtaking when not safe to do so	138	195.15	265	41	92
Using hand-held mobile phone while driving vehicle	154	217.78	291	41	89
Increasing speed while being overtaken	136	192.32	263	41	93
Stopping on area of road marked with keep clear marking	170	240.40	316	41	86
Failing to pay fee, etc. for parking where fees payable	13	18.38	44	41	238
Exceeding the applicable speed limit of a road					
by less than 15km/h[(a)]	122	172.52	150-330	41	23-170
by 15km/h or more but less than 30 km//h[(a)]	194	274.34	330-670	41	70-245
by 30km/h or more	308	435.55	800	41	160
Driving at speed exceeding applicable speed limit by 45km/h or more	541[(b)]	599.09	900[(c)]	11	66

Note: (a) A reclassification of speeding fine levels in 2012 means that now there are three different levels of speeding for exceeding the speed limit by less than 30 kilometres per hour where previously there were two, therefore the classifications prior to 2012 are used for comparison.
(b) Fine in 2008 as this was when the offence was introduced.
(c) For any vehicle other than a road train being driven on a prescribed road.
Source: Government of South Australia (2000 and 2012) and SACES calculations.

Table 10: Changes in Selected Infringements 2000-2012: South Australia

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Exceeding applicable speed-limit on length of road -													
by less than 15km/h	122	126	131	139	144	163	169	176	182	190	196	252	
by 15km/h or more but less than 30km/h	194	200	208	220	228	259	269	280	290	302	312	371	
by less than 10km/h													150
by 10km/h or more but less than 20km/h													330
by 20km/h or more but less than 30km/h													670
by 30km/h or more	308	312	312	330	343	350	350	420	435	453	468	532	800
Driving at speed exceeding applicable speed limit by 45km/h or more:									541	564	564		900
Proceeding through a red traffic light/arrow	205	211	220	234	243	275	285	297	307	320	331	391	404
Overtaking when not safe to do so	138	142	148	157	163	168	174	181	187	195	201	257	265
Using hand-held mobile phone while driving vehicle	154	159	166	175	182	187	194	202	209	218	225	282	291
Driving whilst having prescribed concentration of alcohol in blood. Contravention involving less than 0.08 grams of alcohol in 100 millilitres of blood	125	129	134	142	147	151	157	164	420	438	438	515	532

Source: Government of South Australia Road Traffic (Miscellaneous) Regulations 1999.

Table 11: Comparative penalties: South Australia, Western Australia, Victoria, New South Wales, 2012 ($)

	South Australia[a]	Western Australia	Victoria [b,c]	New South Wales[d]	Tasmania
Speeding no more than 9km/h	150	75	246	105	80
Speeding 10-19km/h	330	150	282	243	110-150
Speeding 20-29km/h	670	300	282-387	521	150-250
Speeding by 30-39km/h	-	700	458-528		450
Speeding by 30-44km/h	800	-		799	450-650
Speeding by 40km/h or more	-	1,000	599		
Speeding by 45km/h or more	900	-	704	2,154	902
Running a red light	404	150	352	397	140
Overtaking when not safe to do so	265	100	282	298	200
Using handheld mobile phone	291	250	282	298	300
Driving whilst having prescribed concentration of alcohol in blood : Contravention involving less than 0.08 grams of alcohol in 100 millilitres of blood	532	250	423	1,100	260
Increasing speed while being overtaken	263	100	282	Unknown	Unknown

Note: (a) $60 Victims of Crime Levy also applies.
(b) Victorian fines have been rounded to the nearest dollar. 246 is 246.47, 282 is 281.68, 387 is 387.31 and so on.
(c) Victorian speeding offences are classified different to South Australian offences. They are classified as follows: Exceed speed limit in a vehicle other than a heavy vehicle by less than 10km/h, and increases by increments 10-14, 15-24, 25-29, 30-34, 35-39, 40-44 and 45 or more.
(d) Higher fines apply in New South Wales for certain offences if the offence is committed in a school zone.

Source: Government of Western Australia (2011) and Government of South Australia (2012), Road Traffic Authority (undated), Transport Tasmania (undated) and VIC Roads (undated).

5. Dangerous behaviours

5.1 Speeding: South Australia

The question, given the different path of infringement penalties between States and different fatality rates, is what impact the higher financial penalties in South Australia have had on reducing road fatalities and injury?

Prior to 2012 fines for exceeding the applicable speed limit were grouped at "less than 15 kilometres per hour" for the lowest level of offence although the actual speed was recorded. SACES was provided with data for the period 2000 to 2012 which we have illustrated in Table 12 and Figures 4, 5 and 6. Of most interest is the data for exceeding the applicable speed limit by no more than 9km/h which increased by over 40,000 from 2006 to 2007 and by a further 95,000 from 2007 to 2008. What were drivers in South Australia doing in these two years?

The dramatic increases in these two years are principally explained by a lowering of the speed limit tolerance level in 2007 (i.e. the level at which one will be charged with speeding (Henderson 2007). It may have been the case that motorists were not aware of the lower tolerance until receiving a fine. These two years – 2007 and 2008 – are an aberration against trend as by 2012 the number of motorists detected for speeding by no more than 9km/h and by 10-19km/h had fallen by 50 per cent relative to the 2008 levels.

