Development of a Best Practice Intervention Model for Recidivist Speeding Offenders
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Austroads profile
Austroads’ purpose is to contribute to improved Australian and New Zealand transport outcomes by:

- providing expert advice to SCOT and ATC on road and road transport issues
- facilitating collaboration between road agencies
- promoting harmonisation, consistency and uniformity in road and related operations
- undertaking strategic research on behalf of road agencies and communicating outcomes
- promoting improved and consistent practice by road agencies.

Austroads membership
Austroads membership comprises the six state and two territory road transport and traffic authorities, the Commonwealth Department of Infrastructure, Transport, Regional Development and Local Government, the Australian Local Government Association, and NZ Transport Agency. Austroads is governed by a council consisting of the chief executive officer (or an alternative senior executive officer) of each of its eleven member organisations:

- Roads and Traffic Authority New South Wales
- Roads Corporation Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department for Transport, Energy and Infrastructure South Australia
- Department of Infrastructure, Energy and Resources Tasmania
- Department of Planning and Infrastructure Northern Territory
- Department of Territory and Municipal Services Australian Capital Territory
- Department of Infrastructure, Transport, Regional Development and Local Government
- Australian Local Government Association
- New Zealand Transport Agency.

The success of Austroads is derived from the collaboration of member organisations and others in the road industry. It aims to be the Australasian leader in providing high quality information, advice and fostering research in the road sector.
SUMMARY

The National Road Safety Action Plan 2007-2008 noted that moderation of travel speeds is critical in establishing a safe road system (Australian Transport Council 2007). On behalf of Austroads, ARRB Group has developed a framework for an intervention to promote safe driving among recidivist speeders. Five key tasks were carried out:

1. a literature review to investigate the scale and nature of speeding, with particular emphasis on the issue as it applies to the Australian and New Zealand road networks
2. an overview of key models of behaviour change to highlight factors that should be addressed by an intervention aimed at recidivist speeders
3. a literature review and consultations with road safety practitioners to identify interventions currently available in Australia and overseas for recidivist speeders
4. development of a best practice model that explores technological and behaviour change interventions, and how these should be applied to recidivist speeding offenders
5. the outlining of an appropriate method for a pilot of the proposed model.

Self report and speed survey studies suggest that a large percentage of Australian and New Zealand drivers exceed the speed limit on a regular basis. Research has reliably shown that repeat offenders are typically male and that they often possess one or several specific personality characteristics, such as impulsiveness. However, recidivist speeders are not a homogeneous group. For example, some speeders are 'unintentional speeders' while others are 'socially deviant drivers' according to one review. As such, in addition to eligibility criteria which ensure that the highest risk recidivists are selected for intervention, some capacity for tailoring to the audience is required.

Driver improvement courses that have been used in Australia and overseas provide useful information on how a course for recidivist speeders could be administered. The few examples that have been subject to outcome evaluation, along with some of the more well-researched behaviour change models, provide useful information on potentially valuable content and delivery approaches. This information was drawn together to arrive at a new intervention framework which combines an in-vehicle technology and an education and motivation based component that would each represent a new initiative.

This promising option is a program that combines the use of in-vehicle data recorders (IVDRs) and intelligent speed adaptation (ISA) with an education/motivation component. Programs using IVDRs and programs using ISA have both been successful in reducing unsafe driving. Combining the two systems would enable drivers (and course facilitators) to access feedback on unsafe driving behaviours, including speeding. A program based on a combined ISA/IVDR system would require substantial investment in equipment and an ongoing program of monitoring and group discussion. However, it is likely to be highly effective, at least in the short and medium term.

A brief overview of how this intervention option might be piloted in Australasia is put forward. Not only do in-vehicle technologies offer a promising intervention technique, they would allow relatively small pilot tests to yield statistically reliable results.
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1 INTRODUCTION

1.1 Background

The relationship between speed and crash risk is well established. Austroads (2005) reports that speed contributes to approximately 29% of fatal crashes in Australia and 35% of fatal crashes in New Zealand\(^1\). The National Road Safety Action Plan 2007-2008 (Australian Transport Council 2007) notes that moderation of speeds is critical in establishing a safe road system (Figure 1.1). A safe road system reflects a recognition that human error within the transport system is inevitable, and that when it does occur, the system should make allowance, so as to minimise the risk of serious injury or death. The safe system approach requires, in part, that:

- speed is managed, in a way that takes account of the risks on different parts of the road system
- road users are advised, educated and encouraged to obey road rules
- enforcement and penalties are applied to deter road users from breaking the rules
- roads and vehicles are designed to reduce the incidence of crashes, and the severity of crashes when they inevitably occur (Australian Transport Council 2006).

\(^1\) Relates to driving too fast for conditions, not necessarily exceeding the speed limit.
In relation to speed, the 2007 – 2008 National Road Safety Action Plan (Australian Transport Council 2006) suggests that:

- Speed in urban areas greater than 5 km/h above average, and 10 km/h above average in rural areas, doubles the risk of an injury crash.
- Reductions of as little as 1% in average speed result in reductions in fatalities and serious injuries.
- The chances of surviving a crash decrease markedly above certain speeds, depending on the type of crash.

Because even low end speeding increases the collective risk to road users there has been substantial investment in preventing such behaviour. Currently in Australia and New Zealand there is a heavy reliance on enforcement initiatives, backed up by mass media campaigns like the RTA’s Speeding: No one thinks big of you campaign and the Transport Accident Commission’s (TAC) Pictures of you campaign to deter drivers from speeding. Drivers for whom the deterrent effect of such measures falls short find themselves subject to increasingly severe penalties. For example, larger fines and more demerit points apply for higher speeds. At sufficiently high speeds, or following the accumulation of a sufficient number of demerit points, a driver’s license can be suspended or disqualified. Vehicle impoundment has also been adopted for ‘hoon’ behaviour in some jurisdictions. In Victoria, for example, police can seize cars and motorbikes used to commit certain offences, including exceeding the speed limit by 45 km/h or more, or travelling at 145 km/h or more in a 110 km/h zone (Perry 2007).

In keeping with the safe system approach, an intensive intervention for recidivist speeders may be a useful adjunct to this penalty structure. One of the actions listed in the 2007-2008 National Road Safety Action Plan is the establishment of a best practice model for the rehabilitation of repeat speeding offenders.

This report is focussed on describing the development of an intervention for recidivist speeders which combines education and driving assistance technologies. Education based programs for high level and recidivist speeders have been implemented in Australia and overseas. These have incorporated a large range of approaches and content. Technological advances in recent years have provided previously unavailable avenues for reducing an individual’s capacity to engage in speeding behaviour.

Nowhere have these programs and technologies been contrasted with each other in an attempt to identify the ‘best’ elements. This project goes one step further by drawing together these elements into a framework for an entirely new program.

1.2 Project Scope

This project involves a number of stages:

1. a literature review to investigate the scale and nature of speeding, with particular emphasis on the issue as it applies to the Australian and New Zealand road networks
2. an overview of key models of behaviour change to highlight factors that should be addressed by an intervention aimed at recidivist speeders
3. a literature review and consultations with road safety practitioners to identify interventions currently available in Australia and overseas for recidivist speeders
4. development of a best practice model that explores technological and behaviour change interventions, and how these should be applied to recidivist speeding offenders
5. the outlining of an appropriate method for a pilot of the proposed model.

1.3 Project Objectives

The aim of this project was to arrive at a framework intervention for recidivist speeding offenders. The project objectives are to:

- profile speeding offenders as well as identify the differences between first time and recidivist speeding offenders, and determine what characteristics distinguish these groups from each other (if any)
- gain a better understanding of the issue of speeding as well as the in-vehicle technological advances and education based measures that can be used to address the issue
- identify a best practice intervention framework that could be implemented to reduce speeding among recidivist offenders
- scope an appropriate method for a trial and evaluation of the proposed best practice model.
2 METHOD

2.1 Literature Review

ARRB’s MG Lay Library provided access to the relevant literature from the following databases:

- Transportation Research Information Service (TRIS) online
- International Transport Research Documentation (ITRD)
- PsycINFO (USA, via Dialog)
- ERIC – Education Resources Information Center (USA)
- The Australian Transport Index (ATI).

The literature was reviewed with respect to:

- the link between speed and crash risk
- the scale and nature of speeding in Australia and New Zealand
- characteristics of speed offenders, including differences between first time and recidivist speeding offenders
- models of behaviour change and what these suggest about the cognitive and social factors that should be addressed by an intervention for recidivist speeders
- existing technological and education based interventions and how effective these have been.

2.2 Consultation with Road Safety Practitioners

The consultation component of the project was aimed at identifying existing interventions for recidivist speeders. The consultation was focussed on Australian and New Zealand road authority initiatives (overseas material was sourced via the literature search). Only New South Wales and South Australia operate programs for recidivist speeders, although some other jurisdictions are contemplating such initiatives.

Representatives of the New South Wales Roads and Traffic Authority (RTA) and the South Australian Department for Transport, Energy and Infrastructure (DTEI) were consulted in relation to the Speeding Traffic Offenders Program (STOP) and the Driver Intervention Program, respectively.

These consultations were guided by the interview schedule presented in Appendix A.
3 OVERVIEW OF SPEED AS A ROAD SAFETY ISSUE

3.1 What is Speeding?

Broadly speaking, there are two approaches to the definition of speeding adopted by road safety practitioners and authors working in the field. According to the ‘legislative’ definition, speeding is driving a motor vehicle faster than is allowed by the law, that is, faster than the speed limit. An objective and readily measurable definition such as this is necessary for consistent enforcement. Some authors (e.g. Fildes et al. 1991; Wundersitz, Baldock, McColl & Allsopp 2001) have ‘stretched’ this definition in research on speed and crash causation, where ‘speeding’ was deemed to be involved in crashes prior to which the speed limit was being exceeded by more than a specified number of kilometres per hour.

However, it is also generally recognised by road safety professionals that the speed limit does not always represent an appropriate speed. Speed limits should be set with reference to factors such as road function, traffic composition, presence of vulnerable road users, road design and road characteristics (OECD & EMCT 2006). Even when this is the case, transient factors, such as inclement weather, short segments of adverse alignment, or even the particular vehicle being driven, for example, make the speed limit unsafe while those conditions exist.

3.2 Speed and Risk

Government investment in a driver improvement scheme, such as one aimed at recidivist speeders, is more easily justified if it can be shown that the target behaviours have negative safety consequences. Well-founded arguments for the negative safety consequences of speed abound.

3.2.1 Crash Causation

The faster a vehicle is travelling, the less time the driver has to react to hazards, and the more likely the vehicle is to lose traction at any given steering angle (Davis, Davuluri & Pei 2006). The graph used in the current Australian National Road Safety Strategy to illustrate that small changes in travel speed have a major influence on the incidence of serious crashes was drawn from work conducted by Kloedon, McLean, Moore and Ponte (1997). Kloedon et al. (1997) found that the risk of a casualty crash is approximately doubled with each 5 km/h increase in travelling speed above 60 km/h, but the risk associated with speeds under 60 km/h was not different (statistically) from the risk associated with 60 km/h (see Figure 3.1).
Kloeden, McLean and Glonek (2002) later re-analysed data from the 1997 study, concluding that if vehicles did not exceed the 60 km/h speed limit, there would be a 25% reduction in casualty crashes in this speed zone.

Kloeden, Ponte and McLean (2001) undertook a study focussing on rural casualty crashes in 80 km/h or greater speed zones in South Australia. As occurred in the urban environment, the relative risk of involvement in a casualty crash was shown to increase as speed increased, as outlined in Table 3.1.
### Table 3.1: Travelling speed and relative risk of involvement in a casualty crash in an 80 km/h or greater speed zone

<table>
<thead>
<tr>
<th>Speed difference</th>
<th>Relative risk</th>
<th>95% confidence limits of the estimated relative risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower limit</td>
</tr>
<tr>
<td>-10</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>-5</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>10</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>15</td>
<td>3.5</td>
<td>2.6</td>
</tr>
<tr>
<td>20</td>
<td>5.8</td>
<td>3.8</td>
</tr>
<tr>
<td>25</td>
<td>10.0</td>
<td>5.7</td>
</tr>
<tr>
<td>30</td>
<td>17.9</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Source: Kloeden, Ponte & McLean (2001)

#### 3.2.2 Crash Severity

As well as contributing to the likelihood of a crash, speed increases crash severity. The faster a vehicle is travelling when it collides with another object, the more rapid the deceleration and the more severe the injuries that result. Elvik, Christensen and Amundsen (2004) undertook a meta-analysis of results from 98 studies which included 460 estimates of relative changes in speed and crash or injury numbers in order to investigate the relationship between changes in speed and injury likelihood. Elvik et al. (2004) note some limitations inherent in the meta-analytic technique and in research on the speed/crash risk relationship, but suggest that the results still provided clear support for a ‘Power Model’ which is expressed in Figure 3.2.

![Figure 3.2: Change in crash severity by change in mean speed from 100 km/h](source)

The studies of Kloeden et al. (1997; 2001; 2002) and Elvik et al. (2004) are examples of the evidence that has led the road safety profession to accept speed as a factor in increasing the risk and severity of crashes. In Australia and New Zealand this acceptance has led to the implementation of a large range of countermeasures aimed at encouraging drivers to adopt appropriate travel speeds. However, many drivers still choose to speed.

3.3 The Extent of Speeding in Australia and New Zealand

Speed surveys and self-report data suggest that a considerable proportion of Australian and New Zealand drivers frequently exceed the speed limit. A smaller percentage choose to exceed speed limits by tens of kilometres per hour.

3.3.1 Speed Survey Data

Speed surveys involve the collection of speed information for vehicles which pass a particular point on the road network over a limited period of time. The systematic monitoring of speeds is not widespread in Australia (Wundersitz & Baldock 2008) but studies based on data from Victoria, Western Australia, South Australia and New Zealand were identified.

Whelan, Diamantopoulou, Senserrick & Cameron (2003) analysed speeds in 60 km/h zones in Victoria for 2001. The results for all 48 sites combined are presented in Table 3.2.

<table>
<thead>
<tr>
<th>Vehicle speed (km/h)</th>
<th>% of vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>61-70</td>
<td>32</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
</tr>
<tr>
<td>81-90</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 90</td>
<td>0.2</td>
</tr>
</tbody>
</table>


Expressed differently, these results suggest that:

- 40% of vehicles were exceeding the speed limit
- 7% were exceeding the speed limit by at least 10 km/h
- 1% were exceeding the speed limit by at least 20 km/h
- 0.2% of vehicles were exceeding the speed limit by at least 30 km/h.

It was not specified by Whelan et al. (2003) whether this data was collected only for vehicles operating under free-flow\(^2\) conditions or not.

D’Elia, Newstead and Cameron (2007) also report Victorian speed survey data, but provide no details of the surveys. Data for 60, 70, 80, 100 and 110 km/h zones is presented by D’Elia et al., and summarised in Table 3.3. Apart from urban 80 km/h zones, at least one third of drivers were exceeding the speed limit at the survey sites during the surveys.

\(^2\) Vehicles travelling at free speed have a gap between them and the vehicle in front (typically a headway of greater than four seconds is required before free-speed conditions are considered to apply), implying that the driver is ‘free’ to adopt a travel speed independent of any influence from other traffic.
Table 3.3: Proportion of vehicles travelling over the speed limit (Victoria, 2004)

<table>
<thead>
<tr>
<th>km/h over the speed limit</th>
<th>Speed zone (km/h)</th>
<th>60</th>
<th>70</th>
<th>80 (urban)</th>
<th>80 (rural)</th>
<th>100</th>
<th>110</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9</td>
<td></td>
<td>43</td>
<td>36</td>
<td>11</td>
<td>29</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>10-14</td>
<td></td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>15-19</td>
<td></td>
<td>2</td>
<td>1</td>
<td>.2</td>
<td>2</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td>20-24</td>
<td></td>
<td>.2</td>
<td>.4</td>
<td>.1</td>
<td>2</td>
<td>.3</td>
<td>.2</td>
</tr>
<tr>
<td>25-29</td>
<td></td>
<td>.3</td>
<td>.1</td>
<td>0</td>
<td>.4</td>
<td>.1</td>
<td>.1</td>
</tr>
<tr>
<td>30+</td>
<td></td>
<td>.1</td>
<td>0</td>
<td>0</td>
<td>.3</td>
<td>.1</td>
<td>.1</td>
</tr>
</tbody>
</table>

In Western Australia, state-wide speed surveys were conducted in 2000, 2003, 2004, 2005 and 2007. For the most recent survey (2007) 201 sites were surveyed. Of these 83 were in rural locations and 118 were in urban locations. The statistics presented in Table 3.4 were drawn from Radalj and Sultana's (2008) report on these surveys which suggest that, overall, 43% of vehicles traveling under free-flow were exceeding the speed limit and 10% were exceeding the speed limit by 10 or more km/h.

Table 3.4: Vehicles travelling over the speed limit: free-flow conditions (Western Australia)

<table>
<thead>
<tr>
<th>Speed limit (km/h)</th>
<th>Vehicles travelling in excess of the speed limit (%)</th>
<th>Vehicles travelling 10+ km/h over the speed limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>70</td>
<td>37</td>
<td>6</td>
</tr>
<tr>
<td>80</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>90</td>
<td>34</td>
<td>7</td>
</tr>
<tr>
<td>100</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>110</td>
<td>62</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: Radalj & Sultana (2008)

The DTEI's most recent *Annual performance indicators of enforced driver behaviours in South Australia* report (Wundersitz & Baldock 2008) provides speed survey data based on surveys undertaken at 21 rural locations: six in country towns on 60 km/h or 50 km/h speed zoned roads, six on 100 km/h zoned roads, six on 110 km/h zoned roads and three on remote outback roads. Table 3.5 shows a summary of the aggregated speed parameters for all free speed vehicles in the rural speed surveys conducted in 2006. Based on the 85th percentile speeds, it can be ascertained that over 15% of vehicles in all three speed zones were exceeding the speed limit.

