MONASH University
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THE RELATIONSHIP BETWEEN CRIME AND ROAD SAFETY

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Abstract:
The aim of this project was to examine the relationship between crime and road safety and to identify what and how pertinent Victorian crime and road safety data can be utilised to examine this relationship. Of specific interest was the relationship between criminal activity of individuals and the likelihood of these individuals being involved in a fatal or serious injury outcome road crash. The key findings of this research suggest that there is a positive relationship between: general negative behaviour (e.g. involvement in antisocial behaviours) and risky driving behaviour; criminal behaviour and traffic offences (specifically violence, theft & burglary and recidivist/drink driving, driving whilst disqualified; risky traffic behaviour contributing to a crash and criminal history (particularly for violent crime, vandalism, property crime, and involvement in traffic crime), and; crash involvement, drink driving and general criminal history including theft, car theft, drug and alcohol related crimes, violence and property damage. There are a variety of approaches that have been adopted internationally to examine these relationships, although such work has not been undertaken in Victoria to date. There are several limitations and barriers for linking crime and road safety data in Victoria, predominantly concerning privacy and ethics, matching of data, issues with data analysis and cost/resource factors. A number of recommendations have been presented to overcome these factors and to explore the relationship between crime and road safety in Victoria.

Key Words:
Crime, road safety, road crash, criminal history, recidivism

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Preface

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EXECUTIVE SUMMARY

Aim and Objectives

The aim of this project was to examine the relationship between crime and road safety and to identify what and how pertinent Victorian crime and road safety data can be utilised to examine this relationship. Of specific interest is the relationship between criminal activity of individuals and the likelihood of these individuals being involved in a fatal or serious injury outcome road crash. The specific objectives of the research were:

- To examine and document the link between crime and road safety from an international/national perspective, with particular emphasis on the relationship between criminal history and involvement in fatal and serious injury crashes.
- To examine the best practice approaches to examining the link between crime and road safety in Victoria and internationally.
- To determine the existing barriers and facilitators to examining the issue of crime and road safety in Victoria.
- To develop strategies to overcome the existing barriers and present a set of recommendations for data collection, data management and analysis.

Methods

In order to achieve these objectives, the scientific and contemporary literature and information with respect to the link between crime and road safety was reviewed and documented and international experts were consulted to establish best practice approaches to examining the research issue. The approaches used to study the issue were examined and the best practice documented. The available information on existing databases was reviewed, including: Law Enforcement Assistance Program, Collisions Management Information System, Traffic Information Management System, Fatal Collisions Management Information System, etc. Based on knowledge gathered during previous activities, the viability of data comparisons and data sharing were examined. The intrinsic issues and limitations including information collection, management and analysis were investigated. The barriers and stakeholder-friendly facilitators to reviewing the link between crime and road safety were identified. Based on knowledge gathered during previous activities, recommendations for improved practices to benefit all stakeholders in sharing/obtaining data were provided.

Key Findings

The classifications of (non-traffic) criminal behaviour and traffic offences and the key relevant psychological theories that have relevance to general risk taking and criminal behaviour have been identified and documented. Experts in the field have been contacted and the scientific literature has been examined. It has been reported that there is a positive relationship between general negative behaviour (e.g. involvement in antisocial behaviours) and risky driving behaviour. These findings support the hypotheses proposed in the relevant psychological theories and would suggest links between criminal behaviours themselves as well as between criminal behaviour and traffic offences. Additionally, the literature reviewed suggests that there is a positive relationship between criminal behaviour and traffic offences. Research has been conducted internationally to

explore the relationships between the various categories of criminal behaviour and the different types of traffic offences. Studies have examined criminal histories and identified links between mainstream crime (specifically violence, theft & burglary) and traffic offences (specifically recidivist/drink driving, driving whilst disqualified). There has been very little work undertaken to explore the effects of the relationship between general criminal behaviour and traffic offences on road safety, and specifically, crash involvement. The work that has been done has revealed a positive relationship between risky traffic behaviour contributing to a crash and criminal history (particularly for violent crime, vandalism, property crime, and involvement in traffic crime). When examining the rate of involvement in road crashes for those individuals with a criminal history compared to those without, the rate for those with a criminal history is more than double (Junger et al, 2001). For the work that has been conducted, the focus has been on the relationship between drink driving, criminal history and road safety. Significant relationships have been identified between crash involvement (Spolander, 1997; Junger, 2001), drink driving (Bailey, 1993; Spolander, 1997) and general criminal history including theft, car theft, drug and alcohol related crimes, violence and property damage.

However, it should be noted that cultural differences may mean that the results of foreign studies do not apply in this country (Broughton, 2007). Additionally, it is suggested that the factors of alcohol use and exposure to crash risk, either alone or in combination, might be sufficient to explain the co-variation between crime and road crashes and that the relationship between crashes and crime could be the result of the differential exposure of criminals to traffic. Therefore, the relatively high exposure of criminals to traffic may be sufficient to explain the relationship between crime and crashes. The relationship between crime and road safety has been examined by investigating a variety of data sources, both retrospectively and prospectively. Due to the limited literature that is available to determine the link between crime and road safety and the limitations of the studies to date, research should be conducted within the Australian context to explore the possible links between the two.

There are a variety of approaches that have been adopted internationally to examine these relationships, although such work has not been undertaken in Victoria to date. Upon investigation, it is clear that there are a variety of limitations and barriers for linking crime and road safety data in Victoria, predominantly concerning privacy and ethics, matching of data, issues with data analysis and cost/resource factors. A number of recommendations have been presented to overcome these factors and to explore the relationship between crime and road safety in Victoria

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GLOSSARY OF TERMS

CMIS	Collision Management Information System
LEAP	Law Enforcement Assistance Program
LDVS	Location Data Validation System
MCIU	Major Collision Investigation Unit
MUARC	Monash University Accident Research Centre
NEVDIS	National Exchange of Vehicle and Driver Information System
RCIS	Road Crash Information System
TIS	Traffic Incident System
VIMS	Victorian Information Management System
VPARS2	Victoria Police Accident Records System V2

1 INTRODUCTION

1.1 BACKGROUND

The crash involvement, traffic offence rates and overall driving behaviour of individuals with a criminal history[1] ("criminals") has not been studied widely. Much research has been conducted in the separate fields of criminology and road safety, which has particularly aimed to understand the underlying behaviour and motivation for committing crimes, and, for having a high rate of crash involvement and traffic offences. The area where the two fields overlap is when the role of visible traffic enforcement in detecting non-traffic crime is assessed (Whelan & Haworth, 2005). Such studies reinforce the fact that many crimes involve the use of motor vehicles and so detection of these crimes may occur as part of visible traffic enforcement. Whilst it is clear that most drivers are not criminals the reverse is often true; most criminals are drivers, Figure 1.1.

> "*Most drivers are not criminals but most criminals are drivers…Routine traffic duties often bring officers into contact with such criminals and traffic patrols continued to make crime a priority during the year – 36% of all arrests made by traffic officers were for crime*."
>
> West Midlands Police, Traffic Division, (1997), quoted in Rose (2000.)
>
> "*A criminal can rob a bank in Carlisle and be back in London in a few hours. My own traffic officers arrest more persons for crime than did my Criminal Investigation Division*."
>
> Joslin (1994) quoted in Rose (2000).

Figure 1.1 Acknowledgement of the importance of road policing for crime policing.

It has been suggested that analysis of the criminal careers of minor traffic offenders could provide useful information regarding links with serious traffic offending and mainstream offending, and exploration of the links between serious traffic offending and mainstream criminal offending (e.g. the relationship between car theft and dangerous driving) could enable the development of more sensitive profiles of traffic offenders (Rose, 2000).

The propensity of criminals to engage in risky driving and commit traffic offences is an area of interest for researchers in criminology, social psychology and road safety (Junger, West, & Timman, 2001). Assessment of the traffic offence history of criminals is useful for several reasons. Firstly, it is accepted that most criminals are drivers, which provides a method to assess and compare their behaviour by analysing traffic offence data. Criminals are not considered a homogonous group – largely due to the range of criminal offences and the varying motivations for committing these offences. Traffic offence data provides a method for assessing the vast array of criminal behaviour and linking this with traffic offences.

[1] In the context of this report, a 'criminal history' refers to the cumulative record of court appearances of an individual.