A possible justification for this lowering of the tolerance limit may arise from road traffic research, including that undertaken by the Centre for Automotive Research which argues that even small (e.g. 5km/h) increments in speed significantly increase the probability of casualty crashes. Such findings are reproduced in the 'wipe-off 5' or 'creeper' commercials. This type of argument is often based on research that compares the estimated / reconstructed speed of cars involved with accidents with the typical speed of other cars observed to pass through the same location at the same day and time of the week. Using this information, it might be shown that cars travelling 65 km per hour in a 60 zone are twice as likely to be represented in the crash group than the other group. Based on these figures, it has not been uncommon for Centres to claim that driving a few km above the speed limit is associated with a 2 or 3 times greater likelihood of being in an accident.

Although logical, such analyses are methodologically and conceptually problematic. Such studies commit a reasoning fallacy in that they assume that the cars travelling at 65 and 60 are the same in every other way. In fact, cars travelling at 65 might also have faulty brakes, be poorer in design, be more likely to be caught in difficult traffic situations, have drivers with quite different characteristics (skill level, drug and alcohol use may differ). Such analyses commit the If A then B, if B is true, then A must be the cause (e.g. driving faster leads to a greater risk of an accident; Car X has been found to drive faster, therefore Car X had this accident because of the greater speed). In fact, there may be other reasons why Car X had the accident. As discussed in this report, speed is only implicated as the sole factor in a minority of fatalities and is often only a contributing factor in many others.

Appraisals of the danger of travelling 5km faster are sometimes based on contrived 'stopping distance' tests in which it is shown that cars travelling at 65km take longer to stop than 60km. However, one could argue the same for any speed. People who travel at 65km simply brake earlier. For this argument to be sustained, one would have to show that there are more accidents on 80 or 100km metropolitan roads vs. 60km, but it is doubtful whether such evidence exists.

An example in another context illustrates the problem. If it were found that problem gamblers typically spend $1,000 per week and non-problem gamblers spend $20, one cannot turn around and argue that spending $1,000 makes you 50 times more likely to be a problem gambler (i.e. 1000/20). Nor is it sensible to argue that each dollar spent above $20 makes one more likely to be a problem gambler. There may be many other risk factors (apart from expenditure) that differentiates the problem gambler from the non-problem gambler. There also may be a certain threshold above which expenditure starts to become problematic in the same way that one only experiences impairments to judgment at a certain BAC level.

Analyses of these nature are problematic in that they use a retrospective logic to study something which should be examined prospectively. That is, in an ideal research design, one would monitor the speed of a larger number of drivers prospectively and then ascertain whether those who go faster are more likely to have an accident (after controlling for other factors).

In other words, it is doubtful whether similar methodologies used in other research contexts would be considered acceptable, but this is one piece of evidence used in support of a government policy that divests many millions of dollars from drivers.

Table 12: South Australia: numbers by infringement, selected years

	Exceeding applicable speed limit of road:				
	by no more than 9km/h	by 10-19km/h	by 20-29km/h	by 30-44km/h	by 45km/h or more
2000	8,360	222,589	17,137	3,731	200
2001	8,564	253,435	20,787	4,494	327
2002	10,047	203,997	17,208	4,177	266
2003	17,300	186,418	16,137	2,694	158
2004	17,488	208,609	16,642	2,457	125
2005	18,149	220,603	15,973	2,303	163
2006	20,682	193,901	12,523	1,302	556
2007	64,205	210,362	13,241	1,400	615
2008	159,747	172,567	11,083	1,149	486
2009	150,548	161,746	10,419	1,013	500
2010	135,079	138,327	8,552	843	416
2011	100,518	107,658	7,266	728	388
2012	78,474	85,223	6,867	1,111	320

Source: SAPOL data.

Despite not making the change in tolerance for speeding known, police data provided to *The Advertiser* showed that in zones between 40km/h and 110km/h in 2013/14 drivers only started to be fined by fixed and mobile speed cameras for speeds 8-10km/h over the speed limit (Nankervis 2014b). However, data police provided to SACES shows a large number of expiations for up to 9km/h over the speed

limit in previous years. In our view it is a responsibility of government to provide consumers with information – in this case, a subtle change to the tolerance level – as the increase in the number of infringement notices "by no more than 9km/h" from 64,205 (2007) to 159,747 (2008) is not due to a change in driver behaviour.