Table 3.5: Surveyed free speeds in rural areas for all vehicles by speed zone (South Australia)

<table>
<thead>
<tr>
<th>Speed limit (km/h)</th>
<th>Mean speed (km/h)</th>
<th>85th percentile speed (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>100</td>
<td>93</td>
<td>103</td>
</tr>
<tr>
<td>110</td>
<td>103</td>
<td>113</td>
</tr>
</tbody>
</table>

There are no systematic on-road speed surveys conducted in the Adelaide metropolitan area but Wundersitz and McClean (2002) report on 2002 data collected in speed surveys conducted as part of an evaluation of the 50km/h default urban speed limit. Surveys of free-flow speeds were conducted at 52 locations zoned at 60 km/h in Adelaide and South Australian regional cities. The results are summarised in Table 3.6. Based on 85th percentile speeds it can be ascertained that on local roads fewer than 15% of drivers were exceeding the speed limit, but on collector and arterial roads, more than 15% of vehicles travelling at free speeds were travelling above the speed limit. The 95th percentile speeds suggest that for collector and arterial roads, 5% of drivers were travelling at least 9 km/h above the speed limit.

### Table 3.6: Surveyed free speeds in 60 km/h urban areas for all vehicles by road type (South Australia)

<table>
<thead>
<tr>
<th>Road type</th>
<th>Mean speed (km/h)</th>
<th>85th percentile speed (km/h)</th>
<th>95th percentile speed (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local streets</td>
<td>48</td>
<td>59</td>
<td>64</td>
</tr>
<tr>
<td>Collector roads</td>
<td>55</td>
<td>64</td>
<td>69</td>
</tr>
<tr>
<td>Arterial roads</td>
<td>59</td>
<td>65</td>
<td>70</td>
</tr>
</tbody>
</table>

New Zealand’s Ministry of Transport (MOT) conducts annual surveys of free speeds on randomly selected open road straights (zoned 100 km/h) and on urban roads (zoned 50 km/h), about 65 open road sites and 65 urban road sites are surveyed each year (MOT 2007). The 2007 results are summarised in Table 3.7.

### Table 3.7: Surveyed free speeds in 2007 (New Zealand)

<table>
<thead>
<tr>
<th>Speed limit (km/h)</th>
<th>Mean speed (km/h)</th>
<th>85th percentile speed (km/h)</th>
<th>% traveling over the speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>53</td>
<td>58</td>
<td>63%</td>
</tr>
<tr>
<td>100</td>
<td>96</td>
<td>103</td>
<td>29%</td>
</tr>
</tbody>
</table>

### 3.3.2 Self-Report Data

The Australian Transport Safety Bureau’s (ATSB) latest survey of community attitudes to road safety was undertaken in 2006 (ATSB 2006). A total of 1,644 telephone interviews with Australians aged 15 years and over were conducted. At least 150 residents of each Australian state and territory were interviewed. Stratified sampling was used to ensure adequate coverage of the Australian population by age, sex, state/territory and capital city/other locations and the results reported by the ATSB are based on weighted data, corrected for any under or over-representation of specific age, sex and location sub-groups that occurred as a result of the sampling method.

The issues examined included attitudes toward speed and self-reported speeding. Self-report measures related to illegal behaviours can be biased by social desirability effects, or the tendency for people to under-report behaviours they believe are socially unacceptable or in contrast to conventional norms. Self-report measures of speeding and of infringement notice history have been shown to fall into this category (Lajunen, Corry, Summala & Hartley 1997). Nonetheless, the ATSB survey revealed that 22% of males and 13% of females agreed with the statement that ‘it is OK to exceed the speed limit if one is driving safely’. Table 3.8 shows that about the same proportion of participants reported having been ‘booked’ for speeding\(^3\) in the past two years, and that almost one in 10 respondents admitted to exceeding the speed limit by at least 10 km/h, more often than not.

---

\(^3\) In addition, the risk of receiving an infringement notice is partly dependent on enforcement practices, with more intense enforcement activity, or lower enforcement thresholds, resulting in more infringement notices.
Interestingly, the only instance where the proportion of respondents who reported typically travelling in excess of 10 km/h over the speed limit is greater than the proportion who reported having been booked for speeding is probationary drivers. This may be because some probationary drivers have not been driving for a full two-year period, and thus have had less exposure than other driver categories to enforcement activities.

Table 3.8: Self-report infringement notice history and speeding behaviour

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>% of respondents booked in last 2 years</th>
<th>% of respondents who always, nearly always or mostly drive 10 km/h over the speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–24</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>25–39</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>40–59</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>60+</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>State/Territory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>VIC</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>QLD</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>SA</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>WA</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>TAS</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>NT</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>ACT</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Capital city/Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital city</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Other location</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Licences currently held</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full car licence</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Heavy vehicle licence</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Full motorcycle licence</td>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>Provisional car licence</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Net: Currently licensed</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Driver status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent distance drivers</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>Regular commuters</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Other regular drivers</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Less frequent drivers</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Been involved in a road accident in the last three years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: ATSB 2006
Speed surveys and a national self report study suggest that a considerable proportion of the Australian and New Zealand driving populations exceed the speed limit on a regular basis. The population of particular interest in this report, however, is the subset of drivers who speed frequently and substantially in excess of the limit. Research on the characteristics that differentiate recidivist speeders from the rest of the driving population is covered in Section 4.
4 RECIDIVIST SPEEDERS

It is important to understand the target population for a behaviour change intervention. This enables the materials, processes and messages to be tailored to the relevant external (environmental) and internal (psychological) factors which promote the problem behaviour.

4.1 Definitions of Recidivism in the Speeding Context

Recidivism is a tendency to lapse into a previous pattern of behaviour, and the term is typically used in relation to an illegal behaviour. There is an objective criterion by which ‘speeding’ can be defined (that is, speed limits), but there is no such benchmark for recidivism. Maltz (1984, cited in Payne 2007 p. 8) notes that ‘recidivism has been defined on an ad hoc basis, without consideration of its true meaning; and it has been measured in ways remarkable for their inconsistency’. Payne (2007) suggests, however, that this inconsistency is legitimate because of the variation in contexts in which recidivism has been studied.

Much of this report is devoted to compiling existing knowledge. In dealing with existing work, it is necessary to highlight the various definitions employed by other authors and practitioners in describing their work. Some authors define speed recidivism in terms of a particular number of speeding offences committed within a particular time period. For example, McColl (2001) defines recidivists as drivers detected over the speed limit more than three times in the two year study period. A greater number of authors, however, appear to use the term ‘recidivist’ interchangeably with terms such as ‘re-offender’ or ‘repeat offender’. These latter terms have implicit in them the implication that only one ‘re-offence’ is required in order to qualify. Papers by Lawpoolsri, Li and Braver (2007), Manderson et al. (2004) demonstrate this approach. Common to both approaches is a reliance on traffic offence history.

Similarly, implicit in the design of the best practice framework for recidivist speeders put forward in this report is the assumption that recidivist speeders will be identified (by the legal system) based at least partly upon their traffic offence history. Questions remain, however, as to exactly what type of offence history would suggest that a driver may benefit from such an intervention. A definition of recidivism that could be adopted for the purpose of selecting suitable candidates for the intervention put forward in this report is dealt with in Section 8.2.2.

4.2 Characteristics of Recidivist Speeders

The body of literature on the characteristics of recidivist speeders is growing. The difference between recidivist speeders and other speeders has been investigated in the studies outlined in this section of the report.

4.2.1 Studies Based on Infringement Data

McColl and Sutherland (1998) investigated the characteristics of repeat speed offenders and high speed offenders to provide information that would assist in targeting speed countermeasures. Two years (1995 and 1996) of South Australian speeding infringement notice data was used, yielding a sample of almost 356,000 speed camera offences, and almost 110,000 speed offences detected through other means, such as laser guns or mobile radars.
Repeat offenders were defined as those detected speeding at least three times in the two year study period. Considering both camera and non-camera offences together, approximately 8% of offenders met this criteria (10% of drivers identified by a camera, and 3% identified through other means). It is not stated in the report how data from drivers detected via both means were treated. If drivers detected speeding twice by a camera and once by non-camera means, for example, were not identified as recidivists, the incidence of recidivism will have been under-estimated.

Comparisons between the sample of recidivist offenders and other drivers revealed that:

- Only one in ten recidivist offenders identified by non-camera means was female, compared to one in four of the entire sample of offenders identified by non-camera means. For speed-camera offences, the entire sample and the recidivist sample contained a similar proportion of females (32% and 30% respectively).

- The mean age of recidivists identified by non-camera means was lower (28 years) than the mean age of other offenders (32 years). The mean ages for recidivist and all offenders identified by speed camera was similar (37 and 38 years respectively).

High speed offenders were defined as those who were issued an infringement notice for exceeding the speed limit by 31 km/h or more. Approximately 4% of offenders (2% of drivers identified by a camera, and 10% identified through other means) met this criteria. Comparisons between the sample of high speed offenders and other drivers revealed that:

- Only one in seven high speed offenders identified by non-camera means was female, compared to one in four of the entire sample of offenders identified by non-camera means. For speed-camera offences, one in four high speed offenders identified by non-camera means was female, compared to one in three of the entire sample of offenders.

- The mean age of high speed offenders identified by non-camera means (30 years) was similar to the mean age of all offenders (32 years). The mean age of high speed offenders identified by cameras (34 years) was lower than the mean age of all offenders (38 years).

Investigation of the offence data for high speed offenders only, revealed that as the number of offences increased, the percentage of higher speed offences tended to increase. For example, 21% of drivers with a single speed camera detected offence were travelling more than 15 km/h over the speed limit but 26% of drivers with three offences were detected travelling more than 15 km/h over the speed limit.

Based on speed camera offences alone, there appears to be no substantial age or gender difference between repeat speed offenders and speed offenders as a whole. Differences become apparent only when considering offenders identified by other means. This group contains a higher proportion of ‘high-speed’ offenders because, when using approaches other than speed cameras, a police officer can select targets and in a group of cars the highest speed car would normally be selected (McColl & Sutherland 1998).

Manderson et al. (2004) obtained just over 4.5 years of traffic infringement data for a sample of 200 Queensland drivers detected speeding by a traffic camera on an index day in 1999. All speed infringements detected between that day and October 2003, and all offences detected after 25 August 2004, or after the driver’s 17th birthday, were also extracted. Repeat speed offenders were those who committed at least one speed offence after the index offence. A high speed offence was one where the speed limit was exceeded by more than 20 km/h.
Almost 30% of offenders had committed a speed offence during the 12 months prior to the index event. The index offence of these drivers was more likely (a statistically significant ratio of 2.6) to be a high speed offence. Almost 70% of the offender sample committed a speed offence during the follow-up period and 44% committed at least two re-offences. One year after the index offence, 28% of drivers had re-offended at least once, a similar percentage to the proportion of drivers who offended within 12 months prior to the index offence. This latter group of drivers was not classified as repeat-offenders however, unless they also offended after the index offence. This highlights the somewhat arbitrary nature of deciding which offences do and do not count towards ‘recidivism’ based on temporal factors.

The following statistically significant findings emerged from the work of Manderson et al. (2004):

- Repeat offenders under the age of 25 years were no more likely to be male than non-repeat offenders.
- Repeat offenders over the age of 25 years were 1.3 times more likely to be male.
- Age was not a statistically significant predictor of repeat offences.
- Age and gender were both statistically significant predictors of the likelihood of a driver’s most severe offence being a high speed offence (with drivers under 25 years of age being 1.4 times more likely to have committed at least one high speed offence and males 1.6 times more likely to have committed at least one high speed offence).

Moffatt and Poynton (2007) examined the court appearance records of more than 70,000 drivers convicted of a driving offence in the NSW Local Court between 1998 and 2000. The mean age of the sample was 36 years and 90% were male. The primary aim of the study was to investigate the efficacy of fines, but the characteristics of repeat offenders were also reported. The authors state that repeat offenders were drivers who reappeared before the court for any new driving offence within five years of the reference offence (the offence noted between 1998 and 2000). The number of drivers who met this criterion is not specified. For the sample of 7,383 speed offenders, the following characteristics were statistically significantly related to a greater likelihood of returning to court for a driving offence within five years:

- a longer licence disqualification period imposed for the reference offence
- having a prior (to the reference offence) driving offence
- a higher level of disadvantage at the driver’s postcode, based on the SEIFA index (see ABS 2006).

The following characteristics were not statistically significantly related to a greater likelihood of returning to court for a driving offence within five years:

- total fine amount imposed for the reference offence
- age
- gender
- Indigenous status
- area of residence (regional or Sydney, Newcastle, Wollongong).

Rosman (2000) conducted a study aimed at measuring the association between traffic offences and crash involvement based on the records of all WA drivers over a three-year period. The recorded crash histories of passenger vehicle drivers and motorcycle and moped riders who held valid licences between 1996 and 1998 (inclusive) were analysed in conjunction with all speeding offences involving speeds 20 km/h or more above the speed limit recorded against these drivers during the same time period.
The driving records of 533,489 males and 491,960 females were available. During the three year study period 14% of males and 7% of females committed at least one criterion level speeding offence and of these, 20% of male offenders and 12% of female offenders had accumulated two or more infringements. This study indicated that the recidivism rate for both male and female offenders decreased with age as shown in Table 4.1. No analysis of crash history and recidivism were reported.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20 years</td>
<td>30%</td>
<td>18%</td>
</tr>
<tr>
<td>20-34 years</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>&gt;34 years</td>
<td>14%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source: Rosman 2000

The above studies have relied on court and/or infringement data to generate information about the characteristics of drivers who speed. However, such data sets are limited in terms of the characteristics that can be investigated. Most of the findings presented above relate to age and gender.

McColl and Sutherland (1998) and Rosman (2000) reported some evidence that compared to drivers who speed, recidivist speeders are younger. McColl and Sutherland (1998), Manderson et al. (2004) and Rosman (2000) all reported evidence that compared to drivers who speed, recidivist speeders are more likely to be male. However, these findings are not particularly robust. In none of these studies was statistical significance evaluated, and conflicting evidence (of no link between recidivism and age and recidivism and gender) a finding validated by statistical testing, was reported by Moffat and Poynton (2007).

One explanation for the mixed pattern of results is that higher speed repeat offenders are likely to be male and also likely to be young compared to higher speed single offenders. Non-speed camera methods of speed infringement detection are more likely to yield a high proportion of high speed offences. In McColl and Sutherland’s (1998) study, the non-speed camera data suggested a relationship between recidivism and age and gender. The speed camera data did not. The work of Rosman (2000), whose definition of a speeding offence involved speeds 20 km/h or more over the speed limit, suggested that age and gender were linked to recidivism.

The absence of consistent evidence regarding demographic differences between repeat offenders and other speed offenders is not a substantial setback in terms of targeting an intervention for recidivist speeders. The research outlined above serves to confirm the well documented fact that the majority of speed offenders are male, and that the majority of speed offenders are under 40 years of age (see Palamara & Stevenson, 2003 for an Australian review) and suggests that this is also the case for recidivist speeders. It is possible that those who repeatedly commit higher speed offences (for example, at least 15 km/h over the limit) are even more likely to be male and tend to be younger than the broader population of repeat speed offenders. Because higher speeds amount to higher risk (as outlined in Section 3.2) this group is particularly important. Materials and messages should be tailored to male recidivists in particular, and must be relevant to younger (under 30 years) drivers.
4.2.2 Studies Involving Self-Report

Simon and Corbett (1991) and Palamara and Stevenson (2003) incorporated self-report data into their studies on speed offenders. This enabled them to draw conclusions about more than demographic characteristics.

Simon and Corbett (1991) report on a roadside study of 110 drivers pulled over by British police for breaking the speed limit. After each driver was pulled over, after having been detected speeding by a radar gun (the report does not describe the enforcement threshold for speeding in the study), he or she was processed according to normal practice. Drivers were then asked if they were willing to be interviewed. Drivers who consented to being interviewed were asked questions about:

- reasons for exceeding the speed limit
- trip purpose
- reactions to being stopped by police
- speeding behaviour and intentions to speed in future.

Simon and Corbett noted the appearance of two groups of speeders. Deliberate speeders were more common among those pulled over for speeding at higher speed locations (with a posted speed limit of 70 mph) and were characterised by being in a hurry, confidence in their skill as a driver and a belief that travelling over the speed limit is safe. Inadvertent speeders were more common among those pulled over in 30 mph zones and tended to report that they had not been thinking, or had not been aware of the speed limit and/or the speed at which they were travelling. More recent research which has investigated speeder subtypes is presented in Section 4.3.

When asked whether being pulled over by police would deter them from speeding in future, 8% said it would not or would probably not because the speeding had been unintentional. Compared to the rest of the drivers sampled, the remaining 29% were more likely to:

- be exceeding the speed limit by more than 15 mph (81% compared to 51%)
- be driving a high performance/sports/up-market vehicle (38% compared to 15%)
- be driving a vehicle with an engine capacity greater than 1600 cc (87% compared to 65%)
- be driving a vehicle less than five years old (80% compared to 65%)
- report that being stopped by police was bound to happen/was just unlucky/made them angry with police (41% compared with 19%).

Compared to the rest of the drivers sampled, the drivers who indicated that being pulled over by police would not deter them from speeding were less likely to:

- report that being stopped by police made them feel distressed/embarrassed/annoyed with themselves (13% compared with 33%).
- report that being stopped by police made them feel guilty (21% compared with 48%)
- perceive a personal link between speeding and crash risk (35% compared with 67%).

Less substantial differences were found in relation to gender and self-reported speeding. Drivers who indicated that being pulled over would probably not affect their future choice of speed were slightly more likely than other respondents to be male (88% compared to 72%) and slightly more likely than other drivers to report exceeding the speed limit in which they had just been pulled over (50% compared to 34%).
Simon and Corbett (1991) note that their study is limited by the small sample size. It should also be noted that even though the interviews were not conducted by police, the potential impact of social desirability effects on the responses obtained in this study should not be overlooked. Nonetheless, this study suggests, that:

there may be a hard core of persistent and deliberate high speeders...Not only does the experience of a police stop seem unlikely to deter such drivers, but also the likelihood of or actual imposition of a disqualification may fail as a deterrent (Simon & Corbett 2001 p. 34).