1.2 PROJECT AIMS

The aim of this project was to examine the relationship between crime and road safety and to identify what and how pertinent Victorian crime and road safety data can be utilised to examine this relationship. Of specific interest is the relationship between criminal activity of individuals and the likelihood of these individuals being involved in a fatal or serious injury outcome road crash. The specific objectives of the research were:

- To examine and document the link between crime and road safety from an international/national perspective, with particular emphasis on the relationship between criminal history and involvement in fatal and serious injury crashes.
- To examine the best practice approaches to examining the link between crime and road safety in Victoria and internationally.
- To determine the existing barriers and facilitators to examining the issue of crime and road safety in Victoria.
- To develop strategies to overcome the existing barriers and present a set of recommendations for data collection, data management and analysis.

This project aims to pursue a strategic approach to identify capabilities, issues (e.g. ethics, privacy, ownership, variety in data classification systems) and opportunities (e.g. resources, facilities, knowledge) to introduce an integrated system to acquire, store, use and secure information. The research methodology is documented in Figure 1.2.

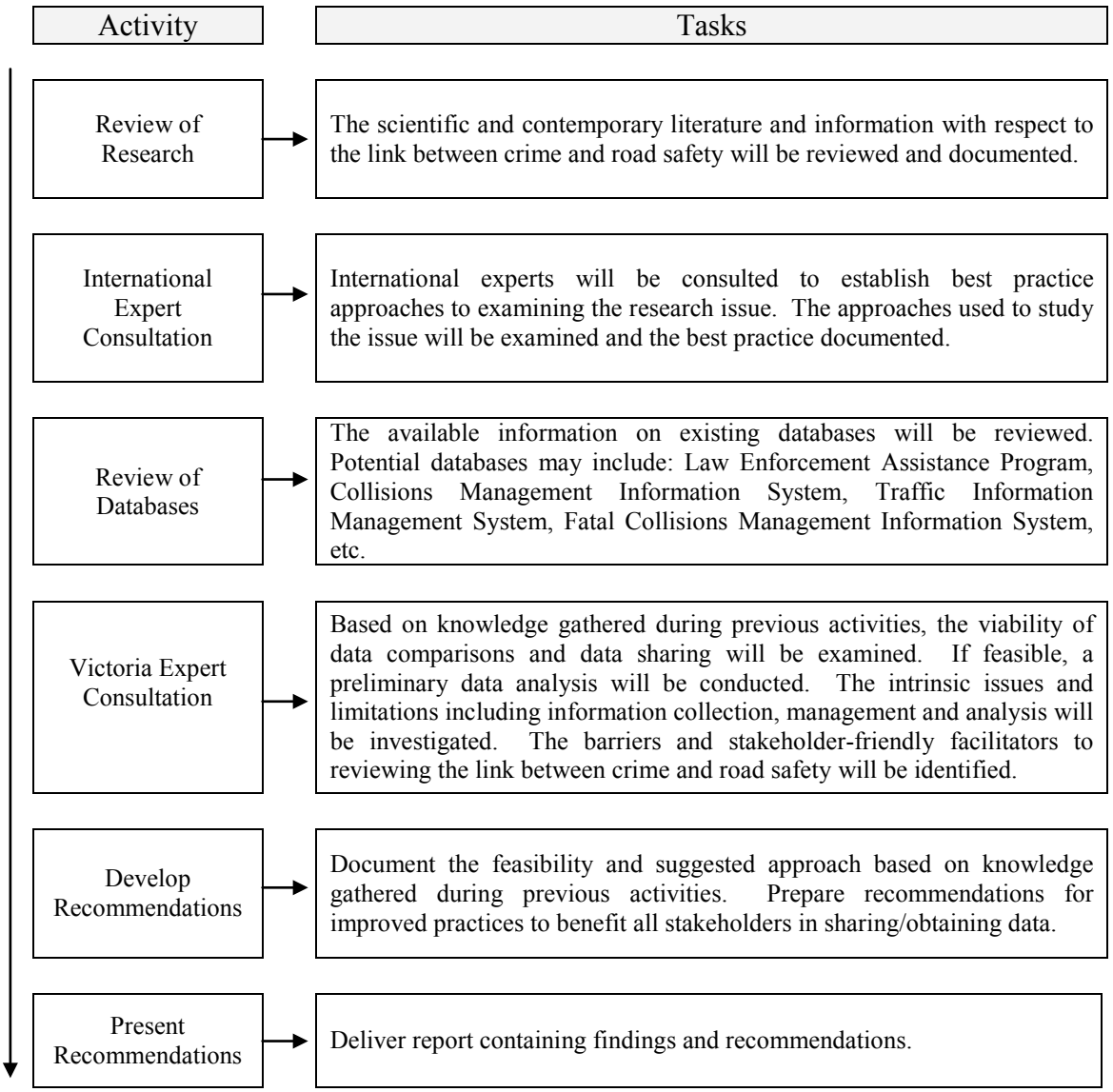

Figure 1.2 Research methodology

2 REVIEW OF RESEARCH

2.1 INTRODUCTION

The aims of the literature review were broken down into fundamental questions to be answered, specifically:

- What are the classifications of (non-traffic) criminal behaviour?
- What are the classifications of traffic offences?
- What are the relevant psychological theories that have relevance to general risk taking and criminal behaviour?
- What is the relationship between general negative behaviour and risky driving behaviour?
- What is the relationship between criminal behaviour and traffic offences?
- What is the relationship between criminal behaviour and crash involvement (especially fatal and serious injury crashes)?
- How have these various relationships been examined (i.e. statistical tests, linking of databases etc.)?

The following keywords (and combinations of each) were used to search the Australian Transport Index, the TRIS (US Transportation Research Information Service) and the ITRD (International Transport Research Documentation) for relevant published studies:

- Crime/criminal behaviour and:
  - Road safety;
  - Road accidents;
  - Crash rates;
  - Driving convictions;
  - Problem drivers;
  - Disqualified drivers.

- Non-traffic related crime and road safety.

These search terms retrieved a total of 128 papers. Of these 128 papers the abstracts were reviewed and sorted by relevance leaving 40 papers for further examination and of these papers 18 are included in the following literature review.

2.2 CLASSIFICATIONS OF CRIMINAL BEHAVIOUR

The Australian Standard Offence Classification (ASOC, 1997) was developed for use by the Australian Bureau of Statistics to provide a national statistical framework for classifying criminal offences, which are grouped into eleven offence categories, Table 2.1. Victoria Police's offence categories are summarised in Table 2.2.

Table 2.1 Offence categories (from ASOC No. 1234.0, Australian Bureau of Statistics, 1997).

Offence Category	Subcategory
Homicide and related offences	Murder, Attempted murder, Manslaughter, Driving causing death, Total homicide and related offences
Kidnapping/abduction	
Assault	
Robbery	Armed robbery, Unarmed robbery, Total robbery
Fraud	
Blackmail/extortion	
Unlawful entry with intent	Involving the taking of property, Other, Total unlawful entry with intent
Motor vehicle theft	
Other theft	
Other	Transport offence, Harassment, threatening behavior and public nuisance including telecommunications offence, Trespass, Liquor Act offences, Other street offence, Marine/Waterway Act offence
Drug offences	

Table 2.2 Offence categories (from Victoria Police Crime Statistics 2006/2007, Victoria Police, 2007)

Offence Category	Subcategory
Crime against the person	Homicide, rape, sex (non-rape), robbery, assault, abduction/kidnap
Crime against property	Arson, property damage, burglary (aggravated), burglary (residential), burglary (other), deception, handle stolen goods, theft from motor vehicle, theft (shop steal), theft of motor vehicle, theft of bicycle, theft (other)
Drug offences	Drug cultivating, drug manufacturing, drug trafficking, drug possession, drug use
Other crimes	Going equipped to steal, justice procedures, regulated public order, weapons/explosives, harassment, behaviour in public, other

2.3 CLASSIFICATIONS OF TRAFFIC OFFENCES

Table 2.1 indicates that the 'Other' offence category contains 'Transport offence'. Transport offences are detailed in the Road Safety Act (1986) and in the Road Management Act (2004). Specific offences that incur fixed penalties fall into several groups:

The Road Safety (Drivers) Regulations 1999. The objective of these Regulations is to make provision under the Road Safety Act 1986 for driver licenses and permits, hours of driving of heavy trucks and commercial buses and the charging of fees.

Road Safety (Driving Instructors) Regulations 1999. The objective of these Regulations is to make provision with respect to driving instructor authorities.

The Road Safety (General) Regulations 1999. The objectives of these Regulations are: (a) to prescribe devices and procedures for obtaining evidence in relation to (i) blood or breath alcohol concentration or the presence of alcohol or any other drug; and (ii) the speed of vehicles; and (iii) the mass of vehicles; and (iv) other traffic offences; and (b) to prescribe the matters to be included in parking infringement notices and traffic infringement notices; and (c) to prescribe the penalties for parking infringements and traffic infringements; and (d) to provide for the application of provisions of the Act and regulations to land of public authorities; and (e) to prescribe other matters authorised under the Road Safety Act 1986.