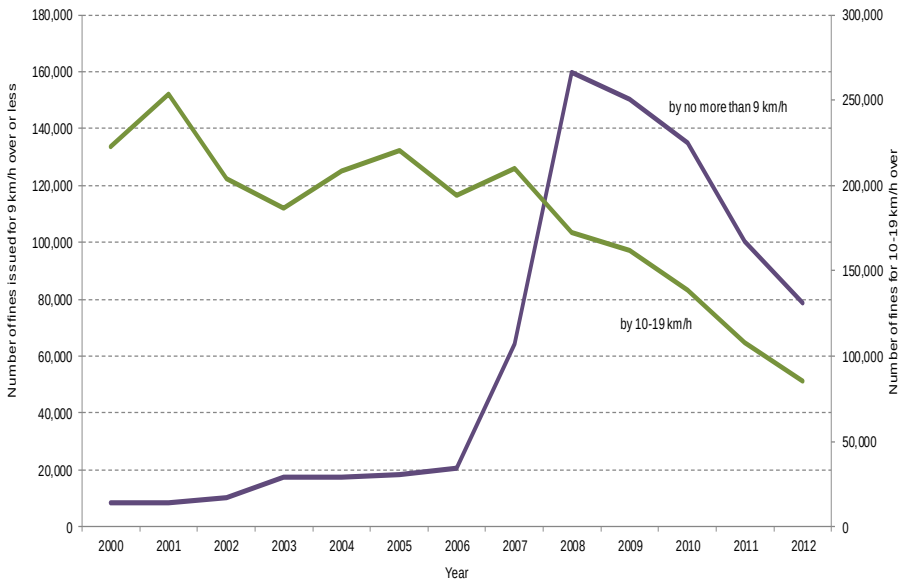
… dramatic increase in fines was not due to change in driver behaviour …

Overall, as shown in Table 12 and Figures 4 - 6, most people adjust their behaviour to changes in speed limits (and information provided) and changes that are designed to improve road safety (e.g. blanket 50 or 40km/h in suburban streets). This observation is consistent with evidence of driver behaviour – the wearing of seatbelts, use of child restraints – and the year on year decline in road fatalities.

… 2007 to 2008 when perception of revenue raising took hold …

Noticeably, fines issued for excessive speed (Figure 6) – 45km/h or over − shows much greater variability although the numbers detected are small (2007: 615; 2012: 320). In fact in 2012 only 8,298 infringements were recorded for "speeding by 20-29km/h, 30-44km/h and greater than 45km/h" less than half the number (21,068) in year 2000.

Figure 4: Fines issued for exceeding the applicable speed limit: South Australia no more the 9km/h, by 10-19km/h



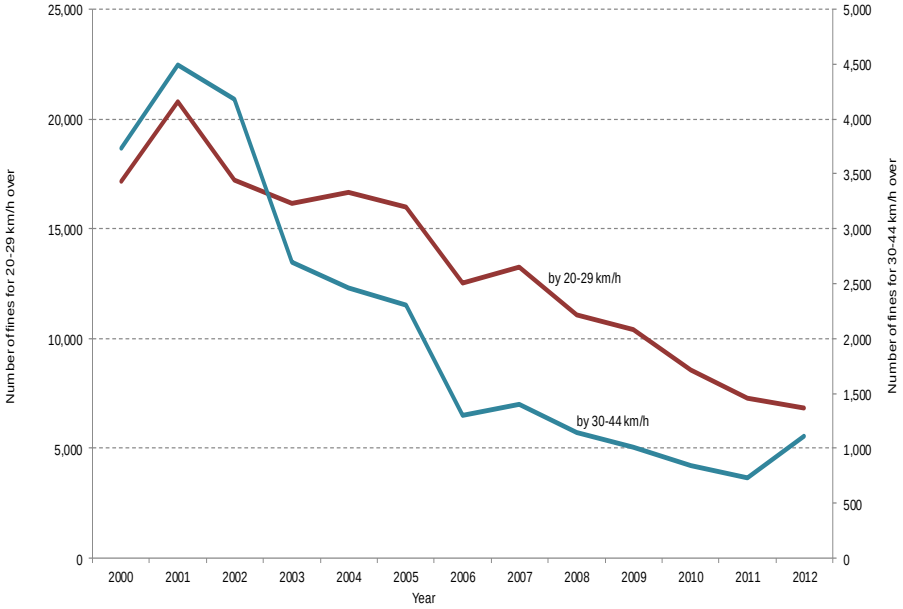
Source: SAPOL data.

5.2 Alcohol use whilst driving

In South Australia in 2011, 21.1 per cent of fatal accidents involved a driver or rider with an illegal blood alcohol concentration.