Palamara and Stevenson (2003) used data collected for the Western Australian Young Driver Cohort Study to explore the traffic offence pattern of 17 year old metropolitan drivers, and to investigate what factors were predictive of this pattern, one, two and three years post-licensing. A sample of 1,277 17 year old drivers were recruited in 1997, after they had successfully completed the on-road driving test. Self-report measures of pre-licence driving experience and a range of psychosocial and behavioural factors were issued upon recruitment and one, two and three years after recruitment/licensing. Traffic infringement notice data for study participants was also analysed. Repeat speeding offenders were defined as drivers who incurred more than one infringement during the three year period of investigation. At 12 months post-licensing 7% of the sample were repeat offenders. By 24 and 36 months post-licensing, 26% and 40% of the sample were classified as repeat offenders, respectively. The likelihood of re-offending within 36 months of licensing was modelled using logistic regression. According to Palamara and Stevenson, three variables were correlated with repeat speeding offences:

• gender – compared to female offenders, male offenders were 1.4 times more likely to be repeat offenders.
• confidence/adventurousness – offending drivers who were high in confidence/adventurousness were 1.86 times as likely to be re-offenders than drivers rated moderate or low on this construct.
• impulsivity and sensation seeking – offending drivers who were rated as moderate to high on impulsivity and sensation seeking were 1.54 times as likely than offenders rated as low on this construct to be repeat offenders.

The variables that were not shown to be correlated with repeat speeding offences were:

• health related behaviours (smoking, alcohol, physical exercise and sun-protection)
• age at first driving
• self-report items related to driving without an appropriate permit
• self-report items relating to driving experience as a learner driver
• driver expectations of committing various on-road behaviours, including violations, lapses and errors, during the first twelve months of driving (as measured by the Driver Behaviour Questionnaire, see Parker, Reason, Manstead & Stradling 1995)
• driver attitudes toward speeding (outcome likelihood combined with outcome evaluations, see Ajzen & Fishbein 1980)
• driver normative beliefs toward speeding
• self-rated driving skill, demeanour and alertness.

It cannot be assumed that these characteristics are associated with recidivism among an older driving population, but this is the only study on repeat speed offenders identified which included an assessment of the personality characteristics of the sample.
4.2.3 Personality and Speeding

Personality traits are, by definition, a relatively permanent part of an individual’s psychological makeup. Personality is notoriously difficult to change. Achieving effective and long-lasting personality change in a high proportion of participants is beyond most purpose-designed interventions, let alone one aimed primarily at addressing a different issue (i.e. recidivist speeding). However, personality forms part of the context within which any behaviour change intervention must operate.

There is a large body of literature on the personality characteristics and profiles associated with risky driving, including speeding. Some personality characteristics, including two highlighted by the research of Palamara and Stevenson (2003), sensation seeking and impulsivity, seem to emerge repeatedly.

Sensation seeking describes a tendency to seek novel and thrilling experiences, and some drivers use a vehicle to gain such experiences. Jonah (1997) reported that of 40 studies reviewed, all but four revealed a positive relationship between sensation seeking and some aspect of risky driving (e.g. impaired driving, non-use of seat belts, speeding, following too closely, traffic violations). More recently Jonah et al. (2001), Sumer (2003) and Whissell and Bigelow (2003) have all found links between sensation seeking and speeding (or self-reported speeding).

Sensation seeking influences the way that drivers perceive and respond to risk. Put simply, those high on sensation seeking may see the risk of crashing or of being ‘caught’ by police as a reinforcing outcome of speeding. Jonah (1997) has suggested that sensation seeking may also; a) encourage drivers to respond to improvements in the safety of their environment by exhibiting greater risky driving (this has implications for some in-vehicle technologies) and b) manifest in aggressive behaviour toward other drivers to provoke a ‘stimulating’ aggressive response.

Impulsiveness is related to one’s control over their thoughts and behaviours. Impulsive people tend to act on the spur of the moment, without considering key aspects of the situation and the possible consequences of their behaviour. Those high on impulsiveness are less likely to choose the safest options when a more immediately rewarding option is on offer. In terms of speeding, some immediate payoffs might include getting to the destination more quickly (or at least feeling that one is getting there more quickly), impressing friends, or excitement (Styles, Imberger & Catchpole 2005). Dahlen et al. (2005) note that impulsiveness is conceptually similar to sensation seeking, however, impulsiveness deals with one’s control over their thoughts and behaviours while sensation seeking refers to one’s preference for novel experiences and a willingness to take risks.

Three additional personality characteristics, not assessed by Palamara and Stevenson, have been implicated in promoting speeding among drivers by other authors, anger, antisocial tendencies and desire for control.

Anger, hostility and aggression

Variants of what might be described with the umbrella term ‘anger’, have been implicated in promoting risky driving behaviours, including speeding. Miles and Johnson (2003) suggest that anger and hostility are components of the ‘Type-A behaviour pattern which underlies tendencies to be ‘competitive and to feel a sense of impatience and time urgency’ and which has been linked to speeding (Boyce & Geller 2002). Richer, Theoret and Bergeron (2007) suggest that the anger/hostility trait is linked to reckless driving but that a distinction should be made between ‘risky’ reckless driving and ‘aggressive’ reckless driving. Richer et al. argue that one difference between the two relates to speed choice. Risky driving is associated with choosing to travel at high speeds, independent of context, whereas aggressive driving is associated with behavioural reactions (i.e. increased speed) as a result of factors such as time pressure.
Antisocial tendencies

Antisocial behaviours reflect a lack of adherence to the social standards that allow members of a society to coexist peacefully. Speeding puts others (and the perpetrator) at risk and so can be defined as antisocial. Recent UK work (Poulter & McKenna 2007) revealed that speeding was rated by residents as more problematic for their local community than all 15 other comparison 'antisocial' behaviours (including vandalism and drug use and dealing).

West, Elander and French (1992; 1993) showed that faster driving was correlated with scores on questionnaire about drivers’ willingness to engage in behaviours such as riding public transport without paying the fare, minor tax evasion, shoplifting, and taking sick leave under false pretences. However, the ATSB (2006) survey described in Section 3.3.2 revealed that just under 40% of Australians think that ‘it is okay to exceed the speed limit if you are driving safely’ (ATSB 2006). This indicates that almost half the Australian population believes that exceeding the speed limit is acceptable under some circumstances (that is, if it is ‘safe’). If social standards in this country do not dictate that all speeding is unacceptable, antisocial tendencies are perhaps likely to be more strongly related to high level recidivist speeding than to lower level offences (which those more powerfully motivated to adhere to social standards may still be willing to engage in).

Desire for control

Research has suggested that the perception of being in control can lead people to accept greater risk in any given situation. Horswill and McKenna (1999) for example, showed that drivers are willing to accept higher speeds when asked to imagine driving a car (in control) than when imagining being a passenger (not in control). However, some people more strongly desire control, in general, than others. It has been revealed that those with a higher desire for control have a tendency toward greater perceived control over events over which they actually have no control (Burger & Cooper, 1979; Burger & Schnerring, 1982; Burger, 1986 as cited in Horswill & McKenna 1999).

Hammond and Horswill (2001) argue that given that people in a position of greater control tolerate higher risk, and people with a higher desire for control are more prone to illusions of control, drivers high in desire for control might be willing to tolerate higher risk. Indeed, using a driving simulator, Hammond and Horswill (2001) found that drivers high in desire for control tend to drive faster.

There is relatively little published research dedicated to exploring the characteristics of repeat or recidivist speeders and how they differ from other speed offenders, but a larger body of work on the characteristics of drivers who speed, in general, has been published. A useful way of aggregating the available research information on the characteristics of speeders is presented by Fylan et al. (2006) who describe four subtypes of speeder. The identification of subgroups of drivers who engage in a particular problem behaviour to facilitate better targeting of intervention is an approach that has also been used in the drink-driving (e.g., Wells-Parker et al. 1993; 1990) and the novice driver (e.g. Deery, Kowadlo, Westphal-Wedding & Fildes 1998) fields.

4.3 Subtypes of Speeder

Based on a comprehensive literature review, Fylan et al. (2006) identified subgroups of speeders, each with different reasons for speeding. Unintentional speeders are drivers who speed because they:

- have limited knowledge of traffic rules
- are not aware of the correct speed limit
- experience a lapse of attention
- temporarily underestimate their speed.
According to Fylan et al. (2006) the best way to reduce speeding among unintentional speeders may be to raise their awareness that they are at risk of speeding, and to teach them tips to identify the speed limit more effectively and how to monitor their speed. The primary need of unintentional speeders thus appears to be education on fairly basic road use skills that are probably not appropriate topics for the majority of high-speed recidivist speeders.

**Moderate occasional speeders** consider themselves to be safe and skillful drivers, and exceed the limit by an amount they believe to be relatively small. This group do not identify themselves as speeders, and typically do not experience pleasure from speeding. According to Fylan et al., the best way to reduce speeding among this group may be to increase their awareness:

- of the link between speed and crash risk
- that they probably overestimate their own driving skill
- that they probably overestimate the speed at which other drivers travel
- that their speeding behaviour is governed by their own decisions rather than the behaviour of other drivers.

**Frequent high speeders** are aware that they drive faster than average and may acknowledge that this represents an increased risk. Frequent high speeders nevertheless believe that they personally are safe drivers. This group has a higher intention to speed and a more positive attitude to speeding than Unintentional Speeders and Moderate Occasional Speeders, and they tend to speed more often and experience more pleasure and emotional outlet from driving. Importantly, these drivers take more risks and report more crashes or traffic violations.

Frequent high speeders are usually more experienced drivers and are more likely to be men. Their high-speed driving may be restricted to certain circumstances, such as a motorway. According to Fylan et al., the best way of reducing speeding among this group may be to increase their awareness of the link between speed and crash risk, of the penalties for driving at excessive speeds, and of the fact that they probably overestimate their own driving skills. Fylan et al. suggest that it is very important that the beliefs of frequent high-speeders be challenged convincingly, and that it is necessary to address the fact that for these drivers, speeding has become a habit.

Particularly interesting is the mention of ‘habit’ in relation to frequent high speeders. Often, one of the best predictors of future behaviour is past behaviour (Oullette & Wood 1998) and habits have been demonstrated empirically to strongly determine the behaviour of people in stable situations (Jager 2003). Although one may be conscious of performing a habitual behaviour, such as speeding, the actual performance of the habit may involve very little thinking. Indeed, Jager points out that habits benefit performance in daily life by keeping our minds free to think about issues that are not routine. However, the lack of thinking or ‘cognitive elaboration’ can also be problematic because new information is not taken into account when performing the behaviour. This means that it is often very hard to change a habitual behaviour using persuasive messages.

The more frequently a behaviour is performed, the more automated the choice process will tend to be (Jager 2003). Almost by definition, frequent high speeders engage in this behaviour often. One of the keys to successfully intervening in the speeding of this group will be making them ‘think’ about the behaviour each time they do it. In-vehicle technology could be used to achieve this.
Socially deviant drivers acknowledge that their speeding is dangerous. This group enjoys taking risks and breaking rules and may engage in more general law breaking. Socially deviant drivers score higher than other groups on the personality measures of psychoticism, thrill, adventure seeking and boredom. These drivers are more likely to be young and it is likely that some members of this group will lose their driving licence or have crashes. Younger drivers who grow out of this behaviour pattern are most likely to do so by the age of 26 years. According to Fylan et al., the best way of reducing speeding among members of this group may be to raise their awareness that their driving behaviour is immature, and that their personality profile causes them to underestimate the risks of speeding.

Higher speed recidivists create the most risk. Fylan et al. note that while both unintentional and moderate occasional speeders are only likely to exceed the speed limit by a small amount, frequent high-speed drivers and socially deviant drivers will show a much wider range of speeds. To identify frequent high speed drivers and socially deviant drivers based on traffic infringement history, Fylan et al. recommend looking for any excessive speed traffic violation and previous traffic violations (not necessarily speed related) and, in the case of socially deviant drivers, a range of traffic and non-traffic violations.

In summary, it is likely that frequent high speed drivers and socially deviant drivers are the most appropriate target groups for an intervention aimed at recidivist speeders and that these populations are identifiable based on conviction history.

4.3.1 Professional Drivers

One group that may be represented within the recidivist speeder population is heavy vehicle drivers. The National Heavy Vehicle Safety Strategy 2003–2010 (National Transport Commission 2002) includes more effective speed management among five strategic objectives, and cites Australian studies which have indicated that around 23% of heavy vehicles exceed the speed limit on roads with speed limits of 100 or 110 km/h and that 10% of articulated and B-double vehicles are travelling 10 km/h above the speed limit in 80 km/h zones.

Heavy vehicle drivers, and others who drive road vehicles as a key component of their employment (e.g. couriers, taxi drivers) represent a unique driver population in that their speeding is likely to be motivated by external pressures that are not so influential among other driver populations. For example, the National Transport Commission (2006) found that 62% of 619 heavy vehicle drivers surveyed at stops/terminals in five states (Queensland, New South Wales, Victoria, South Australia and Western Australia) reported that the most common reason they exceed the speed limit is ‘pressure to make deadlines’ or ‘pressure from boss’.

There are a variety of options for reducing speeding among heavy vehicle drivers that are not applicable to other driver populations. Among other approaches, Withaneachi (2007) recommends workplace communication strategies which include encouraging companies to implement anti-speeding policies and penalties for violations, encouraging companies (and clients) not to punish drivers for missing deadlines and to adopt payment systems that do not encourage speeding.

Although components of the intervention put forward later on in this report would be applicable to professional drivers, it is not designed to focus on the situational factors likely to be important in promoting speeding among this population (such as pressure from the boss). As such, audience specific interventions, such as those put forward by Withaneachi (2007) would remain important in preventing recidivist speeding among heavy vehicle drivers.
4.4 Implications of the Nature of Recidivists

Section 4 suggests that an intervention for recidivist speeders should cater particularly to young males (under 35 years). Candidates for such an intervention should have committed at least one high-speed offence among their speeding offences, while a history of other traffic violations would also support the case for intervention eligibility.

An intervention for recidivist speeders should be effective in the context of personality traits, such as sensation seeking or antisocial tendencies, that can make speeding immediately reinforcing for drivers. An effective intervention for speeders must also address the fact that for many participants, speeding will be a habit. In this case the driver may not be cognizant that there is an alternative behaviour pattern that he or she could engage in. Some in-vehicle technologies may be associated with an immediacy and obtrusiveness that means they help counteract this.

Having explored the nature of recidivist speeders, this report now shifts to an examination of the educational approaches and in-vehicle technologies that may promote behaviour change among members of this population.
5 EDUCATIONAL APPROACHES

Most of the literature on education-based interventions aimed at preventing speeding pertains to commercials, videos or slogan type messages. Based on 35 studies, Masten and Peck (2004) meta-analysed crash and traffic violation effect sizes for 106 individual driver improvement interventions (not necessarily speeding interventions) conducted in the United States. Inclusion criteria for the meta-analysis included the use of some form of comparison group, the inclusion of both subsequent crash rates and subsequent violation rates as outcome measures and the use of a classical experimental design employing random assignment or reasonably approximated treatment/non-treatment group equivalency.

While Masten and Peck note that interpretation of the effect size estimates was complicated by almost ‘ubiquitous heterogeneity’ in facets of study design, they also note that the meta-analysis suggested an overall positive impact of driver improvement interventions in general. The effect sizes for crashes and traffic violations translated into percentage reductions of 6% and 8%, respectively, for treated drivers compared with control drivers. However, the more meaningful results are those presented for the various intervention types individually. Nine treatment types were identified:

- combined
- providing educational or informational material
- group meeting
- individual meetings or hearings
- letter
- licence suspension or revocation
- licence extension
- contingent point reduction
- probation.

The most effective intervention type was suspension and revocation of licence. Of the education-based approaches, group and individual meetings were most effective. These types of intervention achieved statistically significant reductions in both crashes and violations. Group meetings were shown to produce reductions in crashes and violations of 5% and 8% respectively. Individual meetings or hearings were shown to produce reductions in crashes and violations of 8% and 10% respectively. Masten and Peck noted that the effects tend to increase as a function of the level of obtrusiveness of the interventions.

Two ‘obtrusive’ driver improvement interventions, both based around group meetings, stand out in the literature on driver improvement programs, because they have been relatively widely adopted, and because they have been subjected to evaluation. Followed by an overview of these, two Australian courses are outlined.

5.1 Speed Awareness Scheme and its Predecessors

5.1.1 The Course

In the UK, many police forces offer speeders a place on a Speed Awareness Scheme (SAS) course as an alternative to conventional sanctions. The majority of the courses target drivers detected speeding just above the 30 mph enforcement limit, usually 35 – 39 mph (Fylan et al. 2006), and it is noted by one of the deliverers of the SAS course (Driving Services 2008) that:
development of a best practice intervention model for recidivist speeding offenders

- unlike drivers who attend a Driver Improvement Course, where clients have generally made a mistake, clients attending a Speed Awareness Course may fall into one of three categories which need to be addressed:

- Clients who have made an error.
- Clients who have had a lapse in concentration.
- Clients who violate the law on a regular basis.

All participating forces offer a workshop which consists of a one-hour computer-based assessment involving speed choice and hazard perception and an interactive discussion session which lasts for two to three hours. The computer-based assessment determines, for example, how far behind the vehicle in front the participant would choose to travel at various speeds and how fast they would choose to drive on various road types. The data obtained provide the basis for a personalised five-page driving profile which is given to the attendee. This profile outlines the strengths and weaknesses of the driver and safety messages tailored to their personal responses.

During the discussion session, participants are encouraged to discuss the causes of their speeding and how they plan to stop. Scenarios are presented and discussed to highlight hazard perception skills and participants’ beliefs in their infallibility are challenged using discussion of driver stress, distraction and loss of concentration. Exercises are used to demonstrate human error, and the need to practice driving within the speed limit after the course is emphasised.

Some police forces also offer an on-road component which focuses on practical applications of the discussion material. During the on-road component, the instructor, a passenger in a vehicle driven by the participant, provides a commentary, pointing out speed and hazard awareness issues (as raised in the classroom). The participant is then asked to drive while highlighting hazards and speed limits. During this drive, the instructor reinforces appropriate behaviour and draws attention to areas for improvement. Throughout the intervention, participants are encouraged to see driving as a real skill that requires ongoing practice after the course.

5.1.2 Evaluations

The SAS courses originated from experimental courses developed at the University of Reading. McKenna (2004a) undertook a study aimed at determining the relative merits of one of these experimental courses and of fines and demerit points. Sensation seeking and time-pressure as important factors in promoting the speeding behaviour at the time of the speeding offence were also investigated.