Road Safety (Road Rules) Regulations 1999. The main objectives of these Regulations are (a) to incorporate into the law of Victoria, as the Road Rules Victoria, a modified version of the Australian Road Rules1; (b) to establish rules to be observed by road users in matters not otherwise dealt with in the Road Rules; (c) to revoke the Road Safety (Traffic) Regulations 1988 and certain other Regulations relating to traffic regulation; (d) to provide for the installation, operation and maintenance of traffic control items; (e) to make consequential amendments to various Regulations made under the Road Safety Act 1986 because of the introduction of the Road Rules.

Road Safety (Vehicles) Regulations 1999. The objectives of these Regulations are (a) to establish a registration and permit system for motor vehicles and trailers used on highways that— (i) ensures that vehicles are appropriately registered having regard to whether they meet standards for registration; and (ii) records the identification details of each vehicle and the name and address of the person responsible for it; and (iii) provides for the collection of associated fees; and (b) to ensure that when vehicles are used on highways they are safe for use and are used in a safe manner; and (c) to provide the general mass and dimension limits and other requirements for vehicles; and (d) to provide for uniform conditions under which vehicles may safely exceed general mass and dimension limits; and (e) to improve road safety; and (f) to minimise the wear and damage caused by vehicles to roads and related structures, including bridges.

Road Management (Works and Infrastructure) Regulations 2005. These regulations have been developed under the Road Management Act 2004. The objectives of these Regulations are (a) to prescribe exemptions from the requirement to obtain consent under section 63(1) of the Road Management Act 2004 before conducting certain works; (b) to prescribe exemptions from the requirement to give notice as to the conduct

or completion of certain works; (c) to prescribe restrictions on the powers of a coordinating road authority to impose conditions on consents given under section 63(1) of the Road Management Act 2004; (d) to vary periods referred to in Schedule 7 to the Road Management Act 2004 within which certain notices must be given or consent is to be taken to have been given; (e) to prescribe particulars for the purpose of clause 16 of Schedule 7 to the Road Management Act 2004; (f) to prescribe fees for applications under Schedule 7 to the Road Management Act 2004 for written consent to the conduct of proposed works on a road.

Road Management (General) Regulations 2005. These regulations have been developed under the Road Management Act 2004. The objectives of these Regulations are (a) to exempt certain road discontinuances from certain requirements of section 12 of the Act; and (b) to prescribe certain matters that must be recorded in a register of public roads; and (c) to prescribe the interval at which a road authority must review its road management plan; and (d) to prescribe the manner in which a road authority must review its road management plan; and (e) to prescribe the manner in which a road authority may amend its road management plan in certain circumstances; and (f) to prescribe the particulars to be contained in a notice of incident; and (g) to prescribe particulars to be contained in a condition report; and (h) to provide for the protection of roads and property; and (i) to authorise the removal of vehicles and other objects and refuse from roads; and (j) to make provision with respect to the matters that a road authority must consider in exercising its powers in relation to hoardings and advertisements on roads, and to confer certain appeal rights; and (k) to make provision with respect to road management infringement notices; and (l) to fix certain fees and charges.

The most pertinent offences with respect to individual negative behaviour and/or criminal intent are documented within the Road Safety (General) Regulations (1999), specifically within Schedule 4, displayed in Table 2.3.

Table 2.3 Outline of Schedule 4 (Traffic Infringements) of the Road Safety (General) Regulations (1999).

SCHEDULE 4 - Regulation 105 - TRAFFIC INFRINGEMENTS
Large vehicles exceeding their speed limit
Speeding
Failing to give way or stop
Inappropriate keeping left and diverging
Inappropriate overtaking
Inappropriate signalling
Inappropriate turning
Inappropriate lighting (of vehicle)
Inappropriate safety procedures (e.g. use of mobile phone)
Drink driving
Failure to obey signals
Licensing and registration failures

2.4 PSYCHOLOGICAL THEORY

Several theories of human behaviour which have relevance to the relationship between criminal and unsafe behaviour have been proposed and are summarised below. These illustrate some of the underlying psychological theory behind the potential for the relationship between crime and road safety.

According to the Theory of Self-control[2], by Gottfredson and Hirsch (1990, cited in Junger et al., 2001), behaviour is consistent across a range of situations. People with low levels of self-control are more likely to succumb to short-term pleasures with little or no regard for the consequences in the long-term. As a consequence of this, they are more likely to be involved in risky behaviours and suffer the cost of these behaviours, including for example, traffic crashes, divorce, unemployment and illness. If behaviour is consistent across a range of situations then people engaging in risky criminal activity and risky driving behaviour may do so because of their general tendency towards risk taking.

Hatakka and colleagues (Hatakka, Keskinen, Gregersen, Glad, & Hernetkoski, 2002) took a similar holistic attitude when proposing the Hierarchical Approach. This hypothesis appreciates that driving behaviour is not an isolated behaviour and that it is connected to other aspects of life and is affected by motivational and attitudinal issues as well as by individual driving skill, e.g. goals for life and skills for living, refers to the motives and goals of an individual in the broadest sense.

The Problem-Behaviour Theory (Jessor, 1987 cited in (Bina, Graziano, & Bonino, 2006); Jessor, Turbin & Costa, 1997, cited in Bina et al., 2006) is a social-psychological framework which helps to explain the nature and development of alcohol abuse, drug misuse and other problem behaviors. It stresses the need to consider driving behaviour as part of a complex system that includes variables related to adolescents' problematic and conventional behaviours, to the peer, school and family contexts, and to individuals' values, opinions and feelings. The authors suggest that within each system, the variables represent the risk factors or protective factors that create likelihood that problem behaviour will occur (i.e. psychosocial proneness). This theory has been used to suggest that different risk behaviours usually take place together and can be considered as risky lifestyles.

The importance of exploring socio-moral maturity and its relationship with individual criminality and recidivism has been a focus over recent years in the field of criminology (Stevenson, Hall & Innes, 2003). The theoretical underpinnings of socio-moral development derive from cognitive theorist Kohlberg's *Stages of Moral Development* (Kohlberg, 1984) and the recognition of the importance of acquiring a certain level of moral reasoning before an individual's recognition of their social responsibility towards law abidement develops. As recognised by Jurkovic (1980, cited in Arbuthnot & Gordon, 1988) law abiding behaviour is not just related to an individual's knowledge of laws but to the higher order rationalisation of the universal ethics associated with social justice. According to Kohlberg's Theory of Moral Development this social responsibility is reached in the third stage of moral development. Intervention programs based on this

[2] In the literature the Theory of Self-control is also known as the General Theory of Crime.

theoretical model have been designed with the aim of promoting the attainment of Kohlberg's third stage of moral development. Arbothnot and Gordon (1986, cited in Arbuthnot & Gordon, 1988) conducted such a program with Australian high school students displaying delinquent behaviours, finding that the students who displayed greatest behaviour change were those who recorded greater development in socio-moral reasoning.

In his recent thesis into unlicensed/disqualified drivers, Watson (2004) used theories from psychology, sociology and criminology to explore recidivism and risk taking driving behaviour. Deterrence Theory is the theoretical basis for sanctions used in both crime and road safety.

2.5 INTERATIONAL EXPERT CONSULTATION

Several international experts were contacted to ascertain further information about methods applied in the relevant studies reviewed as well as to request their feedback on whether they were aware of any unpublished literature, non-English language/grey literature or ongoing work examining the relationship between criminal history and involvement in fatal and serious injury crashes.

Initially, authors with work published in the area or a closely related area were consulted. Those who responded include:

- David Giacopassi (Memphis University, USA)
- Jeremy Broughton (Statistics and Engineering Group, TRL Limited, UK)
- Bill Frith (ex-Ministry of Land Transport, New Zealand)
- Gerry Rose (Institute of Criminology, University of Cambridge, UK)
- Sharon Pickering (Department of Criminology, Monash University)
- Andrew Carroll (Centre for Forensic Behavioural Science, Monash University)

Although only a small amount of additional information was obtained, this exercise was useful. It yielded information on an internally published document from New Zealand and information was also obtained that pointed the project team in the direction of a Swedish study (published in the Swedish language), thereafter obtained from Thomas Lekander (Swedish Road Administration). Very little work has been undertaken to examine explicitly the relationship between crime and road safety, as described in the findings of the literature review in Sections 2.6-2.10.