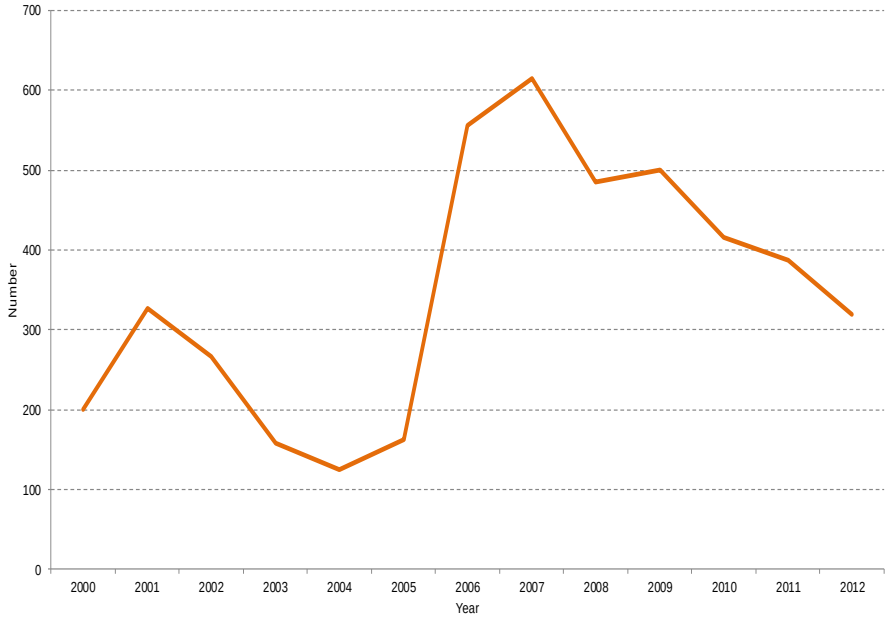
Table 13 shows offences for a blood alcohol concentration of at least 0.05 in South Australia. Since 2009, there has been a downwards trend in this offence indicating that drivers are responding to the don't drink and drive message.

Figure 5: Fines issued for speeding: South Australia 20-29km/h over and 30-44km/h over



Source: SAPOL data.

Figure 6: Fines issued for exceeding the speed limit: South Australia 45km/h or over



Source: SAPOL data.

Table 13: Drink driving offences

	2006	2007	2008	2009	2010	2011	2012
South Australia	9,902	10,339	9,616	10,096	8,958	8,531	7,930

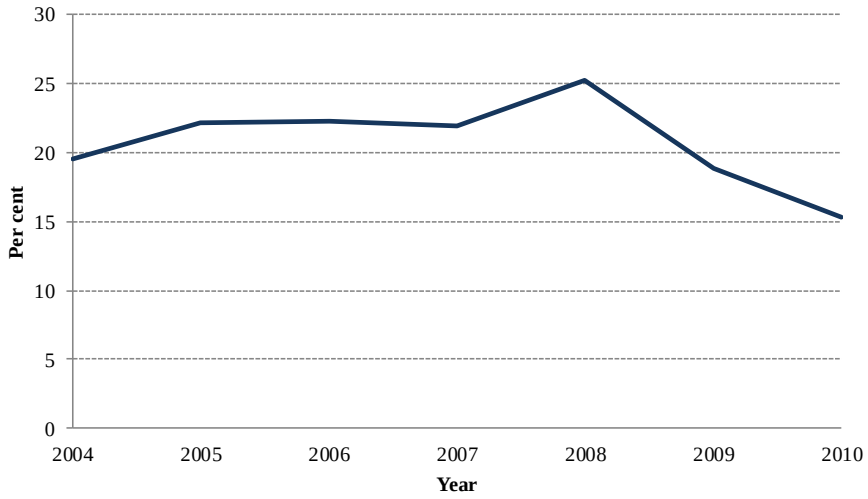
Source: SAPOL data.

Figure 7 presents serious injury accidents involving alcohol for South Australia. That 25 per cent of drivers and riders killed on South Australian roads in 2013 had an illegal blood alcohol concentration (Kelton 2014) is concerning. It also means, however, that 75 per cent did not. Of course, the optimal situation would be if 100 per cent did not.

... a positive downward trend ...

One of the most noticeable increases in expiation fees in the last twelve years in South Australia was the increase in the fine for registering a blood alcohol content of between 0.05 and 0.08 grams per 100 millilitres of blood – an increase of $256 or 160 per cent (in 2008). If the justification for this increase is to improve road user safety it would be expected that fatal and serious injury accidents as a result of low levels of drinking and driving would have decreased. A noticeable impact is found when comparing rates from 2006 to 2010. In 2006 41.7 per cent of fatally injured drivers and riders recorded a blood alcohol level of above 0.05; for seriously injured drivers and riders the proportion was 22.2. In 2010 the proportions were 26.3 for fatally injured drivers and riders and 15.3 for seriously injured drivers and riders. This data suggests a positive impact.

Figure 7: Per cent of alcohol related serious injury accidents - drivers/riders with an illegal BAC, South Australia



Source: SAPOL data and CASR (2009 and 2012b).

This positive result is also supported by the decline in the detection rate of drink driving between 2007 and 2009 from 8.6 to 7.9 per 1,000 people tested (CASR, 2012b). It would appear that the deterrent effects such as an increased level of drink driving enforcement through RBT have contributed to this result. Drivers have also changed behaviours such as the use of a "safety, non-drinking driver", greater use of public transport and private taxis.