The participants were 440 drivers who had been stopped by police for speeding. The majority were male, and the average age was 38 years. Participants who attended the course did not receive the fine or demerit points that would otherwise have accompanied their speeding offence. The trial course was divided into four sections:

- a 15-page questionnaire which covered factors such as sensation seeking, driving violations, speed choice, close following and driver fatigue. Different feelings associated with driving were also explored
- digital-video testing which measured hazard perception, speed choice, gap acceptance and close following
- discussion on speed choice with a focus on the possibility of a crash from speeding and anticipated regret
- an eyesight test.
At the end of the course drivers rated (on a five-point scale) each of the four course components. The study indicated that:

- The majority of drivers were motivated to attend the course to avoid the fine and the demerit points.
- The demerit points were more important than the fine for promoting attendance at the course for both men and women.
- The majority of participants indicated that the police were justified in stopping them for speeding.
- Nearly 70% of participants indicated they would drive more slowly in future.

The drivers were also asked about the usefulness of the course. The discussion was rated as the most useful (rated over 3.5, where 5 was ‘very useful’ and 1 was ‘not at all useful’), followed by the eyesight test and video tasks, both rated around 3.5 overall. The questionnaire was rated as least useful (under 3.0).

McKenna further developed the speed awareness course, drawing on both the criminological and psychological fields, and has completed various studies during the process. A second study by McKenna (2004b) involved 4,678 drivers who attended a low-speed program and 410 who attended a high-speed program. Low-speeders were drivers who had broken the speed limit at the low end of the violation scale, whereas high-speeders were those that were in considerable breach of the speed limit. McKenna does not provide any further definition of these groups. The program was similar to that described earlier, consisting of:

- a computer-based program, 40 to 50 minutes in duration that covered a broad range of topics including demographics, self-reported speed, driving violations, fatigue, driving experiences and aggression
- digitised video tests that assessed close following, hazard perception and speed choice
- four pages of feedback from the program task on the individual’s attitudes and ability, and safety messages tailored to their responses
- group discussion with a trainer, designed to cover perceived barriers to enforcement (e.g. why should the police enforce speed, is it just a money making exercise etc.) and how speed is linked to crash involvement.

High-speeders received the associated demerit points for their offence, whereas low-speeders did not. In addition, high-speeders undertook an on-road driving course (no information was provided about this course in the research report).

The difference between the high and low speeders was investigated. The investigation revealed that high-speeders also had more self-reported driving violations and more crashes than the low-speeders, and a greater proportion of the high-speeders felt that their speed had contributed to the crash. However, little assessment of program outcomes was undertaken. The few outcome assessments that were undertaken revealed that:

- The majority of participants found the digital video, risk profile and trainer discussion useful or very useful, but high-speeders found the digital video and trainer discussion slightly less useful than low speeders.
- Approximately 95% of course attendees (both high and low speeders) intended to drive more slowly following the course – as reported anonymously after the course.
- The usefulness response to the risk profile was the most effective predictor of speed intentions.
McKenna (2005b) continued the above work with a greater number of participants (9,475 low-speeders and 567 high-speeders). This study revealed that high-speeders were more aggressive and experienced more pleasure from driving than low-speeders, and more often reported using the vehicle as an emotional outlet. In terms of course outcomes, it was again revealed that approximately 95% of the course attendees (both high and low speeders) intended to drive more slowly following the course.

McKenna’s evaluations of the earlier courses are comprehensive, but they focus on individual differences and intentions relating to future speeding. Although intentions are often a pre-requisite of behaviour change, they do not necessarily translate into behaviour change (Sheeran 2002; Webb & Sheeran 2006).

Later evaluations incorporated measures of attitudes toward speeding, self-reported changes in driving habits and offence data, in addition to intentions to speed (see Fylan et al. 2006 for an overview of the Humberside, Lincolnshire and Northamptonshire trials) with encouraging results. Like intentions to perform a behaviour, attitude change does not necessarily translate into behaviour change, while self-report data is not a particularly reliable measure of behaviour change. Indeed, Fylan et al. report that the re-offence rates of participants in the Lincolnshire SAS trial who reported having changed their driving habits were no different from the re-offence rates of participants who reported having made no change.

Traffic offence outcomes are a better measure of course results (as discussed in Section 8.3). The re-offending rates of attendees and non-attendees in three SAS courses, as arrived at based on unpublished evaluations reviewed by Fylan et al. are summarised in Table 5.1. The difference between the re-offence rates for attendees and non-attendees was statistically significant in all cases, although not necessarily large in absolute terms.

Table 5.1: Summary of re-offending rates for attendees and non-attendees of four SAS courses

<table>
<thead>
<tr>
<th>SAS Course</th>
<th>Follow-up period</th>
<th>Attended</th>
<th>Did not attend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humberside</td>
<td>12–18 months</td>
<td>40 (8%)</td>
<td>125 (25%)</td>
</tr>
<tr>
<td>Lincolnshire</td>
<td>6–12 months</td>
<td>23 (5%)</td>
<td>46 (10%)</td>
</tr>
<tr>
<td>Northamptonshire</td>
<td>12 months</td>
<td>84 (7%)</td>
<td>125 (9%)</td>
</tr>
</tbody>
</table>

Source: Fylan et al. (2006)

It should be noted that none of these evaluations involved random assignment of participants. That is, the re-offence rates of drivers who chose to participate in the course were compared with the re-offence rates of drivers who opted instead to pay a fine. It is possible that those who choose to engage in the course, rather than paying a fine possess characteristics which make them less likely to re-offend anyway. Indeed, non-attendees in the Humberside SAS course evaluation were shown to be travelling at a slightly higher speed (‘slightly higher’ is not defined) than attendees when initially identified speeding, and the groups were not matched on the number of existing licence points. It is quite conceivable that drivers who are more genuinely interested in curbing their speeding behaviour are not only less likely to re-offend, but also more likely to be interested in undertaking an SAS course. It should also be noted that SAS courses are typically aimed at people who are not significantly over the enforcement speed limit, the majority of whom may be unintentional or moderate occasional speeders (as defined by Fylan et al. 2006).
There is evidence that SAS based courses are effective in reducing re-offending among the general population of speed offenders detected not substantially in excess of the speed limit. However, the evaluations which provide the evidence are methodologically flawed in that appropriately matched control groups have not been used to benchmark the outcomes apparent for the treatment group and provide confidence that these outcomes are not the result of extraneous factors, such as motivation to change.

5.2 The Televerket Road Safety Improvement Course

Although not specifically aimed at modifying speed behaviour, programs aimed at improving driver awareness of safety issues, skills and decision making are widespread and may have applicability to reducing recidivist speeding. An Australian review by Haworth, Tingvall and Kowadlo (2000) reports on eight fleet driver training programs in Australia, but no information on effectiveness was available. One overseas program which has been shown to be effective was run by the Swedish telecommunications company Televerket (Gregersen, Brehmer & Moren 1996). Gregersen et al.’s study has been influential in shaping courses offered by the driver training industry and it is possible that there are a number of effective courses on offer. However, published rigorous evaluations remain elusive.

The Televerket evaluation study compared reductions in crash risk (i.e. crashes per distance travelled) for four different treatment groups and a control group. The four treatments were:

- **Campaigns** – employees were given five talks throughout the year by specially trained employees, accompanied by videos, pamphlets and other supporting materials covering seasonally relevant topics. These included driving in darkness, stopping distance and ice at the beginning of winter, and in spring, vulnerable road users and loading tools and equipment. A summary discussion occurred during the last meeting.
- **Group discussions** – three groups were run, each including 8 to 15 employees, led by a group member who had attended a special introductory course. The company had pledged to do their best to act upon the suggestions made in the group discussions. The group discussions took approximately one hour and consisted of:
  - a warm-up exercise
  - small group work to identify crash risk problems
  - discussion of which problems could be solved by individuals and which could be solved by the company
  - discussions about measures and changes in driver behaviour
  - recording a change in practice on paper.
- **A bonus scheme** – a bonus, based on their respective crash cost savings, was given to each workgroup for a group purchase or activity.
- **Traditional driver training** – on-road training focussing on manoeuvres, skid control and commentary driving (aimed at improving speed adjustment, demonstrating stopping distances and fuel consumption) was undertaken.

Each of the five comparison groups included approximately 900 participants. Outcome measures included crashes per 10,000 km travelled. Based on two years of ‘before’ and two years of ‘after’ crash data, the study found that:

- The campaign group did not experience a reduction in crash risk.
- The bonus group achieved a small reduction in crash risk.
- The discussion and driver training groups achieved major reductions in crash risk.
Traditional driver training, however, would probably not be particularly helpful in the context of speeding prevention. In general, research indicates that drivers with a history of traffic violations and/or crashes do not have less knowledge or skill than drivers with a clean driving record (McKnight 1988; McKnight et al. 1982; Prothero 1976; Staplin et al. 1992; White & O’Connor 1990). Although skills in noting the correct speed limit, paying attention while driving and maintaining awareness of one’s speed may be of assistance to unintentional speeders, as described by Fylan et al. (2006), this group are not a key target group for a recidivist speeding intervention. In addition, as acknowledged by Gregerson et al., driver training has been discounted as an effective crash countermeasure (see Christie 2001 for a review).

Gregersen et al. identify discussion as an effective intervention method, point out that there may be other ways of designing these processes and remind the reader that conclusions from their study properly apply to only the programs they used. Nonetheless, they also point out that the techniques shown to be successful in their study may have a role in improving driver safety in fleets and in other settings, such as high risk drivers. In the context of this report, this evaluation is somewhat limited in that it is not clear whether the group discussions themselves, or the actions undertaken by the company as a result of the group discussions, played a role in promoting safety. The intervention for recidivist speeders put forward in this report would not occur in the context of a supportive company environment. The changes made will need to be made by the participants themselves.

5.3 Australian Examples

Of the Australian and New Zealand road authorities, only NSW and SA were identified as operating intervention programs for speed offenders.

5.3.1 The Driver Intervention Program (South Australia)

South Australia runs a Driver Intervention Program (DIP), available only in that state. The Department for Transport, Energy and Infrastructure (DTEI) is responsible for nominating candidates. The course is funded by fees from attendees and a contribution from DTEI. Clients are learner and provisional drivers aged between 16 and 25 years who are invited to attend after they have been disqualified from driving. They are required to attend a lecture lasting 1½ hours, for which they pay $33. Completion of the course enables attendees to avoid disqualification. Approximately 95% of enrollees complete the course.

There are currently 35 facilitators who are trained to deliver the course, with each facilitator delivering the complete course. The course aims to have 10 participants in each group, and approximately 3,500 people complete the course each year.

The DIP consists of a lecture; there is no on-road component. The key skills for facilitators are the ability to facilitate open discussion with clients and successfully encourage them to talk about issues that relate to their driving. The facilitator’s role is to encourage members of the group to reflect on and work through issues and problems. These include speeding, drinking/drug taking, inexperience, fatigue, seat belt wearing, and peer pressure. The course also attempts to deal with attitudes, lifestyle issues and novice drivers’ crash risks. There is no evaluation of course participant outcomes.

5.3.2 NSW STOP Pilot Program

A pilot Speeding Traffic Offenders Program (STOP) was run in NSW in 2007 (Wall 2007). Course content was developed by staff at the NSW Centre for Road Safety and was based on the findings of a study conducted for the Roads and Traffic Authority by the NSW Injury Risk Management Centre and on Fylan et al.’s (2006) review of effective interventions for speeding motorists.
The course included sessions that examined:

- influences on drivers’ choice of speed
- identifying risks associated with travelling over the speed limit
- the costs of speeding
- strategies to help drivers to stop speeding.

Two pilot courses were held, one in the metropolitan area (Penrith) and the other in a regional centre (Tamworth). Twenty-eight young (25 years or under) probationary licence holders attended the pilots over two consecutive weekends. Fifteen of the participants had either received a warning, or been ‘booked’ for speeding, and fourteen had been disqualified from driving. Measures were taken at four points during the pilot.

First, to determine participant suitability a pre-course telephone survey was administered to all potential participants in the week leading up to the course.

Second, participants completed an on-line survey in the first session of the pilot. A speeding profile for each participant, and the class as a whole, was developed from responses to the survey. The profile provided a basis for class discussions throughout the course and examined factors likely to contribute to speeding, including peer influence, perceived susceptibility, illusory invulnerability, sensation seeking and driver anger.

Third, participants completed a written survey immediately following the course. The survey examined three main areas; course experience, helpfulness of sessions and overall course rating.

Fourth, the pre-course telephone survey results were compared to a post course survey one month after completion of the course.

The speeding profile survey revealed that both groups indicated low perceived susceptibility to the negative consequences of speeding (such as being involved in a crash or being caught and fined by Police) and that there were more costs than benefits associated with obeying the speed limit. Participants also indicated that they experienced anger whilst driving. The profiles suggested that peers influence driving behaviour in both the urban and rural groups, but more so in the rural sample.

Participants most liked the hands-on activity of using a Lidar Laser Gun (a speed measuring device used by NSW Police to enforce speed limits), group discussions and the open environment created within the course. Nine participants reported that ‘the day was too long’. Comparison of the pre and post course telephone surveys suggested that the course was associated with some gains in knowledge about speeding and its consequences.

More participants estimated a more realistic cost to the community of a fatal crash following the course, and there was greater understanding of speed enforcement techniques and capabilities. However, there was little change in the estimate of the lowest collision speed with a pedestrian which was likely to result in a fatality. Results in terms of attitude change were mixed, but generally positive (as shown in Figure 5.1) with more participants saying they would consider speeding to overtake a slow driver or keep up with the traffic, but improved attitudes towards driving over the speed limit, police enforcement, and the financial savings associated with speed compliance.
5.4 Summary

No evaluations of programs aimed specifically at high-level recidivist speeders were identified. Evaluations, albeit of limited rigour, of the UK SAS courses suggest that this approach may be helpful in reducing speeding among lower level speeders, while the Televerket study, although difficult to interpret, also suggests that group discussions may be a good format for a driver intervention.

Two relevant Australian initiatives were identified. No evaluations of the outcomes of these in terms of traffic infringements or crash risk have been undertaken. However, a small pilot study of the NSW STOP program, which is based on the UK SAS approach, provided preliminary evidence of positive changes in speed related attitudes.
6 IN-VEHICLE TECHNOLOGY POSSIBILITIES FOR MANAGING SPEEDS

Interest in the deployment of in-vehicle intelligent transport systems (ITS) to address road safety and travel considerations has increased over recent years. Three of the most promising options are outlined below.

6.1 Intelligent Speed Adaptation (ISA)

6.1.1 The Technology

Intelligent speed adaptation (ISA) is a generic term used for a class of ITS which either provides feedback to the driver when the prevailing speed limit is exceeded or limit the vehicle’s speed to comply with the speed limit (Bishop 2005). ISA systems include a device fitted to the vehicle (mounted on the dashboard) which alerts the driver to the speed limit of the road on which the vehicle is travelling (Roads and Traffic Authority 2008). While there are a range of terms used worldwide to describe the key forms of ISA systems, Australian road agencies working with ISA have recently agreed to adopt the following terms (Office of Road Safety 2008):

- **Advisory ISA** – reminds drivers of the prevailing speed limit through visual and auditory, and/or in some cases ‘haptic’ (increased upward pressure on the accelerator pedal) warnings, but exerts no control over the vehicle.
- **Supportive ISA** – provides some degree of vehicle initiated limiting of speed, but allows the driver to override the system.
- **Limiting ISA** – includes vehicle initiated speed limiting that cannot be overridden (usually accompanied by an emergency failure function). Methods used to achieve this include throttle control, brake application, engine management system manipulation, fuel limiting or a combination of these.

Paine, Paine, Griffiths and Germanos (2007) provide a useful technical summary of ISA systems. To function, an ISA system must know the location of the vehicle, accurate to within a few metres. Location information must also be linked to a digital map containing information such as local speed limits and the location of variable speed zones (e.g. schools and strip shopping centres). In addition, advanced ISA can use real-time updating to include information on areas where speed limits should be reduced due to weather conditions (rain, snow, ice, fog) or around accident scenes and roadworks (Paine et al. 2007).

There are four main types of technology available for alerting the driver to the local speed limit. Some of these also determine the speed of the vehicle independent of the vehicle’s speedometer. These technologies are:

- **GPS** – a network of satellites constantly transmit radio signals which are picked up by GPS radio receivers. By comparing the signals from several satellites, the receiver’s location can be pinpointed, usually to within a few meters (for advanced receivers).
- **Radio Beacons** – Roadside radio beacons transmit data which the car mounted receiver picks up as it passes each beacon. This data could include local speed limits, school zones, variable speed limits or traffic warnings (roadworks, weather, etc.).
- **Dead Reckoning** (DR) – uses a mechanical system linked to the vehicle’s driving assembly, to predict the path that will be taken. By measuring factors such as the rotation of the road wheels and the angle of the steering wheel, a reasonably accurate estimation of the vehicle’s speed and location can be calculated (Paine et al. 2007).
Optical character recognition (OCR) – Some ISA systems use optical character recognition of speed signs. This eliminates the need for regular updating of the on-board digital speed limit map or beacons at, for example, roadworks.

Once the vehicle location has been determined, the accuracy can be checked by digital map matching, whereby the assumed location is compared with known roads (such as those available from a navigation map) and the system snaps to the most likely location on a known road. The most accurate ISA systems use a combination of GPS, dead reckoning and map matching (Basnayake 2004, Calafell 2000, Kao 1991 as cited in Paine et al. 2007).

6.1.2 Evaluation Studies

The TAC SafeCar study examined the effect of several in-vehicle ITS (including intelligent speed adaptation) on driver performance (Mitsopoulos et al. 2004). The study involved 15 experimental Ford passenger cars, equipped with ISA, Following Distance Warning, Seat Belt Reminder and Reverse Collision Warning systems. The ISA system equipment consisted of a GPS and an on-board computer which determined where the vehicle was located on a digital Victorian road network map. The computer also compared the vehicle speedometer-derived speed with the speed limit.