2.6 WHAT IS THE RELATIONSHIP BETWEEN GENERAL NEGATIVE BEHAVIOUR AND RISKY DRIVING BEHAVIOUR?

When considering the relationship between crime and road safety, it is useful to start by contemplating the relationship between general unsociable and/or criminal behaviour and driving behaviour. This is because it has been suggested that early patterns of behaviour (often demonstrated during adolescence) can set the scene for more serious and ongoing patterns that have more severe consequences. Bina et al. (2006) found that displays of risky driving practice are associated with anti-social and low-level criminal behaviours, and that there is an effect of gender in the mix. From their analysis of a questionnaire

survey administered in schools, Bina et al. found that boys displaying risky driving practices are more likely to adopt a lifestyle characterised by high involvement in antisocial behaviours, tobacco smoking, comfort eating and time spent in non-organised activities with friends. Similar results were found for girls, whereby girls displaying risky driving practices were more likely to be involved in other risk-taking behaviours, anti-social behaviours and drug use.

Relationships have been found between risky driving and use of alcohol, marijuana, other illicit drugs and anti-social behaviour (Donovan, 1993, cited in Bina et al., 2006; Everett, Lowry, Cohen & Dellinger, 1999, cited in Bina et al., 2006). These findings support the hypotheses proposed in the psychological theories outlined in Section 2.4 and would suggest links between criminal behaviours themselves as well as between criminal behaviour and traffic offences.

2.7 WHAT IS THE RELATIONSHIP BETWEEN CRIMINAL BEHAVIOUR AND TRAFFIC OFFENCES?

Research has been conducted internationally to explore the relationships between the various categories of criminal behaviour and the different types of traffic offences. Studies in the United Kingdom (UK), United States of America (USA), New Zealand and Australia have examined criminal histories and identified links between mainstream crime and traffic offences.

Parsons (1978) investigated the social characteristics of 1509 serious traffic offenders in New Zealand and analysed each offender's patterns of traffic and non-traffic related offences. Parsons found that serious traffic offenders have distinctive characteristics, especially in terms of their criminal record, as they are more likely to have offences for violent and anti-social behaviour. He argued that those who have accepted violence as a part of normal behaviour would tend to continue this type of behaviour when driving.

Several years later it was reported that individuals with a criminal history in the USA were more than twice as likely to be convicted for recidivist drink driving within a two year period compared to driver's without a criminal history (Nochajski, Miller, Wieczorek, & Whitney, 1993). Recidivism for drink driving arrests was found to be associated with a prior criminal record (Nochajski et al., 1993). The best predictors of the number of drink driving arrests for a group of drink drive offenders were the number of minor (e.g. disorderly conduct, shoplifting etc.) and major (e.g. theft, assault, homicide etc.) crimes (Nochajski et al., 1993).

Sugg (1998) found that British people convicted of traffic offences (including driving whilst disqualified, taking a vehicle without consent, and driving without insurance) were more likely to have prior convictions including theft, burglary, criminal damage, and violence offences. These findings are reinforced in more recent work.

Chenery, Henshaw and Pease (1999) showed evidence of offender targeting through monitoring illegal parking in disabled bays in the UK. Interestingly, the study showed that 20% of vehicles parked illegally in a disabled space would warrant immediate police attention in comparison to 2% of legally parked vehicles. When exploring criminal history, it was found that 33% of the keepers of illegally parked vehicles had a criminal record compared with 2% of the keepers of legally parked vehicles.

In the UK, (Rose, 2000) examined three types of serious traffic offender – the drink driver, the disqualified driver and the dangerous driver – and revealed that many offenders from each group had committed mainstream offences[3]. Rose (2000) found clear differences between the following three serious traffic offender groups, especially in comparison with mainstream offenders: 40% of UK drink drivers had a previous criminal history; 50% of those charged for dangerous driving had a previous criminal history, and; 79% of disqualified drivers had a previous criminal history. Rose (2000) found significant differences between the groups in terms of their socio-demographic profile and frequency of offending. Disqualified drivers, for example, had criminal histories and an age-profile similar to that of mainstream offenders. Drink drivers were often older and were less involved in other offending, although they were still twice as likely as the general population to have a criminal conviction. Serious traffic offending is predominantly a male activity, and relatively few females are involved.

Rose's work suggests that each of the serious traffic offences vary in their level of association with mainstream crime. That is, drink driving was not closely associated with mainstream criminal offences. However, disqualified drivers were shown to have criminal histories similar to mainstream offenders. Furthermore, dangerous drivers showed less involvement with crime than disqualified drivers but more involvement in crime compared to drink drivers. It is suggested that these findings highlight the potential to disrupt mainstream crime through targeting serious traffic offenders and, as such, the report provides a useful basis for further developing an intelligence-led approach to road policing (Rose, 2000).

Subsequent to this work, Davies and Broughton (2002) conducted an investigation into the working of the High Risk Offenders (HROs[4]) Scheme in the UK. The authors present the results of analyses of the criminal and traffic offences committed by drink driving offenders before they became HROs, and their criminal behaviour afterwards. Women were found to form a relatively small group (11%) of all HROs so the analyses focus on men. The male offenders with the best (or least bad) record are HROs detected with a high BAC who have not been convicted of a drink driving offence within the last three years. Additionally, their rate of offending in the previous three years is smaller for nearly every criminal or traffic offence than even that of the ordinary offender, i.e. non-HRO. Male offenders with more severe and/or extensive records are those who committed two or more drink drive offences within three years. Drivers who refused to supply a specimen and had a previous drink drive offence were reported to have the worst record, displaying particularly high levels of convictions for: theft of, or from a vehicle; violence against the person (i.e. assault), and; for robbery, burglary and other theft. Offenders who are convicted of drink driving, have a BAC exceeding 2.5 times the legal limit, and who have no previous drink driving convictions report a similar traffic and criminal history to that of first time drink drive offenders detected with a lower BAC. When considering age, younger drivers (aged under 30 years) were found to have a worse offending record than older drivers aged 30 years or older), regardless of socio-economic group. In the younger

[3] In this context, 'mainstream' criminal offending includes violence against the person, burglary, robbery, theft and handling, criminal damage, drug offences.

[4] HROs are drink drive offenders whose offences suggest that they pose particular risks to other road users, and are classified as so if they are disqualified from driving for any of the following reasons: providing an evidential sample with an alcohol level exceeding 2.5 times the legal limit; providing an evidential sample with an alcohol level between 1 and 2.5 times the legal limit, and having been disqualified for a drink/driving offence in the previous ten years; refusing to supply an evidential sample.

age group, the offence record is greater for the lowest socio-economic group, and lower for the highest socio-economic group. For older drivers, although the offence record is greater for the lowest socio-economic group, the offence histories for all the other socio-economic groups are similar to each other (Davies & Broughton, 2002).

Broughton (2003) tested and proved the hypothesis that a driver's willingness to commit traffic offences tends to be associated with a willingness to commit other types of offences. The results showed that drivers who were convicted of several non-traffic offences were far more likely than non-offenders to also commit offences such as drink driving or dangerous driving. The key finding from the work was that in comparison to men who committed no (non-traffic) criminal offences, on average, men who were convicted of 4-8 (non-traffic) criminal offences committed 18 times as many serious traffic offences, and 6.5 times as many other traffic offences. The effect was even stronger for women. Furthermore, drivers in the lowest socio-economic group committed more serious traffic offences than those in the highest socio-economic group. Broughton (2003) reported that specific types of (non-traffic) criminal offences are associated with an increased number of traffic offences, including: theft of a vehicle – on average, drivers with 4 or more prior vehicle theft convictions committed 25 times as many serious[5] traffic offences compared to a driver with no vehicle theft conviction history; theft (non-vehicle, i.e. burglary, robbery) - on average, drivers with 4 or more prior theft convictions committed 9 times as many serious traffic offences compared to a driver with no theft conviction history.

Broughton also reported that the number of (non-traffic) criminal offences committed impacted upon involvement in certain types of traffic offences. For example the number of dangerous driving and driving whilst disqualified offences increased dramatically in relation to the number of (non-traffic) criminal offences: men with 4 or more non-traffic criminal convictions were 40-50 times more likely to be convicted of dangerous driving than men with no criminal conviction history; women with 4 or more non-traffic criminal convictions were almost 100 times more likely to be convicted of dangerous driving than women with no criminal conviction history. The number of speeding offences was not significantly affected by the number of (non-traffic) criminal offences: men with only one (non-traffic) criminal conviction were only twice as likely to be convicted of speeding compared with men with no criminal conviction history.