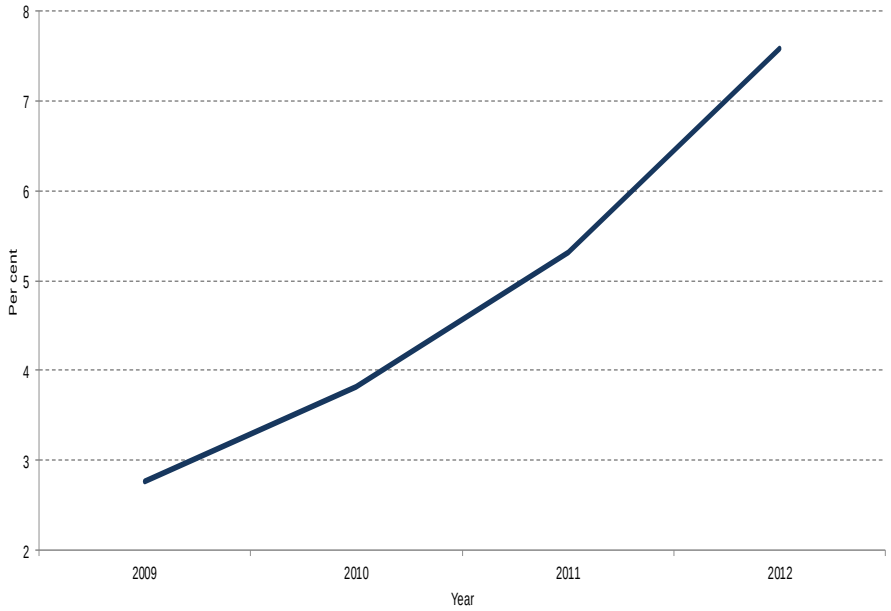
5.3 Drug driving

In 2006, random roadside testing for illegal drugs was introduced in South Australia. In 2009 and 2012 exactly the same number of tests were conducted for drug affected driving, removing one potential bias[12] in the results due to a perceived increase in police presence.

… case for strengthening enforcement and advertising …

Data provided to SACES by SAPOL shows that in 2009 (i.e. three years after the introduction of testing for driving under the influence of drugs) 2.8 per cent of drivers tested for illegal drugs registered a positive reading. In 2012, the proportion was 7.6 per cent. That is to say, even while the fine for this offence had increased the number of drug drivers detected is on the rise, which suggests that greater policing should be conducted perhaps associated with further advertising/publicity.

Figure 8: Percentage of drivers tested for drugs found to be driving under the influence of illegal drugs



Source: SAPOL data, SACES calculations.

5.4 Mobile phone use whilst driving

… a further case for strengthening enforcement

The number of offences recorded for using a handheld mobile phone whilst driving has increased (see Table 14). Between 2000 and 2011 the number of fines issued increased tenfold. Mobile phone use whilst driving is a relatively new offence compared to drink driving and authorities have had success in reducing the number of people drink driving. It is therefore foreseeable that with similar promotion strategies authorities can reduce the number of people fined for using a handheld mobile phone whilst driving.

Table 14: Fines issued for using a mobile phone whilst driving

Year	Number
2000	1,204
2001	2,839
2002	3,192
2003	4,110
2004	3,855
2005	3,625
2006	4,984
2007	6,561
2008	8,385
2009	10,551
2010	12,440
2011	12,214
2012	10,669

Source: SAPOL data.

... new cars do include phone technology ...

6. Driver behaviour

6.1 The impact of speed cameras

The number of speeding offences and particularly those at the lower end of the range have increased substantially in South Australia since 2006 with evidence of a turnaround in 2009. The reasons behind this are the increase in the number and types of speed cameras and the development of technology that enables a finer graduation of actual speeds so that tolerance levels have fallen and more motorists are detected at the low end of speeding offences. There is also the real possibility that drivers are more confused in some suburban areas where there are frequent changes in permissible speed limits (i.e. 40, 50, 60km/h zones) and variations between councils.

The location of speed cameras in South Australia is selected based on the accident history, driver behaviour, network placement, infrastructure and underground services, road geometry and alignment, road safety audits and community feedback and concerns (DPTI personal communication 23/7/14).

At the end of December 2013, South Australia had 117 fixed speed cameras. Of these 109 were also red light cameras (DPTI personal communication 5/12/14).

Despite the majority of South Australian road fatalities occurring on regional and rural roads (see Table 15), the majority of speeding fines are issued in metropolitan areas and the majority of safety cameras are in metropolitan areas.

Table 15: Total road fatalities by location (2010 – 2014)

	Number	Per cent of total
Metro	**179**	**34.4**
Eastern Adelaide	14	2.7
Elizabeth	41	7.9
Holden Hill	30	5.8
South Coast	21	4.0
Sturt	47	9.0
Western Adelaide	26	5.0
Regional	**341**	**65.6**
Barossa	36	6.9
Eyre & Western	36	6.9
Far North	33	6.3
Hills/Fleurieu	78	15.0
Limestone Coast	42	8.1
Murray Mallee	48	9.2
Yorke Mid North	68	13.1

Source: SA Police (2015a, 2015b).

Detection of excessive speed (i.e. actual number) is relatively small in number and fairly consistent over time, irrespective of the level of fines. It is in the two lowest categories of speeding that considerable variability is observed which is principally (as we have indicated) the result of changes to tolerance levels and the use of more sophisticated technology.