The ISA system had a two stage sequence to warn the driver he/she was exceeding the speed limit. When the driver exceeded the speed limit by two km/h or more, a static visual icon of a speed limit sign denoting the speed limit appeared on the Visual Warning Display (located to the left of the driver’s seat on the dash). This visual display was accompanied by a single audio tone (‘bong’). If this warning was ignored by the driver for two seconds or more, the visual icon flashed (red circle only) and was accompanied by strong upward pressure on the accelerator pedal. The driver could override the accelerator feedback by pressing hard on the pedal. A speed request button allowed drivers to manually request the speed limit at any time in any location. The depression of the button resulted in the speed limit being displayed on the Visual Warning Display, and this was preceded by the same auditory tone (‘bong’) (Regan et al. 2006).

A total of 23 fleet car drivers (21 males and 2 females) participated in the study. Fifteen drivers were ‘treatment’ drivers and eight acted as ‘control’ drivers. Data in relation to ISA were available for 14 of the 15 treatment drivers. For the treatment drivers, the study was divided into ‘before’, ‘during’ and ‘after’ periods. In the before period (at least 3,000 kilometres) the ISA was inactive. In the during period the drivers were exposed to the ISA. This phase also lasted for at least 3,000 kilometres. This was followed by a 1,500 kilometre after period, during which the ISA was inactive.

Objective measures of driving performance were collected via a data logger in each of the vehicles. Data for 50, 60, 70, 80 and 100 km/h speed zones were analysed, and in most cases, only free speed data (recorded when the vehicle had at least three second’s headway) were analysed. In the context of this report, results for 85th percentile, maximum speed and percentage of time spent over the speed limit are most relevant. For details on other speed related outcomes the reader is referred to Regan et al. (2006).

85th percentile and maximum speed

- Speed reduced significantly (by up to 2.7 km/h) from the before to the during period in 50, 60, 70 and 80 km/h speed zones.
- The maximum speed reached per trip reduced significantly (up to 2.6 km/h) in 50, 70, 80 and 100 km/h speed zones.
- There were no significant differences in 85th percentile and maximum speeds between the before and after periods, suggesting that the 85th percentile speed increased once the ISA was deactivated.
Percentage of time spent over the speed limit

- The average reduction across speed zones in the percentage of time spent travelling 10 km/h or more over the speed limit was 57%.
- Under constrained conditions (where headway was less than three seconds), the average reduction in the percentage of time spent travelling 5 km/h or more over the speed limit was 62%.

More recent field trials conducted on behalf of the UK DfT (Carston et al. 2008) have investigated how car drivers (a combination of fleet car and private car drivers) behave when driving with ISA. Under the ISA system used, any demand by the driver for a speed in excess of the limit was ignored. The driver could override this limiting either by pressing a button on the steering wheel or by depressing the accelerator pedal fully so as to make contact with an actuator button. Speed limiting was resumed when:
  - the driver brought vehicle speed back below the limit or
  - the driver pressed a ‘reengage’ button on the steering wheel or
  - the vehicle entered a new speed limit zone.

An LCD screen displayed the current speed limit when known.

Data were collected for 79 participants over three phases:
- Phase 1 was one month with no ISA, to serve as the baseline
- Phase 2 was four months with the ISA system active
- Phase 3 was one month with the ISA once more inactive.

The typical pattern was for speeding to reduce in Phase 2 as compared to Phase 1, and then for there to be at least a partial return to the baseline behaviour in Phase 3, resulting in a V-shaped pattern. With ISA, there was a statistically significant reduction in the proportion of distance travelled over the speed limit for all speed limits apart from 20 mph and 60 mph (as shown in Figure 6.1). However, there was no overall reduction in the amount of speeding from Phase 1 to Phase 3.
Study participants were categorised in terms of ‘intention to speed’. It is reasonable to assume that many recidivist speeders would fall into the ‘intenders’ category. Unfortunately, no breakdown of speeding behaviour for this group in particular was provided. However, ‘intenders’ overrode the system more than their counterparts, and intention to speed was the most consistent moderator of ISA acceptability to drivers, such that those expressing strong intentions to speed demonstrated the most resistance to ISA.

Carston et al. (2008) concluded that the evidence gathered suggests that the voluntary implementation of ISA may fail to target those who are most in need of the system, and thus implementation of an ISA system may have more potential if high risk groups are specifically targeted. However, the studies presented above seem to suggest that ISA systems may be helpful while they are fitted, but offer no long-lasting benefits, which indicates that even a targeted intervention should be supplemented by exercises aimed at promoting lasting change.

### 6.1.3 Australasian Intelligent Speed Initiative

Since May 2007, governments and industry have combined their efforts through the Australasian Intelligent Speed Adaptation Initiative (AISAI). AISAI represents collaboration between a group of state government transport and road safety agencies who want to promote the development of ISA technology across Australia and New Zealand. As well as making the case for ISA at the economic and policy level, individual members run trials of ISA to come to grips with the technical and other challenges which need to be overcome in order to make ISA a reality (Crackel & Toster 2007). As part of this initiative, 50 ISA advisory systems are being trialled in private and government volunteer vehicles in Western Australia. According to Crackel and Toster there are three main hardware components to the ISA system:

- a Personal Digital Assistant (PDA), which provides the visual and audible display
- a GPS antenna, which receives signals from a satellite
- computing hardware that determines the location of the vehicle and matches the position to the applicable speed limit and actual vehicle speed.

![Figure 6.2: Intelligent speed assist PDA installation](image)
The computing hardware will be downloaded with the latest digital information on speed zones for all public roads in Western Australia. From time to time, however, changes to permanent speed zones are made centrally by Main Roads WA and these will need to be captured in the in-vehicle database. As part of the trial, Main Roads WA will be trialling technology that will wirelessly transmit digital speed limit information updates to one of three beacons located in the Perth metropolitan area. ISA-equipped vehicles travelling within a theoretical 30 km radius of these beacons will automatically receive map updates through the wireless network. It is also possible for vehicles that have received the map update to wirelessly pass the update to other ISA-equipped vehicles in the near vicinity. Vehicles in rural areas will receive map updates through manual or wireless downloading.

According to the Office of Road Safety the objective of the WA demonstration trial is threefold:

- to create demand within the general community for ISA as a tool that will support drivers in choosing speeds that are at or below the prevailing speed limit
- to demonstrate that reliable ISA is technically possible on a large geographical scale
- to develop the systems within government (notably road agencies) that are necessary for the implementation of ISA on a state-wide (or even national) basis.

A NSW trial (by the NSW Centre for Road Safety) is also underway. This trial will involve fitting 100 vehicles from private fleets in the Illawarra Region with an ISA device and a speed data recorder. The project will run for 12 – 18 months and data recorded will form the basis of a report on system reliability and the benefits such technology would give motorists in NSW. The ISA system employed in this trial accesses a 'live' database, where the process for changing speed limits includes entering the changes on the database. Speed limit information is therefore always up-to-date. This also allows for the possibility of interfacing with dynamic speed limits, so that in-car advice matches the information given by roadside signs to take account of weather or traffic conditions.

6.1.4 In-vehicle Data Recorders

In-vehicle data recorders (IVDRs) are becoming widely available and are finding a range of applications. IVDRs have reached the point where the reliability of the technology, the cost, and the ease with which the information can be displayed and interpreted makes them viable for a range of applications, remedial programs included.

One of the most highly developed examples is the GreenRoad Safety Centre, which is a self-contained pack of instrumentation that provides the driver with feedback about the safety level of his or her driving, and which can be an effective tool in helping drivers to change their habitual driving patterns (http://www.greenroad.com/documents/greenroad_quickguide.pdf). The system does not deal primarily with speed (although it does respond to 'excessive speed', defined in relation to a pre-defined upper limit, but it does deal with many of the consequences of speeding, e.g. sharp decelerations, high lateral forces when cornering or changing lanes). Essentially, the system consists of:

- patented algorithms that can associate risk with specific vehicle movement and assess driver safety on the basis of speed and forward and lateral acceleration
- accelerometers, which measure the forces imparted on the vehicle while driving
- a GPS to track location and provide inputs to speed measurement
- a cellular phone connection to transmit data from the vehicle over a cellular network for website access
A display on the dashboard gives instant, ongoing feedback to the driver about the safety of their driving, a green light indicating safe driving, yellow indicating that the driving is moving beyond what can be considered safe, and red indicating an unsafe action. The web-based component accumulates trip information and sorts it into trip reports, which can be further aggregated to weekly or monthly driving reports. In a fleet setting, these may be the subject of discussion between drivers and their supervisors. The importance of instantaneous feedback in improving performance has long been understood (see Welford 1968 for a discussion of relevant studies to that date); at the same time, the trip or weekly reports offer a consolidated picture of performance which is discussed with the supervisor. This facilitates the setting of goals against which progress can be measured. Goal setting is widely recognised as essential for the initiation and maintenance of behaviour change (Locke & Latham 1990) as goals motivate people to lessen the discrepancy between their current circumstance and the desired circumstance (Lee, Locke, & Latham 1989).

Lotan and Toledo (2005) report on a study in which they attempted to validate an IVDR system for the purpose of monitoring and analysing driver behaviour (branded as Drive Diagnostics at that time). The IVDR sensors allowed the system to collect information on acceleration and speed. Pattern recognition algorithms are then applied to these raw measurements to identify and classify behaviours and manoeuvre types such as lane changes with and without acceleration, sudden braking and strong accelerations. Information from the vehicle was transmitted by wireless networks to a server, which contained a database of vehicle and driver-specific history. The specific behavioural events identified can be synthesised to evaluate trip safety or driver safety over time. In addition, real-time feedback, which typically includes warnings on dangerous behaviour could be delivered either as a text message sent to the driver or to others (e.g., fleet managers, parents of a young driver) or using an in-vehicle display.

In preparation for the larger study, the system was validated as a predictor of driver safety using data collected from 29 vehicles. This pilot study is described in Toledo and Lotan (2006). Crash history and costs for the pilot drivers were collected. The instrumentation package was installed in the cars of the participating drivers, who then drove for one or two months without receiving any feedback from the system (profiling stage), while data on their driving was accumulated. A risk index was calculated for each driver, who was classified as safe, unsafe or dangerous based on the rate and severity of the events they generated, and this index was compared with the drivers’ crash record.

The risk index correlated well with the number of at fault crashes per year ($r = 0.87$) and the cost of crashes per year ($r = 0.72$). Following the ‘blind profiling’ stage, the nature of the system was explained and risk profiles discussed with individual drivers. In the first month, drivers accessed their risk profiles an average of nine times and the risk index fell by an average of 40%. This reduction in risk index was maintained until the fourth month, when it began to rise. By the fifth month it was back to where it had been at the start of the study. Log-ins to the web site showed a continual decrease, finishing with an average of two in the fifth month.

Only preliminary results for the main experiment were reported. These results are focused on the differences between the young drivers and their parents but Lotan and Toledo (2005) report intending to conduct future analyses to test the impact of the program on driving behaviour (although no published accounts of this analysis could be identified).
Toledo, Musicant and Lotan (2008) report on a trial of IVDRs in 191 compact pickup trucks owned by a single company (among a fleet of approximately 1400 vehicles). Each trial vehicle had only one driver and the driver sample consisted of 189 males and 2 females, none of whom were professional drivers. The IVDR program was implemented in two stages:

- The blind-profiling stage began immediately after the IVDR was installed in the vehicle and lasted approximately eight weeks. This time was used to obtain baseline data for each driver, and although drivers received a general explanation of the IVDR, they were not given any feedback. Drivers were, however, told that the information gathered would not be used by their managers.

- The feedback stage followed the blind-profiling stage. At the start of the feedback stage the drivers attended a meeting in which they learned more about the IVDR system. They received feedback on their driving and were given access to a web site showing their own driving data and information on how this data compared to the fleet’s averages. Drivers were informed that the IVDR records would not be used to penalise them.

Real-time feedback was not available to participants but all trips were monitored and records of the log-ins made by all drivers to their personal driving reports were collated. In addition, crash history information for each driver was collected from the company records. The IVDR’s were used for exactly seven months.

Comparison of crash rates for the before period and the experimental period revealed a statistically significant reduction of 38%. There was no reduction in rates of ‘at fault’ crashes though. Toledo et al. also note that the crash rate for the rest of the company fleet dropped by 19% during the same period.

Driver risk-indices were calculated for the blind-profiling period and for each one of the seven months following exposure to the feedback. The risk indices were shown to be lower after initial exposure to IVDR feedback. The reduction in the mean risk index from the blind-profiling period to the first month after the exposure was a statistically significant 33%. The risk indices were also shown to remain at a relatively constant level during the seven months after exposure. This is highlighted in Figure 6.3.

![Figure 6.3: Monthly mean, median and 85th percentile driving risk indices](source: Toledo et al. (2008))
The authors note, however, that some of their previous work which involved the analysis of data gathered from other fleets over a longer period revealed an upward trend in risk indices over the longer term. In their conclusion Toledo et al. suggest that further research is needed to better understand the long term impact of IVDR installation and to develop feedback management systems which will maintain drivers’ interest and maximise the impact of the feedback.

6.1.5 Speed Sensitive Accelerator Pedal

Speed sensitive accelerators are composed of an electronic control unit, a feel forces actuator and a speed selector with a display. The driver can preset speeds and then recall at any time the speed he/she may wish to travel at. When the vehicle reaches the selected speed, a force feedback will stabilise that particular speed. Although this technology has the potential to help drivers avoid unintended speeding, it is only recently developed and no studies have evaluated its effectiveness in the prevention of speeding.

6.2 Summary

Although they have not been trialled as an intervention for offenders, it appears that in-vehicle technologies such as ISA and IVDRs may have the potential to impact upon driving behaviour. However, evaluation studies focusing on both ISA and IVDR suggest that any positive impact may be short-lived. Combining one of these technologies (or a combination of the two) with an education based intervention may produce more lasting change.

The group-discussion based approaches described in Section 5 also show some promise. Adapting them for use in combination with an in-vehicle technology, and adapting this combined approach for application to frequent high-speed drivers and socially deviant drivers represents an opportunity to draw on additional sources of information, other than evaluation studies, on effective behaviour change strategies. Several social-cognitive models, applied widely in the field of health psychology and health promotion are outlined below.
7 BEHAVIOUR CHANGE MODELS

There are many theoretical frameworks aimed at predicting behaviour and describing the way in which people make decisions about health related behaviours. These can be used to guide content selection for behaviour change interventions and increasingly, such theories are being applied in the design and implementation of interventions to change risky behaviours. Five frameworks which have particular applicability to speeding are outlined below.

7.1 Health Belief Model

The Health Belief Model (HBM) was developed to account for the uptake of health behaviours. Although the terminology typically employed in describing the model’s constructs is more fitting to disease prevention than injury prevention, the model can still be applied to adoption of behaviours aimed at preventing injury (such as driving safely). According to the HBM (Rosenstock 1966) health-related behaviours are influenced by an individual’s assessment of the:

- risk of contracting the condition (perceived susceptibility)
- seriousness of the condition and its potential consequences (perceived severity)
- influences that discourage adoption of the promoted behaviour (perceived barriers)
- positive consequences of adopting the behaviour (perceived benefits).

Overall, two key factors influence the likelihood that a person will adopt a recommended preventive health action (for example, refraining from speeding). First, the individual must feel personally threatened by the disease; that is, he or she must feel personally susceptible to the disease and believe that it has serious consequences. Second, the person must believe that the benefits of taking the preventative action outweigh the perceived barriers to, or costs of, preventive action (Fishbein 1995). The HBM is depicted in Figure 7.1.

![Figure 7.1: The Health Belief Model](image)

Seven of the eight reasons that drivers most commonly provide for speeding (according to Silcock et al. as cited in Campbell & Strandling, 2003) can be shown to fall into the categories described by the HBM as outlined below:

- ‘It was unintentional’ – This belief reflects a *perceived barrier* to driving at the speed limit and could be interpreted as ‘I can't stop doing it if I don’t know I’m doing it'.
‘I was being forced to speed’ (‘someone was tailgating me’) – This belief reflects another perceived barrier to adhering to the speed limit.

‘I was in a hurry’ – This reason reflects a perceived benefit of speeding, that is, that speeding will mean arriving at the destination sooner.

‘I think the limit was wrongly set for the location’ – This belief reflects a lack of perceived susceptibility and could be interpreted to mean ‘if the speed limit is too low for the road, exceeding it is not dangerous’.

‘My modern car can stop more quickly than those on the roads at the time the limit was set, therefore my speeding is safe’ – This is a second example of a lack of perceived susceptibility and could be interpreted to mean ‘if the speed limit is too low for the car that I drive, exceeding it is not dangerous’.

‘I don’t think the same speed limit should apply at all times’ (when the road is empty, late at night) – Again, a lack of perceived susceptibility is evident. This belief could be interpreted to mean ‘if the speed limit is too low for the traffic conditions, exceeding it is not dangerous’.

‘the limit does not apply to me because I am an above-average driver’ – This is also a fairly direct reference to a lack of perceived susceptibility.

The eighth reason identified by Silcock et al., which is not readily categorised using the HBM framework, is ‘my speeding is acceptable because it is not a lot over the limit and others abuse the limit more flagrantly’. This belief appears to be an example of a supportive subjective norm, described below.

7.2 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) was developed by Ajzen in 1985[^4]. Ajzen suggests that the main determinant of behaviour is a person’s intention to engage in it. The TPB consists of three facets that control intentions:

- attitude – positive and negative evaluations about performing the behaviour
- subjective norm – perceived social pressure concerning the behaviour
- perceived behavioural control – perceived ease or difficulty of performing the behaviour.

The TPB is represented graphically in Figure 7.2.

[^4]: The Theory of Planned Behaviour is an extension of the Theory of Reasoned Action that was developed by Fishbein and Ajzen in 1975.
According to the TPB:

- Attitudes are the product of beliefs about the likelihood of various outcomes (for example, being fined) occurring as a result of performing the behaviour and beliefs about how good or bad each outcome is.
- Subjective norms are a product of the perceived amount of pressure from others to perform the behaviour and motivation to comply with these others.
- Perceived behavioural control is a product of the perceived likelihood of factors which inhibit or facilitate performance of the behaviour and corresponding beliefs about the perceived power of these factors.