In summary, Broughton (2003) found that in the UK, between 1995 and 1999, 25% (for men) and 3% (for women) of traffic offences were committed by drivers who also committed (non-traffic) criminal offences during that time period. Additionally, 25% (for men) and 8% (for women) of traffic offences were committed by drivers who also committed drink driving offences during that time period. Furthermore, 50% of traffic offences were committed by drivers who also committed dangerous driving during that time period. Finally, 75% of traffic offences were committed by drivers who also committed driving whilst disqualified during that time period.

In Queensland, Palk and Davey (2005) adopted comparative analysis of traffic (drink driving, disqualified driving and dangerous driving) and non-traffic crimes in a comprehensive assessment of their relationship. The results showed that certain serious traffic offences and non-traffic offences, such as disturbances and offences against the person, share similar characteristics and occur in concentrated places and at similar times.

[5] 'Serious' traffic offences include: drink driving, dangerous driving and driving while disqualified.

Further work by Broughton (2006; 2007) reported that, on average, men convicted of between 4 and 8 non-traffic offences committed 21 times as many serious traffic offences and almost 4 times as many other traffic offences as men not convicted of non-traffic offences. The effect is even stronger for women. The strongest relationship was found for the offence of driving whilst disqualified: on average, men convicted of at least 9 traffic offences between 1999 and 2003 committed more than 100 times as many driving while disqualified offences as men not convicted of non-traffic offences.

2.8 WHAT IS THE RELATIONSHIP BETWEEN CRIMINAL BEHAVIOUR AND CRASH INVOLVEMENT?

Despite the general consensus in psychological hypotheses and data evidence, there has been very little work undertaken to explore the effects of the relationship between general criminal behaviour and traffic offences on road safety, and specifically, crash involvement.

Bailey (1993) conducted a study that explored prior traffic and criminal convictions for all New Zealand drivers involved in fatal crashes during 1986. Post crash traffic conviction data was collected for 5 years for all surviving drivers. A major focus of this study was on drink driving as 55% of the 1593 fatally injured drivers in New Zealand during 1987-1991 were proven or suspected drink drivers. From the sample of 893 drivers it was identified that 38% of drivers had one or more prior traffic convictions and 25% had one or more prior criminal convictions. From the "at fault" drivers, drink drivers were approximately two and a half times as likely to have a criminal conviction, crimes involving violence being the most common type of conviction. They also reported four times the proportion of prior drink driving convictions and double the dangerous or careless driving convictions compared to sober "at fault" drivers. Of the drink drivers found to have a prior criminal conviction for violence, 46% had a prior drink driving conviction. Of those on their first drink driving conviction 37% had a past criminal conviction compared to 72% of the recidivist drink drivers. The highest proportion of drivers convicted for drink driving were unskilled workers or were unemployed. In the four years following their crash involvement 18.5% of the drivers (who survived the fatal crash) received a subsequent conviction for drink driving. Bailey (1993) suggests that increasing police resources to detect drink drivers may by default lead to the increased detection of individuals wanted for other criminal activities.

According to Spolander (1997, p.2), "motor vehicle drivers involved in accidents have more crimes in their records than comparable crash-free drivers. This holds for all types of crime". Data was extrapolated for the years 1990-1994 from 200,000 motor vehicle drivers, 100,000 of whom had been involved in a police reported traffic crash that involved personal injury and matched with 100,000 crash free drivers (Spolander, 1997). Traffic and criminal history for five years prior to the crash was explored. Drivers found to be drunk at the time of the crash 90% of whom are males, reported the most extensive criminal and traffic histories with 54% having prior criminal convictions. The most common types of crime identified within this drink driver population were theft, car theft, crimes relating to narcotics and alcohol, causing of bodily injury, and property damage. Of the drivers with a prior criminal record, 39% did not possess a valid driver's licence at the time of the crash.

This 1997 study followed on from an earlier study by Spolander conducted in Sweden in 1994. This study involving 30,000 motor vehicle drivers aimed to explore the relationship between drink driving and other criminal and/or traffic crime history. The study identified that eight out of ten drink drivers involved in crashes had a previous criminal history three times higher than crash free motorists. The majority of sober crash involved drivers did not have a previous criminal history.

Giacopassi and Forde (2000) investigated the relationship between the homicide rate and the motor-vehicle fatality rate in the USA. Using Wilson and Kelling's broken windows theory (Wilson & Kelling, 1982, cited in (Giacopassi & Forde, 2000)[6] as a framework for their research, they found a strong relationship between traffic fatalities and the homicide rate at both the city and state levels in the U.S. They viewed the traffic equivalent to broken windows theory as 'crumpled fenders'. That is, a lack of police enforcement may send a message that the police are not patrolling nearby areas or that they are indifferent, which they argue may lead to a disregard for traffic laws and an increase in crashes but also a higher rate of crime, including the rate of homicides. Based on their results, the authors argued that an increase in visible police traffic enforcement would be an effective method to challenge this perception, thus deterring criminal activity and promoting safe driving.

The hypothesis of the Theory of Self-control was confirmed in a Dutch study of crash involvement and criminal records data by Junger et al. (2001). After controlling for exposure to crashes, plus age and gender, log linear analyses revealed that individuals who displayed risky traffic behaviour contributing to or causing a crash had an odds ratio of 2.6 for having a police record for violent crime, 2.5 for vandalism, 1.5 for property crime, and 5.3 for being involved in traffic crime. The authors suggest that the results are consistent with the idea of a common factor underlying risky behaviour in traffic and criminal behaviour and that this trait may represent an individual's general disregard for the consequences of their actions, which could be referred to as lack of self control, risk taking, or impulsiveness.

Junger et al.'s sample of road users involved in crashes had, in general, a high rate of criminal history (men: 31% compared with 15.2% for the population of The Hague as a whole, $p<.001$; women: 11.4% versus 3.5%, $p<.001$), which was found for all age groups, Figure 2.1.

[6] Much of the research that investigates the role of traffic enforcement in reducing non-traffic crime originates from Wilson and Kelling's "Broken windows theory" (Wilson & Kelling, 1982, cited in (Giacopassi & Forde, 2000). This theory developed from an experiment by psychologist Philip Zimbardo who took two cars and parked one of them with no number plate and its hood up in the Bronx and the other in Palo Alto. The car in the Bronx was stripped within a day. The car in Palo Alto remained untouched for a week, until Zimbardo smashed one of the windows and then it was stripped within hours. Wilson and Kelling argue that broken windows that are left unrepaired create a sense of community disorder and are likely to attract criminals. The opposite of this predicts that windows that are always in working order create a sense of order and therefore are not likely to attract criminals. Relating broken windows theory to police based traffic enforcement, areas with highly visible traffic enforcement would deter risky driving and criminal activity compared to areas with no police based traffic enforcement.

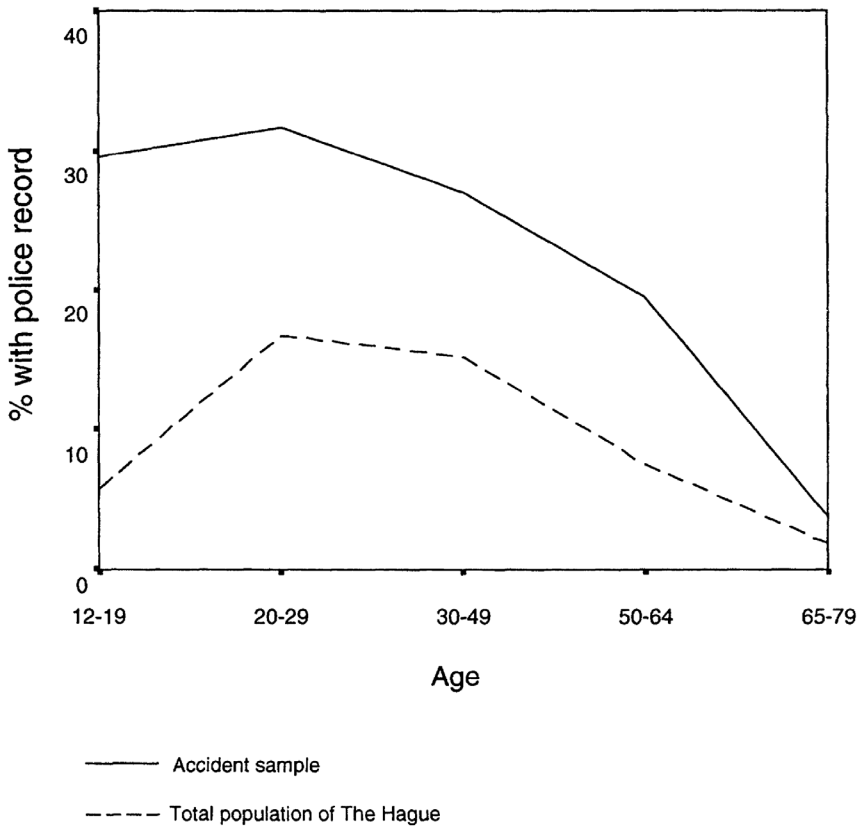

Figure 2.1 From Junger et al. (2001): Percentage of individuals in the database of offenders, inhabitants of the City of The Hague compared with the traffic users in crashes.