There is evidence for South Australia (based on aggregate 2011 and 2012 data) that there was a decline in the number of speeding offences for the two lowest categories (< 9km/h and 10-19km/h) from 208,176 (2011) to 163,697 (2012) but no change in the higher, excessive speed categories (20-29, 30-44, > 45km/h). This appears to be the result of two factors over that period:

- increase in the level of fines for all offences; and
- changes in speeding categories such as > 15km/h was replaced by < 10km/h and < 30km/h was split into between 10 and < 20km/h and between 20 and < 30km/h.

In summary, in South Australia over the last decade the real value of fines has increased significantly, there was a finer graduation in speeding categories and lower tolerance levels and we observe a decline in the number of low level speeding offences. With respect to revenue derived from speeding offences, in 2012 in South Australia some 87 per cent of revenue was derived from the two lowest categories of offences (< 9km/h, 10-19km/h).

… 87 per cent of revenue from the two lowest categories of speeding …

6.2 Positive reinforcement

It is a well-established principle in behavioural and social psychology that reinforcement or reward is much more likely to lead to sustainable changes in behaviour than punishment. Punishment often

leads to short-term evasion strategies to avoid the aversive experience (e.g. looking out for cameras, slowing down only at certain points), but it may not lead to long-term behavioural change once the 'punishment schedule' has been removed. In fact, there is evidence in the psychological literature of so-called behavioural contrast effects in which undesired behaviour may increase in situations where the usual strictures are removed. In other words, people adhere to the limits when they know their driving could be monitored by a camera, but then 'cut loose' when they know that such strictures may not be present (e.g. on back country roads).

... rewards, not punishment will gain respect, cooperation and change driver attitudes ...

In social psychology, it is well established that behaviour modification via punishments does not work. It only leads to behaviour change; it does not lead to attitude change. If the Government's aim is change driver attitudes they have to gain the respect and co-operation of drivers. For this reason, it is imperative that generally good drivers who happen to exceed the speed limit on rare occasions are not punished so that they remain in support of the broader road safety policy. Speed cameras need to be seen as a safety measure and not a form of punishment to generally law-abiding drivers. This would lead to a greater likelihood of sustainable changes in attitudes and behaviours.

The development of good driving habits at an early age is critical to improvements in driver behaviour and road safety. Aligning the public interest (objective of government) and self-interest (individual motivation) is the basis of good public policy. There is a clear risk that this alignment is prejudiced to the extent that government and police legitimacy is eroded by the excessive reliance on penalties and virtually no system of rewards.

... what reward system is in place for good driving behaviour ...

It is our view that measures of positive reinforcement should be in place to encourage safe driver behaviours in the early years of driving. In Western Australia should a novice driver on a provisional licence not commit an offence in the first two years of driving unsupervised (i.e. whilst on a provisional licence), they are then eligible to receive a free year (licence renewal) when they graduate to a full licence (Department of Transport, 2013).

A similar scheme is in place in Victoria where drivers under 26 receive a discount on their licence renewal fee if they have not had an infringement in the preceding three years (Vic Roads, 2013). Such a discount represents a relatively small cost to government but a valued incentive for a young person. Importantly, rewards encourage good driving behaviour when driving habits are being formed.

The conventional system of enforcing good driving is to punish bad behaviour, although there are some small rewards for good driving (e.g. small discounts on licence renewal fees in some Australian states). A trial in Sweden entered drivers passing a particular speed

camera at or below the speed limit in a lottery. As further incentive, the fines paid by drivers speeding past the camera funded the lottery (Sorrel, 2010). Perhaps when officials of government parrot "we make no apologies for being tough on speeding" they could make reference to any change in tolerance levels and rewards for good driving behaviour.

... innovations coming from the insurance industry ...

Apps are being developed that can track the behaviour of drivers. In particular, AAMI (insurance agency) has developed one that records adherence to speed limits, braking and mobile phone usage (Cleary, 2015b). Driving performance is scored out of 100. Drivers who score over 60 receive free roadside assistance: this is a reward for good driving instead of a punishment for bad driving. It is possible that technology like this could one day eliminate the need for speed cameras. Technology is evolving all the time. It is feasible that in the future technology may evolve to a point where it is not possible for cars to speed, where on-board readers respond to detected speed limits.

... rewarding good driving history ...

Another example of positive reinforcement for good driving behaviour is the opportunity to receive an official warning instead of a fine for minor offences if a driver has a good driving history. A scheme like this is in place in both Victoria and New South Wales. Although the schemes vary slightly, they essentially reward a driver with a history of no driving offences in a certain number of preceding years with an official warning instead of a fine for infringements such as low level speeding. The rewards/incentives do not exist in South Australia.

6.3 Demerit points, loss of licence

Often coupled with fines is the use of demerit points. In principle, demerit points are allocated for offences on the likelihood of the offence causing an accident (Government of South Australia, 2011b). For some offences there would appear to be a high degree of subjectivity in this assessment. For example, an examination of demerit points in South Australia found that failure of learners and P1 licence holders to display appropriate plates (i.e. L or P plates) incurs the same number of demerit points as a driver failing to keep left of oncoming vehicles.