A frequent criticism of the TPB is the imperfectness of the link between intentions and behaviour. Put simply, people often do not always act as they intend to. A construct that appears important to the translation of intentions into behaviour is implementation intentions (Gollwitzer 1993). A useful summary of implementation intentions is presented by Fylan et al. (2006, p 13):

> While goal intentions are concerned with intentions to perform a behaviour or achieve a goal (i.e. ‘I intend to comply with the speed limit’), implementation intentions are concerned with plans as to when, where and how the goal intention is to be translated into behaviour (i.e. ‘I intend to comply with the speed limit when I drive to work’). The important point about implementation intentions is that they commit the individual to a specific course of action when certain environmental conditions are met; in so doing, they help translate goal intentions into action. Gollwitzer (1993) argues that by making implementation intentions, individuals pass control to the environment. The environment therefore acts as a cue to action, such that when certain conditions are met, the performance of the intended behaviour follows almost automatically.

### 7.3 Social Cognitive Theory

Social cognitive theory (SCT) explains how people acquire and maintain behavioural patterns (for example, recidivist speeding) while also providing the basis for intervention strategies. SCT in its current form was advanced by Bandura (1977) who expanded on social learning models of earlier years (e.g. Miller & Dollard 1941).
Earlier social learning models posited that human behaviour was reactive, the result of interplay between internal drives and the environmental factors which could positively or negatively reinforce or punish behaviour. Both social and physical environmental factors were recognised as important. Social environment factors might include family members, friends and colleagues. Physical environment factors, in relation to recidivist speeding, might include traffic conditions, weather conditions, road type, vehicle type, and so on. Bandura introduced the concepts of vicarious learning and self-efficacy to supplement this notion.

Vicarious learning is learning from observing the outcomes of behaviour exhibited by others. Self-efficacy is the judgement about one’s own ability to perform the behaviours required to achieve specific goals (similar to perceived behavioural control, a component of the TPB). According to Bandura (1998, p. 6-7):

In social cognitive theory, efficacy beliefs operate as one of many determinants that regulate motivation, affect, and behaviour…Outcome expectations about the effects of different lifestyle habits also contribute to health behaviour…the anticipated positive outcomes serve as incentives, the negative outcomes as disincentives…Behaviour is also partly regulated by the social reactions it evokes. The positive and negative social sanctions constitute the second class of outcomes…[people also] adopt personal standards and regulate their behaviour by their self-sanctions. They do things that give them self-satisfaction and self-worth, and refrain from behaving in ways that breed self-dissatisfaction. This third class of outcomes concerns the positive and negative self-evaluative reactions to one’s behaviour. Evaluative self-sanction is one of the more influential regulators of human behaviour but is typically ignored in models of personal change.

Figure 7.3 highlights the links between the various factors described above and behaviour.

Source: Bandura (1998)

**Figure 7.3: Social Cognitive Theory**

### 7.4 Other Behaviour Change Models, Overlap, and What is Important in the End

The HBM, TPB, and SCT are three relatively well researched models that can be employed to explain behaviour change, and thus guide behaviour change interventions. Other examples include:

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5 By definition, reinforcement (both positive and negative) increases the target behaviour. Potential 'reinforcers' can only be called such by demonstrating increases in behaviour after their administration.
- Protection Motivation Theory
- The Transtheoretical Model
- Theory of Subjective Culture and Interpersonal Relations
- The Self-Regulation Model

These frameworks are not all described here, largely because similar concepts emerge repeatedly. Indeed, a number of authors have commented on the theoretical overlap between constructs contained in the main behaviour change models. Over ten years ago, Fishbein (1995, p. 249-250) described the outcomes of a meeting between principal proponents of several of the most prominent behaviour change theories:

Consensus was reached on eight variables that appear to account for most of the variation in any given behaviour: intentions, skills, environmental constraints, outcome expectancies (or attitude), norms, self-standards, emotional reactions, and self-efficacy. Generally speaking, it appears that for a person to perform a given behaviour, one or more of the following must be true:

1. The person forms a strong positive intention, or makes a commitment, to perform the behaviour;
2. There are no environmental constraints that make it impossible for the behaviour to occur;
3. The person possesses the skills necessary to perform the behaviour;
4. The person believes that the advantages (benefits, anticipated positive outcomes) of performing the behaviour outweigh the disadvantages (costs, anticipated negative outcomes) - in other words, the person has a positive attitude toward performing the behaviour;
5. The person perceives more normative pressure to perform the behaviour than to not perform the behaviour;
6. The person perceives that performance of the behaviour is more consistent than inconsistent with his or her self-image or that it does not violate personal standards;
7. The person’s emotional reaction to performing the behaviour is more positive than negative; or
8. The person perceives that he or she has the capabilities to perform the behaviour under a number of different circumstances - in other words, the person has self-efficacy with respect to executing the behaviour in question.

### 7.5 A Communication Model

Behaviour change models such as those outlined above provide guidance on the types of messages that promote behaviour change. The Elaboration Likelihood Model (ELM) (Petty & Cacioppo 1986) provides guidance on which delivery methods are most likely to prove effective. The ELM outlines the basic processes underlying the effectiveness of persuasive communications, such as would take place in an educational course for recidivist speeders. The ELM distinguishes between two routes to persuasion: the central route and the peripheral route.

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6 An overview of all of these models as they relate to speeding is presented in Fylan et al. 2006.
The central route involves careful scrutiny of the persuasive communication (e.g. a lecture) to determine the merits of the arguments. The peripheral route, in contrast, is used when the audience does not pay close attention to the persuasive communication and is instead swayed by more superficial characteristics of the message, such as the perceived credibility or attractiveness of the source or the quality of the presentation.

Attitude change via the central route appears to be more persistent, resistant to change and predictive of behaviour than that which occurs via the peripheral route (Petty & Cacioppo 1986). Petty and Cacioppo (1997) suggest that people using central route processing will react in a similar way to the same argument because they have considered all sides of the argument. This suggests that central route processing leads to more predictable change. Predictable and lasting change is important in terms of an intervention for recidivist speeders. This means that an intervention aimed at recidivist speeders should be designed to encourage participants to process the message via the central route.

When central route processing (see Figure 7.4) is considered in isolation, more persuasive messages will be those which:

- occur in conjunction with the ability to process: Information processing is more likely to occur if the individual is not distracted at the time and if the messages are repeated. The information must also be accessible to the receiver (for example, in terms of the language used).
- enhance motivation to process thoroughly: Petty and Cacioppo (1997) suggest that if the issue at hand is of high personal importance, persuasion was more of the central route. It is therefore important to demonstrate how an issue is meaningful and relevant to the audience.
- are well-constructed and convincing (incorporating evidence, examples, reasoning, and logic). The exact nature of a good quality argument depends upon the receiver and corresponds with their perspective on the target issue.
The ELM aligns well with some general principles of adult education, which include:

- Build on the knowledge and experiences of the group/individual.
- Make the learning environment comfortable and encouraging.
- Ensure that the learning activity meets the needs and relates to the problems of the client group.
- Make sure activities actively involve people, are stimulating and participatory.
- Allow time for people to reflect on what they are learning, take difficult subjects slowly and always be open to questioning.
- Build group confidence that they are making progress towards their learning goals (Fell 2007).

### 7.5.1 Summary of Important Content

In relation to an intervention for recidivist speeders, the theories covered in this section suggest that the following topic areas should prove helpful:

- Exploration of perceived environmental and normative pressure to speed and problem solving to address these issues.
- Clear, concise, credible and accurate information highlighting the fact that most drivers do not engage in the same speeding behaviours.

- Clear, concise, credible and accurate information on the costs of speeding. Research has shown that drivers who speed do not believe they are at risk or that they pose a risk to others (Rothengatter 1988), and statistically speaking, most drivers will not be involved in a serious injury crash as a result of their speeding. As such, the potential costs of injury should not be the focus of such information. Indeed, McKnight (1986) suggested that driver improvement courses should focus on the sanctions associated with committing further violations, since research shows such courses are more effective than courses that provide safe driving information.

- Exploration of the emotional reactions and emotional precursors to speeding, and the cognitions that underpin these reactions, with the aim of having course participants a) perceive greater control over the behaviour and b) identify techniques for dealing with the emotional precursors to their speeding.

- Implementing techniques aimed at securing a commitment (possibly to oneself, to the rest of the group, or to a family member) to change the unsafe behaviour, and details about when, where and exactly what constitutes ‘successes’ may also be helpful.

The ELM and adult learning principles appear to suggest that interactive discussion should form the core of an education program. This format also enables a skilled instructor to tailor the messages to the audience.

In addition, arguments presented during the intervention should be factual. Attempting to convince drivers that they are likely to be killed because of their speeding, for example, is unlikely to help and may detract from the credibility of other messages presented. The course should be spread over several sessions (to allow for thorough message processing) and a supportive approach should be adopted by the instructor and encouraged within the audience.

So far, this report has outlined what empirical and theoretical work to date reveals in relation to who recidivist speeders are, and how recidivist speeders might best be encouraged to change their driving behaviour. The report now shifts focus to what initiatives could be implemented in future.
8  TOWARDS A BEST PRACTICE MODEL

Chapter 8 draws together material presented in the previous sections to highlight, in broad terms a promising option for an intervention to prevent speeding among recidivists.

8.1  Intervention Format

8.1.1  The Most Promising Possibility

The present generation of IVDRs can process only absolute speed and changes in speed and acceleration. ISA technology as it stands does not record when the speed limit has been exceeded. Combining features of the two technologies would create a powerful package for monitoring speeds and maximising the likelihood of change in speed behaviour.

If an IVDR can be configured to communicate exceeding the speed limit in addition to high risk braking and cornering behaviours, and to record these in addition to the existing dynamic data, then comprehensive feedback about speed behaviour would be available to the driver. This would include not only exceeding the speed limit, but also instances where speed was too fast for the conditions, resulting in excessive braking or cornering forces.

At least one commercial monitoring service is already available in the US, Instamapper, which tracks mobile phones loaded with the appropriate software (http://www.instamapper.com/fe?page=demo). The mobile phone is programmed to call in at set time periods with GPS location information. From previous data, Instamapper can calculate speed and heading. This information can then be aggregated to provide reports.

Evidence to date suggests that the benefits that might be achieved using in-vehicle technologies will not persist in the long term. Experience gained during the development of alcohol interlock programs suggests that interventions based around the use of alcohol interlocks should incorporate education, counselling and regular assessment of progress. For example, the following conclusions emerged from the Traffic Injury Research Foundation symposium on alcohol interlock programs (Beirness 2001):

- Evaluations of interlock programs consistently show that interlock participants have drink-driving recidivism rates that are as much as 90% lower than among non-participants as long as the interlock is in the vehicle.
- Once removed, recidivism rates are comparable among interlock participants and non-participants.
- To reduce the likelihood of recidivism once the interlock has been removed, there is a need to enhance rehabilitation services and related programs available to interlock participants.

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7 One of the most significant hurdles is not in the IVDR technology, but in the fact that regularly updated accurate speed limit maps are not available for all Australian roads. Indeed, a number of Australian companies already use telematics to alert remote monitoring stations about speed breaches among their heavy vehicle fleet as part of the Intelligent Access Program (IAP). The IAP provides heavy vehicles with improved access to the Australian road network in return for monitored compliance with specific access conditions, including vehicle speed. However, only vehicle speed, and not the speed limit, is measured in IAP.
Feedback about driving behaviour, short and long term, is the critical ingredient of IVDR packages. To ensure the highest possible success rate for a program based around the use of in-vehicle technology, it will be necessary to have ongoing contact with course participants to review their driving behaviour as the intervention progresses, as well as to incorporate relevant motivational and educational content. Group discussion was identified in Section 5 as an element that seems to make for a successful program. An arrangement that brought participants together to discuss their feedback, along with other driving issues, could be a very effective way to proceed.

Of course, adopting a multi-faceted approach such as that suggested above has disadvantages. It will be much more costly to use in-vehicle technologies and an education-based approach than using either alone. Further, the combined ISA/IVDR technology still needs to be developed, a curriculum and supportive materials for the motivation/education component has to be produced and then the intervention program would need to be piloted and refined. All of these are costly exercises that would take several years to complete. This combined in-vehicle technology/education approach is put forward not as the most economical option, but as the option which appears most likely to produce road safety benefits based on the evidence reviewed.

The selection of content to be covered during group discussions with course participants will require careful consideration. It is unreasonable to expect course participants to attend a very large number of group discussions, or to attend lengthy group discussions (especially given that these will need to be offered during non-business hours, probably evenings). This means that course content must be limited, and therefore carefully chosen.

Lastly, any in-vehicle technology, especially one associated with the collection and reporting of data, may be met with opposition from those who believe that it is invasive.

In summary, this proposed intervention is likely to be relatively costly, because of the need for further development and testing of the technologies required and of the education and motivation component, and the need for ongoing monitoring. However, based on the empirical and theoretical evidence reviewed it is likely to deliver greater benefits than existing approaches.

8.1.2 Some Additional Points

An intermediate step: driver feedback plus motivational component

Programs crafted around in-vehicle data recorders (IVDRs) show promise as a means of effecting safer driving. Although the current generation systems, such as the GreenRoad Safety Centre respond to forwards and lateral acceleration rather than speed per se, they could still be used as a source of feedback to recidivist speeders on their driving safety and this feedback could be used in combination with a motivational/education intervention as outlined in the previous section. This option could be developed more quickly and at less expense than the option described above because it does not require further development of in-vehicle technologies.

Intelligent speed assist

As discussed in Section 7, ISA technology is progressing rapidly. The latest system being trialled in Australia relies on real-time access to a ‘live’ data base, with up-to-the-minute information on speed limits. Earlier trials of ISA have shown that the technology helps drivers stay within the speed limit. It should be noted that these trials have been carried out with a convenience sample of drivers, and not with drivers who have a history of speeding.

Although there are still technical issues to be resolved, it seems likely that ISA will progress to the stage where it is market-ready in the next few years. Once this occurs, one possibility is to develop a program for recidivist speeders based around ISA.
Advisory and supporting ISA are solely a source of advice about speed; unless participants in the program are motivated to change behaviour, ISA is unlikely to have any effect on speed choice or re-offending. On their own, advisory and supporting ISA would therefore seem to be best suited to inadvertent speeders.

Another limitation of this approach is that while on-the-spot feedback is provided about speed behaviour, there is no permanent record or aggregated statistics which could be fed back to the individual, and which could serve as the basis for group discussions. Limiting ISA is discussed below.

**In-vehicle technologies as enforcement devices**

In the longer term, it may be possible to think in terms of more severe approaches for individuals who continue to re-offend. Possibilities include:

- the use of the IVDR/ISA system as a tool for monitoring compliance with speed limits, with the possibility of disqualification for more than a limited number of speeding transgressions
- use of the ISA system as a speed limiter rather than as an advisory device.

It is likely to be some time before the technology would be sufficiently accurate and reliable to be deployed in this fashion though. It may also take some time before the community and the political system are likely to accept such intrusive measures.

### 8.2 Intervention delivery

Three key documents, outlined below and supplemented by Australian material, were used to guide the content of Section 8.2, which outlines an implementation method for the proposed framework.

An unpublished report undertaken on behalf of the Department for Transport (Walker et al. 2003) describes the outcomes of a large scale consultation during which representatives of 86 countries were asked about local driver improvement initiatives. These examples provide clues as to how a course for recidivist speeders could be operated.

Wright, Ayton, Rowe and van der Plight (2007) report on the recommendations of a working group convened in preparation for legal provisions for drivers convicted of serious traffic offences, including driving at high speeds. The working group recommendations cover the intervention format, structure and content likely to have the most positive impact on road safety attitudes and behaviour of traffic offenders, based on ‘the available scientific evidence related to conceptual theories and empirical work in the judgement and decision-making field, combined with evidence on educational interventions from the wider psychological and educational literature’ (p. 5).

Fylan et al. (2006) report on the outcomes of an expert group meeting held in September 2005, attended by researchers, scientists, and representatives of the UK Department for Transport, the Driving Standards Agency, the Parliamentary Advisory Council for Transport Safety, the Association of National Driver Improvement Scheme Providers, and the Association of Chief Police Officers. The expert group discussed the research review (Fylan et al. 2006) on interventions for speeding motorists to arrive at recommendations that translated the research findings into practical recommendations for police forces and course providers.
8.2.1 Should the Course be Compulsory or Voluntary?

Perceived fairness has been an important factor in determining whether people accept legal decisions and whether they change their behaviour to obey the law. The introduction of a course for recidivist speeders offers an alternative to punishment. In so doing, such a course may lead the public to feel that the organisations responsible for road safety are attempting to be flexible about speed enforcement. Such a course also has an obvious link to road safety outcomes, thus avoiding the potential for the public to perceive the intervention as ‘revenue raising’ (McKenna 2005a). The question remains, however, as to whether drivers should be compelled, or simply encouraged, to participate.

Some courses are compulsory for nominated drivers. Failure to attend results in further penalties, such as licence suspension. Other courses are ‘voluntary’. Usually voluntary courses are undertaken, at the discretion of the driver, in exchange for reduced licence demerit points or as an alternative to licence suspension. McKenna (2004a) discusses four approaches to course recruitment:

- No fine, no demerit points – this course is maximally advantageous to the driver. However, if demerit points dissuade speeding and the course is not effective in persuading drivers to drive slower, such a course may be counterproductive.
- Pay for course, no demerit points – such a course would be self-financing. However, it may also be counterproductive for the reason outlined above.
- No fine, get demerit points – if drivers’ speed choices were more dictated by points than a speed-diversion course, then this type of course would be superior. However, this information is not known. A disadvantage of this approach is that it is not self-funding. Another limitation might be that motivation to attend these courses may be higher if points, rather than the fine, were at stake.
- Suspended points – if participants attending courses were not guilty of subsequent offences in a specified time period, the points associated with the offence that saw them nominated for the course would not be awarded.

In general, the voluntary courses are presented as an option to reduce the severity of the penalties that will otherwise apply. The compulsory courses oblige offenders to attempt the course, possibly in association with other penalties, and the penalties for non-compliance tend to be more severe than the alternatives to the voluntary courses. In very few situations can courses be undertaken in order to completely waive other penalties.

Participant motivation is a key factor in the success of behaviour change interventions, especially interventions based upon self-management rather than external reinforcement and punishment. People who volunteer to participate in a study, or intervention, may be different to non-volunteers. In the medical and human behaviour research fields the term ‘volunteer bias’ is used. Volunteer bias usually, but not always, favours the treatment group, as volunteers tend to be more motivated and concerned about the issue of interest (Hartman, Forsen, Wallace & Neely 2002). To the extent that volunteer participants are more motivated to change their speeding behaviour than those compelled to attend, the cost-effectiveness of a course aimed at recidivist speeders will probably be greater if the course is only attended by drivers who choose to attend.