Junger et al. (2001) reported an interaction between risky behaviour and crime that suggested this association was weaker for younger individuals. It was suggested that this is because younger people are generally more likely to commit crimes than older people, and committing a crime is therefore less related to traits and more related to opportunities. It was also proposed that the specific measure of crime used in the study is influenced by age, i.e. the police have had more time to build a criminal record for older people and if people commit more serious crimes they will stay in the system for a longer time.

The authors suggest that the factors of alcohol use and exposure to crash risk, either alone or in combination, might be sufficient to explain the co-variation between crime and road crashes. Furthermore, they suggest that the relationship between crashes and crime could also be the result of the differential exposure of criminals to traffic, therefore, the relatively high exposure of criminals to traffic may be sufficient to explain the relationship between crime and crashes (Junger et al., 2001).

2.9 HOW HAVE THESE RELATIONSHIPS BEEN EXAMINED?

Table 2.4 summarises the data sources used in the most relevant studies reviewed that have involved data linking activities to examine the relationship between criminal history and road crash involvement. Detailed information about these sources is found below.

Table 2.4 Summary of studies linking crime and road safety data

Study	Data source	Agency	Country
Bailey (1993)	New Zealand Ministry of Transport (MOT), EHFS data, Wanganui Computer Centre	New Zealand Ministry of Transport (MOT)	New Zealand
Spolander (1997)	Traffic crash data, Crime data	Police	Sweden
Rose (2000)	Home Office's Offender Index (OI) & national survey of Young People and Crime (YPAC)	Home Office	U.K
Junger et al. (2001)	National Database on Offenders, and the Police Accident Registration	Police	Netherlands
Broughton (2003; 2006; 2007)	Archive driving license information. Home Office's Offender Index (OI)	TRL (based on licensing information by national Driving and Vehicle Licensing Agency (DVLA)	U.K

To examine the relationship between prior criminal and traffic history with fatal crash involvement, Bailey (1993) accessed demographic and severity of injury data from the New Zealand Ministry of Transport's (MOT) fatal crash files. While the MOT data did identify drivers over the legal BAC limit DSIR Chemistry (now EHFS) data was cross matched to provide BAC level data obtained from hospital records. Variables used in this matching process were: surname, first initial, date, location, and name of hospital attended. Ethnicity and marital status data was obtained from the Department of Health by matching names. Criminal and traffic conviction data was obtained from the Wanganui Computer Centre (central law enforcement computer) using name and date of birth. Difficulties with data matching arose due to variations in names and dates of birth provided by the individuals across the various systems, where feasible manually data matching was used to compensate for computerised matching challenges.

Unfortunately, further information about Spolander's (1997) study is not available as it is not fully documented in English.

Rose (2000) examined the socio-demographic characteristics and the criminal histories of serious traffic offenders in the UK using two existing data sources: the Home Office's Offender Index (OI) and a national survey of Young People and Crime (YPAC). YPAC is a large study investigating self-reports of offending based on a national random sample of 1,721 young people aged 14-25. Respondents were asked about their involvement in criminal offences including five serious traffic offences (licence and insurance offences, drink driving, dangerous driving, disqualified driving, crash offences [had a crash when driving, without stopping to see what had happened or reporting it to the police]). Analysis of criminal histories from the OI concentrated on the links between serous traffic offending, 'mainstream' criminal offending and vehicle theft. The analysis examined current court convictions, past offending behaviour and reconvictions. The OI sample consisted of 42,861 offenders, with national (UK) coverage and comprehensive records of criminal convictions. As a basis for the analysis, seven main groups of offence were identified, including: Mainstream criminal offences (violence, burglary, robbery, theft and handling, criminal damage, drug offences); Car theft (theft or unauthorised taking of a vehicle, theft from a vehicle); Serious traffic offences (drink driving, driving whilst disqualified, dangerous driving (including causing death); Other standard list offences (offences not classified within the specified main types of offence, or where the offence classification was not recorded); Breaking bail and breach cases (failing to surrender to bail, cases arising from a breach of the requirements or conditions of a previous sentence); Summary traffic offences (traffic offences that are not on the standard list); Other summary offences (other offences (not including traffic offences) that are not standard list offences). As an offender's court appearance may involve several charges, the OI defines the principle offence as the most serious sentence given, therefore, Rose's study regarded the principle offence as the most importance for classifying offenders.

Junger et al. (2001) inspected data from two independent police databases to examine the relationship between risky behaviour in traffic and criminal history based on a random sample of 1531 people involved in crashes. Descriptions of the crashes by the police were used to identify individuals who had displayed risky traffic behaviour contributing to or causing a crash, and evidence of offending was based on a register of contacts with police.

Broughton (2003; 2006; 2007) analysed the UK's archive of driving license information held by TRL which is based on licensing information supplied by the national Driving and Vehicle Licensing Agency (DVLA). The DVLA information supplied included details of convictions for traffic offences only and is recorded in the form of archived material because DVLA data can change in short time periods (e.g. points can be cleared from a licence after 3 years) in accordance with legislation. The archive therefore overcomes this loss of historical information and contains approximately 1% of licence records, maintained solely for research purposes. Information on other criminal offences was made available to the author from the Offenders Index (maintained by the UK Government's Home Office). A stratified sample of drivers was selected from the TRL archive and matched to the Offenders Index.

2.10 SECTION SUMMARY

The classifications of (non-traffic) criminal behaviour and traffic offences and the key relevant psychological theories that have relevance to general risk taking and criminal behaviour have been identified and documented. Experts in the field have been contacted and the scientific literature has been examined. It has been reported that there is a positive relationship between general negative behaviour (e.g. involvement in antisocial

behaviours) and risky driving behaviour. These findings support the hypotheses proposed in the relevant psychological theories and would suggest links between criminal behaviours themselves as well as between criminal behaviour and traffic offences. Additionally, the literature reviewed suggests that there is a positive relationship between criminal behaviour and traffic offences. Research has been conducted internationally to explore the relationships between the various categories of criminal behaviour and the different types of traffic offences. Studies have examined criminal histories and identified links between mainstream crime (specifically violence, theft & burglary) and traffic offences (specifically recidivist/drink driving, driving whilst disqualified). There has been very little work undertaken to explore the effects of the relationship between general criminal behaviour and traffic offences on road safety, and specifically, crash involvement. The work that has been done has revealed a positive relationship between risky traffic behaviour contributing to a crash and criminal history (particularly for violent crime, vandalism, property crime, and involvement in traffic crime). When examining the rate of involvement in road crashes for those individuals with a criminal history compared to those without, the rate for those with a criminal history is more than double (Junger et al, 2001). For the work that has been conducted, the focus has been on the relationship between drink driving, criminal history and road safety. Significant relationships have been identified between crash involvement (Spolander, 1997; Junger, 2001), drink driving (Bailey, 1993; Spolander, 1997) and general criminal history including theft, car theft, drug and alcohol related crimes, violence and property damage.

However, it should be noted that cultural differences may mean that the results of foreign studies do not apply in this country (Broughton, 2007). Additionally, it is suggested that the factors of alcohol use and exposure to crash risk, either alone or in combination, might be sufficient to explain the co-variation between crime and road crashes and that the relationship between crashes and crime could be the result of the differential exposure of criminals to traffic. Therefore, the relatively high exposure of criminals to traffic may be sufficient to explain the relationship between crime and crashes. The relationship between crime and road safety has been examined by investigating a variety of data sources, both retrospectively and prospectively. Due to the limited literature that is available to determine the link between crime and road safety and the limitations of the studies to date, research should be conducted within the Australian context to explore the possible links between the two.

3 REVIEW OF VICTORIAN CRIME AND ROAD CRASH DATA SOURCES

3.1 INTRODUCTION

Information on data sources relevant to crime and road safety data has been obtained from the online electronic sources, a limited number of publications, but primarily from a variety of contacts within Victoria Police, Victorian Department of Justice, and VicRoads, as well as from colleagues at MUARC.