Demerit points have the advantage of enforcing rules through non-financial incentives. For high income earners it may be the case that a financial penalty is not a deterrent; however the potential loss of licence may be a deterrent as this is likely to have impacts on a person's lifestyle such as loss of employment, social image, mobility etc.

Demerit points accrued for traffic offences are generally similar across states. The main point of difference however is the accruement of demerit points on public holidays and long weekends. In some States certain offences (speeding, drink driving and non-restraint use)

committed on long weekends or public holidays result in double the number of demerit points. The introduction of double demerit points in South Australia is often debated but road authorities insist there is no evidence to support its introduction (Rice, 2013).

Double demerit points were first trialled in Western Australia in 2002 and 2003 and were gazetted into law in 2004. There have been a number of reviews of double demerit points conducted. The findings of some in Western Australia are summarised below.

In order to observe the true impact of double demerit points the levels of infringements and crashes caused by those offences where double demerit points are applicable were examined. In Western Australia there have been three State government funded examinations of the double demerit points program, one in the first couple of years after the implementation of the trial program, one in 2007 and one in 2009. It has been noted that during double demerit points periods the level of police enforcement activity increases and as such it might reasonably be expected that the number of reported infringements would also increase. Batini (2004) examined the number of infringements per enforcement hour and found that during periods of double demerit points the number of traffic infringements per hour of enforcement actually decreased. Batini reported that following the introduction of double demerit points there was a reduction in the number of fatal crashes caused by "double demerit attracting offences".

Other researchers have argued the effectiveness of the double demerit point system. Synovate (2009) found that between 2001 and 2008 there was a 13 per cent reduction in the daily average number of fatal accidents with speeding as a contributing factor during double demerit periods compared to a 32 per cent increase in non-double demerit point periods. Similar findings for alcohol related crashes were also reported. The daily average of fatal alcohol related accidents increased 13 per cent during double demerit point periods compared to a 33 per cent increase in non-double demerit point periods.

Overall, our assessment is that the evidence is mixed. Whether the Western Australian experience provides evidence that the introduction of double demerit points has an effect on improving driver behaviour or whether this is due to a visible increase in police presence (amongst other factors) would require further examination.

It is possible to be disqualified from driving for illegal behaviours in all jurisdictions but there is little uniformity in its application. In Western Australia, minimal licence loss periods can be much longer than in South Australia. In Western Australia a person caught driving with an alcohol level above 0.15 for a third or subsequent time will receive a permanent disqualification from driving (in reality the suspension is for ten years) (Lenton, et al, 2010). In South Australia, the minimum disqualification is for three years.

Whilst permanent disqualification may seem like it would be a deterrent, Ferrante (2003) found that long periods of disqualification tend to result in individuals continuing to drive unlicensed. Somewhat paradoxically, Ferrante found that when individuals drive whilst disqualified, they tend to report taking precautions so as to avoid detection such as obeying the posted speed limit and avoiding driving at night and hence consider themselves safer on the roads.

Whether there is scope for jurisdictions to implement similar "loss of licence" periods is worthy of further investigation as consistency facilitates cost effectiveness, it is also the basis for national information and advisory campaigns. In addition, a restricted licence rather than a loss of licence might be advantageous with respect to a person maintaining employment.

6.4 The role of information

... important role of information in changing driver behaviour ...

The provision of demerit point information given to drivers in Australia varies depending on which jurisdiction they are in. Western Australia, the Northern Territory and New South Wales allow drivers to check their driving history free online. This is a convenient and effective way for drivers to find out how many demerit points they have accrued.

In South Australia there are two methods by which a driver can obtain details of how many demerit points they have accrued. A driver can obtain a copy of their driving history by application to DPTI at a cost of $22. This fee is a disincentive to obtain information on driving history. There should be a facility to access this information online at no cost. A "smart state" would provide such a facility.

The second method results from a driver who accrues over six demerit points. A warning notice is automatically sent informing the driver of the offences and demerit points. In practice, an individual could accrue the demerit point limit before realising that they are close to losing their licence.

The provision of information potentially can act to change a driver's behaviour and it should be easily accessible and in this case, at no cost.

6.5 Equality of fines

In Finland, an individual was fined €54,000 (AU$77,000) for driving 103 km/h in an 80 km/h zone.[13] The fine equated to 0.8 per cent of his income in 2013. In Finland, a fine is calculated by estimating a person's daily income and then halving it: this is considered a reasonable amount of money to deprive a person of as punishment. The severity of the offence determines how many days an individual is deprived of this money, for example speeding by around 25 km/h will result in 12 days of reduced income (Pinsker, 2015).

... building in equity and progressivity of the level of fines ...

In Victoria the Sentencing Advisory Panel recommended that persons experiencing financial hardship should have their fines reduced by 50 per cent and stated that courts must take into account the financial circumstances of an offender when setting a fine (Sentencing Advisory Council, 2014). Such policy has the effect of equalising the impact of a fine on people with low and high incomes. The Sentencing Advisory Panel also considered the use of 'day fines' to equalise the impact across social groups but concluded the system would be too expensive to administer.