Before a course for recidivist speeders could be made available, and certainly before it could be made compulsory, it would be necessary to run a trial and possibly a demonstration project. It would also be crucial to consult extensively with representatives of the police and court systems to determine exactly how recidivist speeders could be compelled, or simply encouraged, to participate.
8.2.2 Defining Eligible Drivers

Fylan et al.’s (2006) speeder subtypes are helpful in considering which criteria could be used in selecting the most appropriate candidates for the proposed course. Higher speeds, and therefore high speed recidivists, create the most risk. Fylan et al. note that unintentional and moderate occasional speeders are only likely to exceed the speed limit by a small amount but the infringement notice history of frequent high-speed drivers and socially deviant drivers will show a much wider range of speeds. To identify frequent high speed drivers and socially deviant drivers based on traffic infringement history, Fylan et al. recommend looking for any excessive speed traffic violation and previous traffic violations (not necessarily speed related) and in the case of socially deviant drivers, a range of traffic and non-traffic violations.

When considering recidivist speeders, it is proposed that at least two speed related offences must have occurred. This helps to ensure that the program is not provided to those for whom the existing enforcement regime is sufficient deterrent from speeding. To ensure that the highest risk offenders are identified, it is proposed that at least one of these speed offences is for excessive speed.

It is also necessary to specify a time-frame in which the offences must have occurred. For example, a driver detected at 30 km/h over the speed limit a month after being detected at 20 km/h over the speed limit is probably of more concern than a driver detected at 30 km/h over the speed limit ten years after being detected at 20 km/h over the speed limit. To reduce the administrative demands associated with the implementation of an intervention for recidivist speeders, it may be helpful to base eligibility criteria around current penalty systems, like the demerit point schemes used in Australia and New Zealand.

The demerit point system used in Australia is based on a three year ‘point life’. In New Zealand points expire after two years. The demerit point schemes applied in New Zealand and across Australian states vary slightly, for example, in New South Wales exceeding the speed limit by between 30 and 45 km/h typically attracts four demerit points. In Victoria, exceeding the speed limit by between 25 and 35 km/h typically attracts four demerit points.

As a general rule, it is proposed that eligible recidivists be defined as drivers who are detected at least twice for speeding within a three year period, with at least one of these offences being a high speed offence, possibly defined in terms of its attracting four or more demerit points. These criteria alone may be too inclusive, identifying many more eligible candidates than can be accommodated within the course. If this is the case, these factors combined with the loss of all demerit points (and therefore possible license suspension) would make an even stronger case for eligibility, and would also help ‘prioritise’ provisional license holders, who have been well documented as an especially high risk driver group, and who are allowed to accumulate fewer demerit points than full licence holders.

More detailed criteria, which, among other things, accord with the enforcement penalty regime in the various states (for example, the National Driver Licensing Scheme allows for drivers facing licence suspension for demerit point accrual to avoid the suspension, but incur double the original suspension term if they accrue more than two demerits within 12 months) and highlight additional factors for consideration in determining eligibility (for example, geographic location in relation to the nearest course), would need to be developed before the proposed intervention was implemented.

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8 This statement applies to an individual basis. The relative safety benefits of investment in addressing the relatively few high risk, high end speeders compared to investment in the many lower end speeders is an issue still to be resolved.
Attendees for most courses identified by Walker et al. (2003) were nominated by the courts, licensing authority, or police. Currently in South Australia the DTEI is responsible for nominating candidates for the Driver Intervention Program (outlined in Section 5.3.1).

As with decisions about whether the course should be compulsory or voluntary, it would be crucial to consult extensively with representatives of state road authorities, the police and court systems to determine who should be responsible for nominating eligible driver and exactly what criteria could be employed. An assessment of whether the agreed criteria are correctly focussed and sufficiently stringent to identify the ‘highest-risk’ recidivists and to identify a manageable number of attendees, would be important, as would a referral criteria policy to enable the appropriate bodies to easily decide whether an offender should be sent on the course or not.

8.2.3 Course Length and Group Size

Wright et al. (2007) provide helpful guidance in terms of what length of time the intervention should be implemented over and an appropriate group size. Wright et al. suggest that a course for traffic offenders should consist of multiple (six) two-to-three hour sessions held a week apart and further suggest that delivering a course in this way will enhance attendee commitment because the completion of ‘homework’ will be required between sessions.

The nature of the ‘homework’ will be such that it will require each participant to prepare a short presentation on their own, individual, reaction to a topic. Thus, the individual’s development and presentation of his or her views on a topic will, necessarily, engender personal effort and commitment (Wright et al. 2006, p. 33).

Wright et al. argue that it is essential that course attendees expend effort in processing the information provided in the course. The Elaboration Likelihood Model supports this argument. According to the ELM (as outlined in Section 7.5) information processing that is low in elaboration and depth results in poorer message persuasiveness, which is less likely to lead to attitude and behaviour change. Adult learning principles (Section 7.5) also suggest that time to reflect on what is being learned is important.

The intervention proposed in this report, however, is probably different from what the contributors to the recommendations put forward by Wright et al. (2007) had in mind. The use of in-vehicle technology provides an opportunity for the intervention to be relatively long-lived without substantial additional human resource requirements. It may prove more effective to have initial sessions spaced a week apart; these would necessarily include discussion of the in-vehicle technologies, course introduction topics and the application of key motivational techniques. Any problems or concerns regarding the technology that arise during initial use could then be dealt with during the next session (that is, within a week). Later sessions could be much briefer and spread at much greater intervals, and be focused on the IVDR feedback and related problem solving.

An additional benefit of drawing out the group discussion sessions is that the reversal of driver improvement that research on IVDR suggests occurs over time might be captured within the intervention period, and addressed. IVDR systems also provide a ‘ready-made’ homework activity, checking and reflecting on the driving profile it produces.

Wright et al. (2007) report that research provides no definitive guidance as to the optimal size of intervention groups, but suggest that because driver offender courses should be intensive and deal with drivers’ personal beliefs and values, small groups are preferable.
The ideal group size for this type of training varies with the personality characteristics of the members of each particular group, but, ideally, the materials and delivery methods that we recommend for the road safety course for serious offenders imply that the cohort size should be eight to twelve participants. Groups of fewer than eight limit the number of subgroup techniques the trainer can utilise and also limit the variety of different perspectives to which individual participants will be exposed in discussion sessions. Groups composed of more than 12 limit the opportunities for individual members to express their views (Wright et al. 2007, p. 31).

Wright et al. also note that larger groups are also associated with problematic group processes. For example, ‘social loafing’ and ‘free riding’ (in which some members of the group withdraw from the process and do less work), and a feeling of anonymity among group members. Although an intervention based on larger (than 12 people) discussion groups would be less expensive, reductions in the impact of the course messages may make it a false economy. It is thus proposed that groups be no larger than 12 people.

8.2.4 Who Provides the Course?

Course guidelines are generally developed by some form of road safety group, and courses are typically provided by private vendors and/or the police (Walker et al. 2003). There are several consultant firms in Australia, including the authors of this report, which would be capable of developing a curriculum and materials for a course aimed at recidivist speeders.

After the course materials have been developed and a delivery firm has been identified, course instructors should be carefully selected. Wright et al. (2007) suggest that the key to success as a facilitator of small group sessions is the ability to help attendees explore their driving attitudes. According to Wright et al. (2007, p. 36)

A successful facilitator knows that the motivation to change behaviour must be elicited from the individual and not be imposed from outside. Direct persuasion is not an effective method for resolving ambivalent attitudes. Seeking to understand the individual attendee’s frame of reference by reflective listening is particularly effective and has been used with problem drinkers and those wishing to diet or give up smoking (see Bundy (2004) for a review)... the course should not be lecture-based but should be delivered in a manner that is very interactive...the group atmosphere should be informal and provide an atmosphere in which attendees can discuss the social norms of driving behaviour, cognitive misconceptions, risk taking, emotional responses to difficult driving situations, and future driving intentions.

Depending on the course, the qualifications required of instructors for the courses identified by Walker et al. (2003) included:

- practical driving instructor or driving trainer qualification
- a teaching qualification or experience
- psychology/social work qualifications.

Several eligibility criteria were also identified:

- ‘valid’ or ‘clean’ driver’s licence
- no criminal convictions
- minimum age of 21.
All of these qualifications and criteria have merit. However, adopting all of them would limit the potential pool of candidates too severely. Based on the above listed examples, instructors of a course for recidivist drivers could reasonably be required to have:

- qualifications in psychology/social science or a qualification or experience in adult education
- be at least 21 years of age
- have held a driver's licence for three years continuously (i.e. no suspensions or cancellations) at the time of application
- pass a police check.

Once hired, instructors should complete a purpose designed training program before acting as co-trainer. This program should engender in instructors an accurate understanding of the effect of driver training on the acquisition of skills and knowledge. In terms of professional development training, feedback on the course and the trainer would be gathered from each participant at the end of each course. Short sessions of retraining would be required at set intervals (possibly annually) and could include (but should not be limited to) 'sitting in' on other instructors.

There are also qualifications not listed above that would be ‘desirable’ in an instructor. These include experience in delivering interventions to offender populations, previous road safety experience and a thorough knowledge of the Australian Road Rules.

Although a Certificate IV in Transport and Logistics (Road Transport – Driving Instruction), the nationally recognised qualification for driving instructors, or its equivalent are often used as selection criteria for other similar existing courses (Walker et al. 2003), it is not relevant to the proposed intervention framework because the course proposed would not involve in-vehicle training.

### 8.3 Course Aims and Monitoring and Evaluation

Walker et al. (2003) listed several broad aims that applied to many of the courses they identified:

- prevent re-offending
- change driving attitudes
- modify behaviour
- improve traffic knowledge
- reduce traffic collisions
- promote safe driving.

These aims are all linked, and could be considered hierarchical, as depicted in Figure 8.1. The overarching objective of any course for recidivist speeders should be to modify driving behaviour so it becomes safer. In the case of a course for recidivist speeders, this would take the form of less extreme and/or less frequent speeding. However, objectives should be measurable. The flow-on effect of reduced speeding will be reduced risk of traffic collisions and of being issued with another infringement notice. Fylan et al. (2006) suggest that re-offending rates should be monitored at three months and at 12 months, if possible. Re-offence rates are readily measured among course participants. Participants in the New South Wales Traffic Offenders Program (TOP) are required to sign a statement consenting to the course providers being given access to their licensing details and driving offence records as held by the NSW RTA.
Improved traffic knowledge and attitude change are also readily measured but they may not be followed by the more important outcome of safer driving behaviour.

![Course](image)

**Figure 8.1: Potential aims of a course for recidivist speeders**

It will be important to ensure that the quality of any recidivist speeding course is of a high standard and achieves its stated objectives. Ongoing monitoring of the driver improvement courses identified by Walker et al. (2003) included strategies such as:

- audits at regular intervals
- audits in response to complaints
- random spot checks
- course students provide an assessment of the course provision.

Monitoring is typically carried out by a ‘supervising authority’ or some other external body appointed by the supervising authority.

### 8.4 Intervention Alignment with Best Practice

Combining speed monitoring technology, and the feedback it provides, with an education/motivation based intervention (involving group discussions) could, if the content of the discussions was suitably designed, address the effective intervention components that have been discussed in this report, as shown in Table 8.1.
Table 8.1: Summary of how the proposed intervention could incorporate effective elements

<table>
<thead>
<tr>
<th>Important intervention components</th>
<th>Key source of theoretical evidence that it is important</th>
<th>How the proposed intervention could address the component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactivity</td>
<td>Adult learning principles, Elaboration Likelihood Model (ELM)</td>
<td>Group discussion is a key part of proposed intervention.</td>
</tr>
<tr>
<td>Tailored to the group/individual</td>
<td>Adult learning principles, ELM</td>
<td>Personalised feedback based on the IVDR and the potential to tailor group discussion content around this, and around the issues expressed by the group/individual.</td>
</tr>
<tr>
<td>Allow time for reflection</td>
<td>Adult learning principles, ELM</td>
<td>Multiple sessions, spread over a period of time, are proposed.</td>
</tr>
<tr>
<td>The setting of goals</td>
<td>Social Cognitive Theory (SCT)</td>
<td>IVDR enables the setting of clear and measurable goals.</td>
</tr>
<tr>
<td>Build confidence that progress toward goals is being made</td>
<td>Adult learning principles</td>
<td>IVDR enables the setting of clear and measurable goals that can be monitored.</td>
</tr>
<tr>
<td>A comfortable learning environment</td>
<td>Adult learning principles</td>
<td>Trained group facilitators recommended, it would also be important for the group discussions to be preceded by discussion of appropriate conduct in the group environment.</td>
</tr>
<tr>
<td>Demonstrate how the issue is meaningful to the audience</td>
<td>ELM</td>
<td>Group speed profiles could be used to highlight ‘problem areas’ and how these particular behaviours contribute to crashes could be discussed in the group setting.</td>
</tr>
<tr>
<td>Well constructed and convincing messages</td>
<td>ELM</td>
<td>‘Market testing’ of course materials would be important in the development phase.</td>
</tr>
<tr>
<td>Messages are repeated</td>
<td>ELM</td>
<td>Multiple sessions are proposed, enabling key messages to be rephrased and repeated.</td>
</tr>
<tr>
<td>Absence of environmental constraints that make the behaviour difficult or impossible</td>
<td>Health Belief Model, Theory of Planned Behaviour (TPB), SCT</td>
<td>This can be included in discussions in the group setting. Exercises could include identifying different sources of pressure from other road users to speed, and to change the relative importance given to each influence, and identifying/rehearsing methods of resisting pressures to speed, e.g. from tailgaters (Fylan et al. 2006). Being able to see initial successes through IVDR data will reinforce the message that participant’s speeding is within their own control.</td>
</tr>
<tr>
<td>Participants form a strong intention, or make a commitment to perform the behaviour</td>
<td>TPB</td>
<td>If commitment can be secured in the group setting (possibly through the use of a reward system), the combination of not wanting to let the group down and the potential to monitor adherence to any commitments made could be a powerful change motivator.</td>
</tr>
<tr>
<td>Participants believe that the likely advantages of not speeding outweigh the likely disadvantages</td>
<td>TPB, SCT</td>
<td>IVDR enables the setting of clear and measurable goals and thus also allows for the introduction of rewards for success. Group discussion provides a good format for providing information on enforcement penalties and discussing the negative consequences of speeding, such as the greater cost of car insurance, and the implications of being banned from driving, such as the loss of a job and social life, and increased day-to-day hassles (Fylan et al. 2006). Some information about how speed contributes to crashes is appropriate, but should not be a key focus as most drivers think this outcome, although negative, unlikely.</td>
</tr>
</tbody>
</table>
| The person’s emotional reaction to performing the behaviour is more positive than negative | SCT | Group discussions provide an appropriate format for topics like those put forward by Fylan et al. (2006):  
  - Would it not be healthier to get one’s kicks in contexts (extreme sports, for example) where the only one whose life is at risk is oneself? Is it really appropriate to feel good about putting other people at risk?  
  - We are ready to criticise others for their selfish and dangerous behaviour on the road. Are we immune from doing the same things? (hypocrisy)  
  - The good feelings that can arise from driving more slowly, such as feeling less anxious and feeling more in control.  
  - We underestimate the extent to which emotion influences our behaviour. We need to gain control of our driving, not let our emotions control us. |
Table 8.1: Summary of how the proposed intervention could incorporate effective elements – cont’d

<table>
<thead>
<tr>
<th>Important intervention components</th>
<th>Key source of theoretical evidence that it is important</th>
<th>How the proposed intervention could address the component</th>
</tr>
</thead>
<tbody>
<tr>
<td>The participants perceive normative pressure to perform the behaviour</td>
<td>Theory of Planned Behaviour, Social Cognitive Theory</td>
<td>Comparing group speed data with that of a typical driving population will highlight the fact that they are behaving abnormally, and the IVDR would make it possible to set measurable group goals to facilitate normative pressure from within the group of participants.</td>
</tr>
<tr>
<td>Help participants break the habit of speeding</td>
<td>Not typically included in models of behaviour change because it is tautological (Jager 2003)</td>
<td>IVDR data provides a record of driving behaviour that may assist drivers overcome habitual speeding by offering them tangible goals associated with alternative driving behaviours. In-vehicle alert systems also help make drivers cognizant of the fact that they are speeding. It is recommended that the intervention occur over a period of time. The longer the intervention can prevent the behaviour the more time drivers have to replace speeding with safer driving habits.</td>
</tr>
</tbody>
</table>
9 HOW WOULD IT BE PILOTED?

The first step of implementing the proposed intervention would be developing the necessary in-vehicle technologies and a curriculum and supporting materials for the associated education/motivation component. After these had been market tested, it would be necessary to conduct a pilot intervention to determine whether the proposed intervention operated as planned and whether it produced the kinds of outcomes expected.

9.1 Outcome Evaluation Options for Different Types of Intervention

Fylan et al. (2006) recommend that in evaluations of the effectiveness of interventions aimed at preventing speeding, intentions and attitudes to speeding should both be assessed, as well as changes to any other constructs that the course is designed to influence, such as self-efficacy and normative beliefs. Such measures are important in highlighting what mechanisms may be responsible for any behavioural changes that occur. However, as discussed in Section 5.1.2, such constructs are not always highly correlated with behaviour and the most important outcome for an intervention aimed at recidivist speeders is behaviour change. If the intervention option described in Section 8 (a combined ISA/IVDR and motivation/education intervention) was to be piloted, the following outcome measures would be important:

- number of speed warnings by different speed zones
- the amount and percentage of time spent travelling over the speed limit for different speed zones
- risk profile as assessed by the in-vehicle technology
- number of events involving severe braking, excessive cornering forces, etc.

While self-reported attitudes and intentions, and self-report measures of other key psychological constructs addressed in the course may yield some insights, they should not form the core of the outcome evaluations.

Notably absent from the above list are crashes and speeding offences. Speeding offences and crashes are excellent outcome measures in terms of assessment of the overarching aims of an intervention for recidivist speeders (i.e. to reduce speeding and improve road safety). However, using crashes and speeding offences as outcome measures is not feasible for an Australasian trial because an unreasonably large number of participants would be required in order to achieve statistically reliable results (as will be highlighted in Section 9.2). This is one problem that the use of IVDR solves. With this technology comes in-built capacity to directly measure driving behaviour.