Additionally, a multi-disciplinary meeting was convened on 19 September 2007 with senior members of Victoria Police to find out more about the data that Victoria Police hold, how it is currently being used, and ideas for collaboration in data sharing/research direction. Participants included staff from Victoria Police's Corporate Strategy and Performance Department (researchers, statisticians), Traffic and Transport Services Division, as well as the secretary to Victoria Police's Research Coordination Committee. Staff from the MUARC project team and other senior MUARC researchers were also in attendance.

The most relevant data sources are identified in this section and their variables summarised. At the end of the section, a flowchart is provided to indicate the relationship of each of the main data sources to each other (see Figure 3.1).

3.2 RELEVANT DATA SOURCES

3.2.1 The Law Enforcement Assistance Program[7]

Victoria Police implemented the Law Enforcement Assistance Program (LEAP) state-wide in 1993. The LEAP database is fully relational and stores particulars of all crimes bought to the notice of police as well as family incidents and missing persons. It also includes details on locations, vehicles and persons involved. Victoria Police uses three methods of counting crime depending on the particular offence. For all crime against the person, and most crime against property, the counting unit is the number of principal victims for each separate occurrence of the offence. For example, if three offenders assault two persons, then two offences of assault are recorded.

Only the most serious offence which best describes a distinct course of criminal conduct is recorded in official crime statistics, even though an offender may be charged with other offences resulting from the one incident. For example, an offender carrying a firearm commits an armed robbery - only the offence of armed robbery is recorded although the offender would be charged with armed robbery and possession of a firearm.

[7] The information in this sub-section has been extracted from Victoria Police's web site: http://www.police.vic.gov.au/content.asp?Document_ID=781

The number of distinct courses of criminal conduct occurring within an incident will generally be one unless there is a break in time and/or location. For example, if an offender presents three valueless cheques to a teller only one offence would be recorded but if the three cheques were presented at different times or at different branches then three offences would be recorded.

There are in excess of 4000 individual statutory and common law offences recorded on LEAP which have been grouped into 27 broad offence categories. These categories are further subdivided into four general classes of:

- Crime Against the Person
- Crime Against Property
- Drug Offences
- Other Crime

Offences dealt with by way of penalty notice and/or traffic offences are not recorded on LEAP and are not included in the official crime statistics. Offences are classified as substantive offences, attempts, conspiracies, accessories and/or aid or incitement and abet. Unless otherwise stated, the statistics presented in publications include all degrees of the offence.

Of relevance to this project, the offence category of 'homicide' is not restricted to the offence of murder but includes offences such as manslaughter and culpable driving which also result in the death of a person. The offence category of homicide also includes attempts and other degrees of the offence.

3.2.2 The Traffic Incident System

The 'Traffic Incident System' (TIS) contains information collected by police officers who attend the scene of a road crash that fits particular criteria[8].

Prior to 2006, the Victoria Police Collision Report Form (VP510 Form) was used by police officers to officially record information about a crash (fitting the criteria). The VP510 Form was either completed at the scene of the crash or on return to the station by the attending member. The data recorded on the VP510 Form was then mailed to a central data entry point and entered into the Traffic Accident Information System (TAIS) database. The VP510 form and TAIS database were made obsolete in January 2006, at which point a computer based application for entering collision data was implemented, i.e. the Traffic Incident System (TIS).

[8] Criteria for attending the scene of a road crash:

1. The crash resulted in: the death of any person within thirty days of the crash, and/or; personal injury as identified by the police officers completing the crash report.
2. The crash occurred on any road, street, thoroughfare, footpath, railway level crossing, or any place open to the public.
3. The crash involved one or more road vehicles which, at the time of the accident were in motion, including motor cars, station wagons, utilities, panel vans, motor cycles, trucks, buses, trams and railway vehicles, pedal cyclists and ridden animals.

The types of variables held in TIS include:

- day, date and time the crash occurred;
- location (e.g. street, road or highway, that the crash occurred on, suburb that the crash occurred in, Melway reference etc);
- type of collision (e.g. collision with vehicle, collision with fixed object etc);
- information regarding the people involved (e.g. road user type, name, etc);
- information regarding the vehicles involved (e.g. make and model, registration, etc);
- diagram of collision scene;
- brief description of collision (with no apportioning of blame);
- environmental conditions (e.g. road surface type, condition, lighting conditions, atmospheric conditions);
- traffic control involved (e.g. intersection signals operating, pedestrian crossing etc);
- driver movement prior to impact (e.g. going straight ahead, avoiding animals, out of control etc);
- driver intentions prior to collision;
- initial point of impact;
- level of damage; and
- whether the vehicles involved were towing a trailer of some sort.

Further details about the variables are provided in Appendix A. The new TIS system allows the user to check a person against LEAP using a master name index (MNI), which is given to a person whether they are a victim of crime or involved in a crime. The result of this check is not recorded anywhere in LEAP or TIS, the information is solely 'viewed' by the user who is conducting the search.

3.2.3 The Major Collisions Investigation Unit

The Major Collisions Investigation Unit (MCIU) consists of a group of approximately 50 officers specially trained in collision investigations that are called out to assist patrol officers with fatal collisions and/or major injury collisions.

The MCIU criteria for attending a crash are: if three or more people are killed; if someone is killed or suffers life-threatening injury and the person who caused that crash is in some way culpable, and that culpability can be by way of excessive speed, or drug, or alcohol, or reckless behaviour. The MCIU attend approximately 300 crashes a year but fully investigate approximately 150 crashes of these. The team take measurements and photographs and reconstruct the crash based on the available evidence. Due to the detailed nature of their investigations, it is usual for this team to collect and record additional records that TIS may not have, although the standard data is still entered into TIS. Driver's name, date of birth, address and if available MNI are used to identify any criminal history recorded in LEAP. Past traffic offence is also linked via LEAP through the licensing and

vehicle registration section. Details of any past criminal and traffic offence history are recorded onto an Inquest Brief of Evidence for court sentencing purposes. However this information is not recorded in the MCIU Yearly Take-Ons database.

3.2.4 The Road Crash Information System

The TIS information on crashes[9] is sent to VicRoads who enhance the data set with VicRoads information. This enhanced data is then held in the Road Crash Information System (RCIS). This system holds data on crashes up to the end of 2005 and is a particularly useful source of information on fatal and serious road crashes.

3.2.5 The Collisions Management Information System

The Collisions Management Information System (CMIS) was designed and is managed by Corporate Statistics. The system provides summary information relating to all traffic collisions reported to Victoria Police, by reading data from TIS (based on crash data submitted by police officers).

CMIS data is similar to RCIS data but not as detailed; it is more of an overview of the situation. CMIS contains a crash blackspot module, which provides users with information pertaining to traffic crash blackspots. Either intersection or mid-block blackspots can be targeted, with results shown as a simple tabular summary or in more detailed reports.

Corporate Statistics is also responsible for the collection, collation and analysis of road traffic fatalities throughout Victoria. The fatal collisions management information system (FCMIS) provides management and operational information relating to fatal traffic crashes.

3.2.6 The Traffic Infringement Database

Traffic infringements occurring within Victoria are recorded in the Victorian Information Management System (VIMS). Up until recently this database has been managed by Tenix Solutions on behalf of the State. Requests to access this data must be made through the Information Management and Enforcement Services (IMES) Unit of Department of Justice (DOJ). The data field codes that are included in the database are included in Appendix B of this report. All traffic infringements are entered into VIMS including red-light and speed cameras and on-the-spot infringements which are entered in a manual process. Registration numbers are identified in camera detected offences personal contact details are obtained though links with the VicRoads Registration and Licensing database, which also keeps record of respective demerit point losses. These personal details and infringement history are stored in VIMS. These infringements are then linked with VicRoads for the allocation of demerit points. VIMS also links with the Sheriff's Office (DOJ) who serve warrants for outstanding fines. As part of the new tender, VIMS is scheduled for replacement/modification over the next 12 months. Discussion is taking place between interested parties such as DOJ and Victoria Police regarding the possibility of including minor summary offences e.g. offensive language, minor thefts into the VIMS system. This would then involve forming links with the LEAP System.

[9]The 'Members Opinion of Cause' for the crash that is held in TIS is not included in the information sent to VicRoads as it is not a 'proven fact' but rather a subjective opinion by the reporting police officer.

3.2.7 The Courtlink Database

The Courtlink Database is managed by the Department of Justice and is a case management system for the courts, including both criminal and road traffic offences. The majority of the cases are initialized electronically from the Victoria Police following a chargeable offence. An individual's past criminal history is not recorded in this initial process. If found guilty, in relation to the Finalizing Order, a magistrate will be provided with a paper copy of an individual's prior convictions from the Police Prosecutor obtained via LEAP. The Magistrate's Office then enters the final court orders including past criminal convictions into the individual's case records within the Courtlink database. Courtlink is not used to link past criminal histories, especially as the identifiable variables are difficult to match due to discrepancies in details provided by the individual e.g. DOB, address, name. Summary data from the Courtlink database is used internally for monitoring the court system, e.g. how many cases were heard in each court over a period of time but not for analysis regarding the types of criminal activities heard by the courts.