Instead of people completely losing their licence for unpaid fines they could be issued a drivers licence for work purposes only (Bolton, 2014). Such a licence would neutralise the further economic cost of losing a job due to loss of licence. Additionally, it would remove some temptation to drive unlicensed.

7. Concluding comments

On metropolitan roads in South Australia, speed limits can vary from 40 km/h to 50 km/h to 60 km/h and often inconsistently revert between 50 and 60 km/h. Motorists can legitimately be confused as to what speed zone they are required to travel.

Petroulias (2011) reported that 66 per cent of South Australians surveyed considered speeding fines to be revenue raising. The persistent and strong perception of "revenue raising" relative to "road safety objectives" carries a significant danger for government policy and the legitimacy of police efforts.

It is time for a serious re-think of efforts to reduce the road toll that in the final analysis, is critically dependent on driver training, driving behaviour and driver attitudes. It is without doubt, for example, that there has been an increase in the level of confusion arising from changes to speed zones – by local councils and by State government. There appears to be little consistency in this regard. As a result, many drivers use this as an excuse when incurring a penalty – government needs to provide consistency to "remove the excuse".

The reduction in road trauma must be a community priority. For some offences (i.e. drink driving, drug driving, use of mobile phone, failure to wear a seatbelt) the data shows that more needs to be done to reduce the commission of offences as they are frequently associated with road fatalities. Hoon driving, tailgating and road rage behaviour each illustrate discourteous behaviour and a lack of respect for other road users and are appropriately subject to severe penalties.

... unshakeable belief in revenue raising ...

Road traffic fines in South Australia are higher than those in other States for the same or similar offences. Road fatalities and serious injury are a complex 'policy problem' for government – we do not dispute that – but the reliance on heavy financial penalties in South

Australia indicates an overly strong preference for revenue raising in the pursuit of greater road safety.

Public policy in seeking to influence behaviour is essentially based on the rational choice model of which one important element is the provision of information such that the individual/consumer/driver is then able to make a choice (in the face of rewards, punishments, sanctions, pleasure) that maximises their net benefit.

... a much greater emphasis on information might balance the ledger ...

The provision of information has a role to play in the behaviour individuals chose to engage in (e.g. don't drink and drive as the likelihood of getting caught is high). However, traffic fines are most often delivered to a person after the event and they may in fact not even remember the occasion which led to the infringement and therefore may not change their behaviour. There is every reason for example to provide information to drivers about the operation of mobile speed cameras as the object is to ensure motorists do not speed. The number of road fatalities on country and regional roads and the number of fatalities involving drivers aged over 70 years are indicators of the need to re-balance the road safety message.

Suggestions for reform include:

... some suggestions ...

- incentivising good driving begins with initial training and should be reinforced through rewards and penalties;
- two "new" offences – the use of mobile phones whilst driving and drug driving – should be vigorously addressed similar to the drink driving campaign. Failure to wear a seatbelt is a known factor in road fatalities and should continue to attract high penalties;
- South Australian traffic fines should be indexed to inflation or changes in labour incomes;
- re-introduce visible signs to warn drivers that mobile speed detection devices are in use;
- the South Australian Government makes the basis for the calculation of fines public knowledge. This change would lead to a better public perception of the traffic fines system;
- information on demerit points should be readily available at no cost, so the $22 fee to be abolished; and
- it is important in driver education that much greater information on road, fatality and driving is provided through road safety campaigns. This would add, not dilute, the "speed can kill" message. One example of relevant information is that each year some 65 to 68 per cent of all road fatalities occur on regional and rural roads.

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Endnotes

1 Australian Public Service Commission (2007), p. 1.

2 Foucault (1975) where he illustrates through reference to J. Bentham's *Panopticon*, the circular orchestrated structure, that surveillance by government (with advanced in technology) is more intrusive and acts as a disciplinary force.

3 http://theage.drive.com.au/motor-news/victoria "Victorian Police document reveals arsenal of weapons for war on speeding".

4 Department of Planning, Transport and Infrastructure (DPTI) personal correspondence, 13 May 2014.

5 Costs would include a human capital component that would have risen more strongly than inflation.

6 This does not include non-fatal accidents which are expected to cost at least as much as fatal accidents if not more. If willingness to pay measures were used these costs would be higher.

7 It is important to note that if willingness to pay was used to evaluate the cost of road fatalities it is expected that this figure would be higher.

8 Free speeds means the speed of vehicles for which a four-second gap to the vehicle in front existed.

9 In rural areas, arterial roads with speed limits of 110 km/h are referred to when quoting averages. For metropolitan areas, arterial roads with speed limits of 60 km/h are referred to when quoting averages.

10 Correspondence form the Attorney-General to SACES, 16 April 2014.

11 Acts Interpretation Act – 1915 – Section 28A has 12 division fines and 12 division fees: Division 1: a fine not exceeding $60,000 through to Division 12: a fine not exceeding $50.

12 A bias associated with any difference in where police decide to test could remain.

13 "The guy who copped a $77,000 speeding fine", 4 March 2015, www.news.com.au