In line with sound practice in experimental design, outcome measures would need to be taken at four points, as a minimum: before the intervention, during the intervention, immediately after the intervention, and 12 months after the intervention.

Before

Instruments for collecting self-report data should be administered before the intervention to provide a baseline measure against which improvements, if they are present, can be benchmarked. The pilot study should also include time for participants to get used to the presence of the in-vehicle technology. In the TAC SafeCar study, drivers were allowed 3,000 kilometres with the in-vehicle technology inactive for this to occur (Mitsopoulos et al. 2004). In the pilot of the proposed intervention, it should be possible for the IVDR to collect data unobtrusively while the display unit remains inactive. This time would represent an opportunity for baseline data on driving behaviour as measured by the in-vehicle technology to be collected.
Despite allowing the participants time to habituate to the presence of the IVDR before baseline recordings commence, participants in an intervention may still be suspicious of the IVDR (the TAC SafeCar participants were presumably benevolent volunteers, whereas most participants in an intervention for recidivist speeders would not be). It would be important to consider this potential when interpreting the results of any evaluation. If, for example, intervention participants drive more cautiously due to the presence of the IVDR during the before period, any comparative improvement in behaviour observed in the ‘after’ period would be smaller than the improvement that occurred between the after period and the time prior to the installation of the IVDR.

During

With the commencement of the pilot intervention, the in-vehicle technology would be made fully operational and group sessions would occur. Because the proposed intervention will take place over a number of months, it will be possible to measure participant progress, based on IVDR data, as it occurs. Data provided by the IVDR would provide an ongoing account of participant driver behaviour throughout the duration of the intervention.

Immediately after

A similar suite of measures to that used before the intervention would be used immediately after the intervention ceased. Process evaluation measures (see Section 9.5) would also be undertaken at this point.

Longer term

For the purpose of a pilot study, the IVDR/ISA system would remain in the car at the end of the intervention but the in-vehicle displays would be inactive while the system continued to gather data for some months after the cessation of the intervention. This would show whether or not any improvements present immediately after the intervention were maintained after the intervention ceased. This data is extremely important because the proposed intervention would require substantial investment. If the changes persist only while the intervention is taking place (that is, for less than six-months) the intervention is unlikely to see adequate returns in crash savings.

If the pilot is large enough, it might be possible to allow the ISA display to continue to function in the vehicles of some participants after the intervention has ceased. ISA may be in the process of being rolled out for all vehicles, if the pilot showed that the ISA, on its own, facilitated longer lasting improvement, the ISA equipment might be left in the vehicle after the intervention.

9.2 Size of Trial

Different outcome measures have different implications for the number of participants required. This arises from the frequency with which different types of outcome event occur. The various outcome measures that could be evaluated are listed below in descending order of the number of participants required.

9.2.1 Crashes

To illustrate the required sample size for evaluating an intervention for recidivist speeders based on crash outcomes, Victoria is used as an example. In Victoria, approximately 16,000 casualty crashes are reported each year. As a rough rule of thumb, 10 non-casualty crashes can generally be assumed for every casualty crash that occurs, giving an estimated total of 160,000 crashes per year. If it is assumed that two-thirds of these are multiple vehicle crashes, then an estimated 270,000 drivers are involved in a crash in Victoria every year, from a total of approximately 4 million drivers. Therefore, approximately 7% of Victorian drivers are involved in a crash each year.
The size of the sample needed to have a reasonable prospect of arriving at statistically reliable conclusions can be calculated using the SPSS Sample Power software. For the calculations which follow, alpha (the likelihood of a finding being identified as statistically significant when it in fact represents random fluctuation in the data) is set at the conventional level of 0.05 (1-tail) and statistical power is set at 0.80. If it is assumed the intervention will result in a 10% reduction in crashes, the size of the study needed to show this is 15,000 participants, divided equally into a treatment group and a control group. If the alpha level is set at .10, the sample requirement becomes 11,000 participants. In states where the crash rate is higher or lower than 7%, the required sample size would be smaller or larger than 11,000, respectively.

9.2.2 Offences

Data presented by Cairney and Imberger (2005) suggests that in most Australian jurisdictions, offences detected by speed cameras (the vast majority of speeding offences) are approximately 1,500 – 2,000 per 100,000 registered vehicles per month. Taking the lower figure, this suggests that approximately 18% of vehicles will attract a speeding infringement notice each year. For the purpose of this estimate, this is assumed to be equivalent to approximately 18% of drivers. For a one year follow-up period, 18% of offending drivers would be expected to re-offend (leaving aside for now the possibilities that the fine may deter further offences, or that people who commit one offence have a higher probability of committing subsequent offences). Assuming the piloted intervention reduces speeding offences by 10%, analysis using the SPSS Sample Power package, with alpha = 0.05 (1-tail) and power = 0.80, indicates that a sample of 8,600 participants would be required, divided equally into a treatment group and a control group. If the alpha level is set at .10, the sample requirement becomes 6,400 participants.

9.2.3 Attitude Surveys

The key data here are likely to be the proportion of participants who hold core beliefs or attitudes relevant to engagement in the behaviour of interest (speeding) before and after the intervention. Assuming that 50% of participants hold a particular attitude before the intervention, with alpha = 0.05 and power = 0.80, to detect a 10% increase in the number of individuals holding that attitude would require a sample size of 600, divided equally into a treatment group and a control group. If the alpha level is set at 0.10, the sample requirement becomes 450 participants. However, it is not recommended that any evaluation of a recidivist speeding program rely solely on attitude surveys. Attitude change often does not translate into behaviour change, and self-report measures used in this type of context are prone to social desirability factors, whereby respondents tend to report the outcomes that they believe the researchers want to see.

9.2.4 In-Vehicle Feedback

To calculate a required sample size for an evaluation based on IVDR data it is assumed that participants have, on average, one ‘event’ (that is, one episode of severe braking or cornering) per day, or 30 events per month (with a standard deviation of 3 events per month), and that a 10% reduction in these episodes is expected. To show a statistically significant reduction, with alpha = 0.05 and power = 0.80, would require a sample of 18 months before data and 18 months after data. Assuming it is possible to collect baseline data for two months before the introductory session is presented and the in-vehicle display is switched on, a trial as small as 20 participants (10 treatment, 10 control) would be sufficient to test whether the intervention was changing behaviour.
9.3 Control and Comparison Groups

‘After’ outcome data should be compared with baseline measures. It should also be compared with ‘after’ data for a control group. Control groups generally receive no intervention, or minimal intervention, and the data gathered in relation to control groups is used to help ensure that changes noted among the treatment group are due to the intervention, and not to external influences. For example, an anti-speeding campaign or an enforcement regime introduced while the pilot intervention was in progress may lessen speeding. If there was no control group, the pilot study may lead researchers to conclude that the intervention is effective. Data which showed that a control group also lessened their speeding would give researchers reason to question such a conclusion.

In the case of the proposed intervention, it would prove prudent, if resources allow, to trial the in-vehicle technology on its own, without the education/motivational component. If this was shown to be as effective as the combined in-vehicle technology, motivational/educational intervention, further investment in the latter component could be avoided. This would mean at least three participant groups would be involved in the pilot, a control group, a group who undertakes the full intervention, and a group who uses the in-vehicle technology only.

It would be important, in adhering to key principles of ethical research, to offer the full intervention to participants in the control and ‘in-vehicle technology only’ groups at the conclusion of the pilot, especially if the full intervention is shown to be effective.

9.4 Need for Random Assignment

Whatever intervention or interventions are trialled, it is essential that participants be randomly assigned to a treatment or a control group. Unless this happens, drivers who are highly motivated and who are less likely to re-offend without any intervention are likely to volunteer for the treatment group. This would result in any beneficial effects being exaggerated. The history of alcohol interlock program evaluation is a clear reminder of this.

In order to achieve random assignment, it is imperative that the authority imposing sanctions on the recidivist speeders fully accepts the need for a trial, understands the reasons for random assignment and accepts their validity. To remove subjective judgement from the process as much as possible, it is essential that the eligibility criteria for inclusion in the trial are clearly documented and that the person imposing the sanctions uses them when making the decision to allocate someone to the trial or not. It is equally essential that this person does not allocate offenders to the treatment or control group; this should be left to a strictly controlled impersonal process (many software programs include a random selection utility) which ensures truly random allocation.

9.5 Process Evaluation

In addition to program outcomes, it is important that the trial program be evaluated in terms of exactly what services were provided to participants, by whom and how. Knowing how the program was implemented enables outcomes to be better interpreted. That is, process evaluation provides an answer to the question, ‘these results were the outcome of what exactly?’, and can also highlight problems in the adopted delivery mechanisms. Process evaluations typically focus on coverage and process. Some of the questions that may be answered by process evaluation in relation to the coverage of a trial recidivist speeder intervention include:

- What were the demographic characteristics and driving history of those enrolled in the course?
- What personality characteristics were common among those enrolled in the course?
What proportion of those enrolled completed the course and what were the characteristics of those who dropped out? (WHO 2000).

Not only can the answers to these questions help those responsible for the intervention in tailoring it, they help researchers understand how generalisable the results of their outcome evaluations are. A pilot that was successful among a group of young recidivist speeders all high in sensation seeking may not enjoy the same level of success among a group of older recidivist speeders high in anger and hostility. If tailoring materials does not improve the outcomes for the less impacted groups, selection criteria could be modified to ensure the best safety returns on investment in the intervention.

Some of the questions that may be answered by process evaluation in relation to the processes involved in a trial of a recidivist speeder intervention include:

- By what route have participants entered the course?
- How were participants identified and how were they assigned to the treatment and control groups?
- What happened to the participants during the program and is this as intended?
- Were program activities consistent with the results of any participant assessments conducted?
- How much use was made of program materials by participants?
- How suitable/helpful do program participants and delivery staff find program materials?
- Were the activities delivered to a high standard and were various program components well-coordinated?

Process evaluations are aimed at the collection of descriptive rather than inferential data and as such there are no minimum requirements in terms of sample size. There are a vast range of published resources available on how to conduct process evaluations.
10 CONCLUSIONS

There is a comprehensive body of literature which examines questions of behavioural change and the critical factors required to achieve it. Despite a wide array of theoretical perspectives and terminology, there is some consensus on what the critical factors are. Fishbein et al. (1992) offered a useful general overview; Fylan et al. (2006) also provided a useful overview, in this case focussed specifically on best practice for changing speeding behaviour.

There is also consensus that speed offenders are not one undifferentiated group, but commit speeding offences for different reasons, and that they exceed speed limits with different frequencies by different amounts. The classification system put forward by Fylan et al. (2006), which outlines characteristics associated with unintentional speeders, occasional moderate speeders, frequent high speeders, and socially deviant drivers, is particularly useful.

The Speed Awareness Scheme is widely used and highly regarded in the UK. Fylan et al.’s (2006) benchmarking study indicated that the Speed Awareness Scheme meets most of the prescriptions for best practice (as derived from their consideration of the literature related to changing the behaviour of speeders). A small NSW pilot course designed according to these same principles has been shown to be associated with some gains in knowledge and improvements in attitude, and was well-received by participants. However, the SAS scheme is aimed at people who are not significantly over the enforcement speed limit and although there is some evidence that SAS based courses are effective in reducing re-offending among this population the evaluations are methodologically flawed in that appropriately matched control groups have not been used.

Programs using in-vehicle data recorders (IVDRs) have been successful in reducing unsafe driving. These systems are based on measuring and giving feedback about braking and cornering forces, but they do not currently measure speed in relation to speed limits. Intelligent Speed Adaptation technology is rapidly developing (see ERTICO 2008). Advisory and supportive ISA devices may be effective in assisting unintentional speeders but are unlikely, on their own, to change the behaviour of other groups of recidivist speeders. Combining features of the two technologies (IVDR and ISA) would create a powerful package for monitoring speeds and maximising the likelihood of change in speed behaviour. However, even this is unlikely to produce changes in driver behaviour that persist for long after the technology is removed from the vehicle. As such, the intervention framework put forward in this report includes a series of group discussions aimed at motivating recidivist speeders to change their behaviour. The feedback provided by IVDR systems would be an integral topic for group discussion sessions.

A program based on a combined ISA/IVDR system would require substantial investment in equipment, and an ongoing program of monitoring and group discussion would require substantial investment for development and in human resources for delivery. However, it is likely to be highly effective, at least in the medium term.

A pilot study would be needed before the proposed intervention could be implemented on a larger scale. Different outcome measures have different implications for the size of the trial needed to have a reasonable prospect of arriving at statistically reliable conclusions. Whatever type of intervention and evaluation is decided on, random assignment of participants to treatment and control groups is essential.
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APPENDIX A CONSULTATION INTERVIEW SCHEDULE

Questions re Recidivist programs (telephone interview version)

Name of the intervention program: ___________________________

Jurisdiction: ___________________________

Name of contact: ___________________________

On behalf of Austroads, ARRB Group is undertaking a project to identify best-practice in relation to interventions for recidivist driving offenders. As part of the project, we are consulting those involved in the development or delivery of existing programs so that we can understand some of the practicalities of such a program, and some of the lessons already learned.

As such, the following questions are designed not only to ask about how the course you are involved in currently operates, but your opinion on the advantages and disadvantages of various approaches. We would appreciate your input into this project and would be happy to send you an electronic copy of the project report upon completion of the project.

Section 1 – The context

1. What year was your program established? ________

2. Who are the target group for your program?

3. a. Who is responsible for nominating candidates for your program?

   Courts □
   Police □
   Road authority □

   Other: ___________________________

   b. What are the key advantages of this means of candidate nomination?

   ○
   ___________________________

   ○
   ___________________________

   ○
c. What are the key disadvantages of this means of candidate nomination?

- 
- 
- 

4. Once nominated, is the course compulsory or voluntary?

  Compulsory ☐
  Voluntary ☐ if voluntary, roughly what percentage accept? ___%

5. What incentives are provided for attendance?

  Fine lessened ☐
  Fine waived ☐
  Demerit points lessened ☐
  Demerit points waived ☐

  Other: _______________________

6. Are there any additional disincentives for refusal in-place?

  Yes ☐ Please specify:
  _______________________________________________________________
  _______________________________________________________________

  No ☐

7. In your opinion, are there ways that the incentives/disincentives could be improved?

  Yes ☐ Please specify:
  _______________________________________________________________
  _______________________________________________________________

  No ☐
8. 
   a. **What counts as ‘completing’ the course?**
      Attending all sessions 
      Attending for a certain proportion of the sessions
      Passing a test
      Other: ______________________
   
b. **What percentage of those who enrol ‘complete’ the course? ___%**
   
c. **What happens to those who don’t?**

9. **How did the program get incorporated into the system? (e.g. how was it marketed to magistrates, etc)**


10. **What were they main obstacles to getting the program incorporated into the system? (e.g. Attitude of judiciary)?**


11. 
   a. **Who funds the delivery of the program? ______________________
   
   b. **Do attendees pay to attend?** Yes □ $_____ No □
Section 2 – Delivery & content

12.  
   a. How many facilitators run the course? ___
   b. Are different facilitators required for different components? Yes ☐ No ☐

13. What skills/background are most important for the facilitator/s?

14. How many students in a group? ___

15. How long are the sessions and how many are there?

16. What are the key activities of the course which relate to speeding?
   (please leave this open ended – the check boxes should make it easier to record the responses but the respondent should be encouraged to outline the activity, not just how it is delivered).

   Class room teaching (group) ☐
   One to one teaching (individual) ☐
   Practical in car training ☐
   Private study (home work) ☐
   Interactive computer programme ☐
   Videos ☐
17. **What other key topics are covered?**

   - Defensive driving  
   - Attitudes  
   - Vehicle maintenance and safety  
   - Hazard recognition and prevention  
   - Road traffic law  
   - Lifestyle issues (drugs/alcohol/peer pressure)  
   - Improving driving skills  
   - Novice drivers’ crash risks  
   - Other: ______________________________________
   
   ______________________________________________
   
   ______________________________________________

18.  

   a. **Are there any on-road tasks?** *(ask 18 only if they haven’t mentioned on-road activities in Q16 above)*

      - No  
      - Yes  

      **If yes:**

   b. **Where do they occur?**

      ______________________________________________
      
      ______________________________________________
      
      ______________________________________________

   c. **What skills are taught?**

      ______________________________________________
      
      ______________________________________________
      
      ______________________________________________

19. **Can you provide a course outline or overview of topic areas covered?**

      Yes  *(offer to email them your details, so you can send them the necessary postal/email address)*

      No  

20. **What are the key skills and messages that you want people to leave the course with?**

..................................................................................................................

21. **How is student progress evaluated?**

..................................................................................................................

22. **Is there any post-course follow-up?**

Yes ☐: *(brief outline)*

No ☐

23. **Roughly how many students enrol in the course annually?**

24. **Are ITS solutions to speed management incorporated in the program?**

Yes ☐: *(brief outline)*

No ☐

25. **If you were not constrained by resource or financial limitations, how would you like the course to delivered differently?**

26. **If you were not constrained by resource or financial limitations, how would you like the course to be monitored/evaluated differently?**

27. **Do you have any additional comments?**

28. **Would you like to receive an electronic copy of a report summarising the information collected?**

Yes ☐

No ☐

If yes please provide an email address to which we can email the report:

**Thankyou!**
INFORMATION RETRIEVAL

Austroads (2009), *Development of a Best Practice Intervention Model for Recidivist Speeding Offenders*, Sydney, A4, 86pp, AP-T134/09

**Keywords:**
Recidivist, repeat, speed, intervention, best practice.

**Abstract:**
Speed-related crashes are a continuing concern in Australasia. On behalf of Austroads, ARRB Group undertook to develop a framework for an intervention to promote safe driving among recidivist speeders. Five key tasks were carried out.

- a literature review to investigate the scale and nature of speeding on the Australasian road network
- an overview of key models of behaviour change
- a literature review and consultations to identify interventions currently available for recidivist speeders
- development of a best practice model that explores technological and behaviour change interventions, and how these should be applied to recidivist speeding offenders
- the outlining of an appropriate method for the trial and evaluation of the proposed models.

The most promising intervention option involves a combination of in-vehicle technology and driver education.