The Courtlink system is scheduled to be phased out and replaced by the "Court View" system over the next 12 months. This new system will incorporate data from the Magistrates Court, County Court, Supreme Court, Children's Court, Coroners Court, VCAT and the Disputes Settlements Centre. Details of the proposed system were not readily available however it is envisaged that this new amalgamated database will allow for more interactive data access across the Courts system.

The statistical section of DOJ produces regular publications for each of the court jurisdictions. These publications provide summary data such as: number of offenders processed through the courts; demographic characteristics of offenders; types of offences; and types of penalties prescribed. Presently they do not report on links between crime and road traffic offences, again because of the challenges with matching individual cases. Currently if an individual is charged with an offence one day and then for another offence at a later date their records are entered as 2 completely separate cases. As with the Courtlink data staff, they hope to have more flexibility in data analysis with the introduction of the Court View system.

3.1.8 VicRoads Licensing and Registration Databases

3.1.8.1 Driver Licensing System

This database contains all Victorian Driver licence data. Data is recorded in a case by case manner and includes variables such as driver's licence number, name, address, DOB, licence status and conviction and demerit points history. As this is an individual client based data system it can be challenging and/or time consuming to extract summary data e.g. number of Victorians who have had their licence disqualified. Traffic Infringements that involve a loss of demerit points are recorded against client's files from DOJ via weekly electronic file transfers from Tenix Solutions. VicRoads then notifies DOJ about any non-matched data. The Victoria Police have direct access to the Driver Licensing System via LEAP.

3.1.8.2 Victorian Registration Database

This database hold Victorian car registration details such as registration plate number, name, DOB, address, status of vehicle. It also holds data about whether the vehicle is stolen, this information is provided to VicRoads from the Victoria Police via the LEAP system.

VicRoads Victorian driver's licence and car registration information is also partially linked to the National Exchange of Vehicle and Driver Information System (NEVDIS). This enables interstate licence and registration transfers and also tracking of stolen vehicles.

3.3 RELATIONSHIPS BETWEEN THE DATA SOURCES

It was suggested that LEAP is used as a source of validation rather than for analysis purposes. For example, LEAP is used to validate crash data that is collected, i.e. TIS uses LEAP to look at vehicle registration, driver licence, stolen vehicles etc. There is no overlap of data between LEAP and TIS and it was suggested that perhaps there should be (Stakeholder, LEAP Management Unit, Victoria Police). Another stakeholder verified that there is no direct link between criminal records and crash records (Stakeholder, Corporate Statistics, Victoria Police).

It was reported that there is a middleware system that has been implemented that enables several data systems to be linked. It was reported that when this system is fully initiated it will enable two options for examining and collecting data:

> *"As well as producing TIS, you will notice that we have a thing in the middle there called an EAI, which is like middleware, a bit like a telephone exchange, and the fact that we installed that means that all of the systems can come into that one point and then feed the data out. What that means, without getting into all the acronyms, is that in the future you will have two options in terms of collecting data: you can collect data into the traffic incident system, which is a database designed to collect this data, or you can take data from other systems and link it through this middleware, this telephone exchange, and use that as a feeder point to pass data through. For example, the way we have set up TIS, it links through the middleware, it links to VicRoads for license registration checks, for driver's license checks, and to our LEAP system for personnel checks, and feeds that back into the traffic incident system as a database. The advantage of this is that, depending on where you want to go in the future, you have the option of connecting things together so that it feeds the data through, so it is a lot more integrated.[10]"*
>
> *Quotes from A/Inspector Jeff Cole, Victoria Police in the transcript of the Road Safety Committee Inquiry into Driver Distraction, 27 March 2006, Melbourne.*

This system, therefore, enables linking of data that has not previously been possible. However, as suggested by the comments received from the stakeholders, this new system may enable data examination but does not enable recording of findings/analyses.

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[10] *The TIS application & EAI middleware interface is now fully operational with validation and data supply links via the EAI to internal and approved 3rd party external systems.*

3.4 SECTION SUMMARY

Figure 3.1 summarises the relationships between the main data sources and indicates the jurisdictions that manage them.

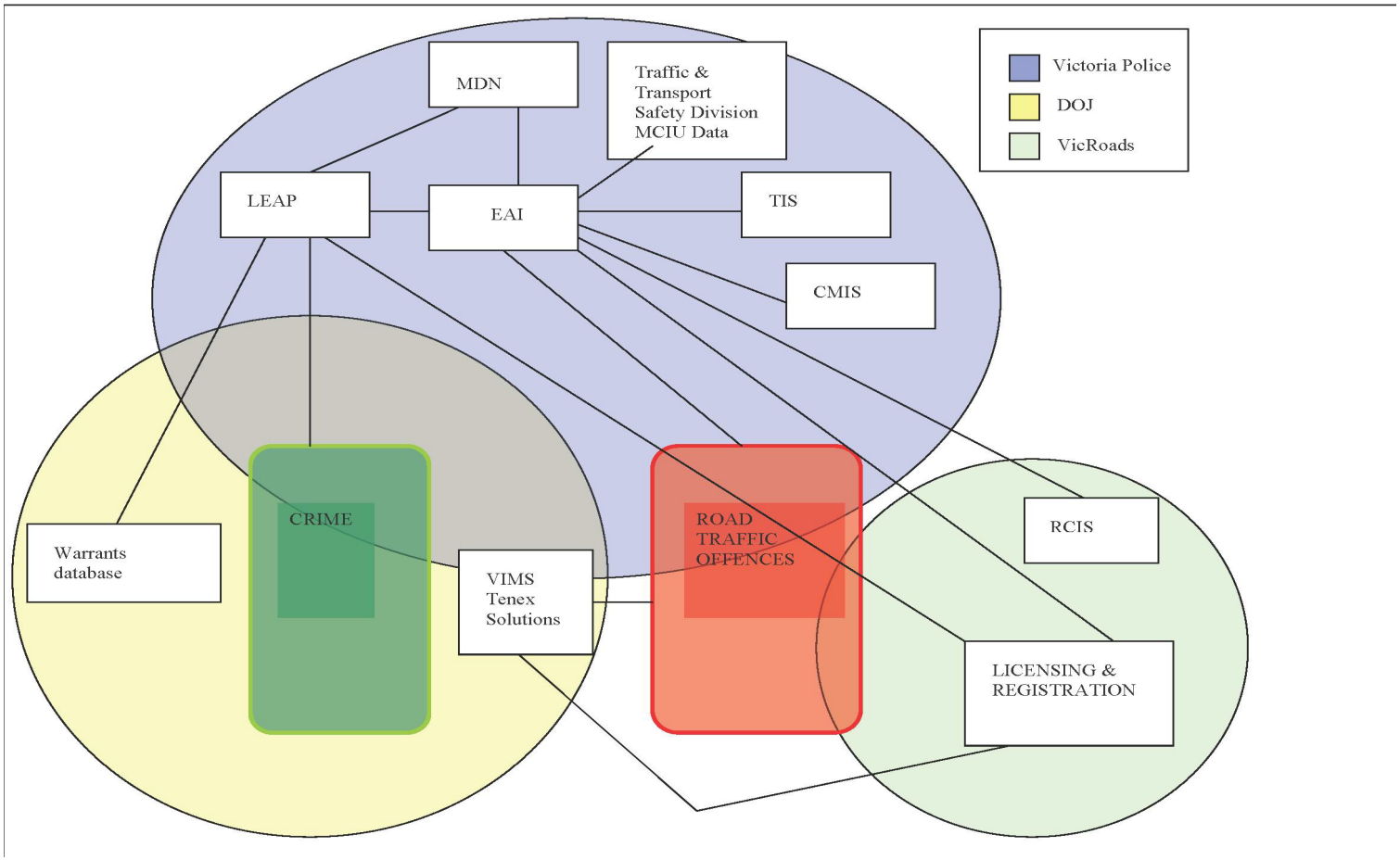

Figure 3.1 Flowchart of relevant road safety and crime data and associated agencies

*Note: This flowchart is a summary of the relevant databases and existing links between them. Access to the various levels within many of these databases is governed by authorisation within individual departments with more senior staff having more extensive access.

4 APPROACHES FOR LINKING CRIME AND CRASH DATA

4.1 INTRODUCTION

This section contains a summary of the potential approaches for linking crime and crash data and their relevance to the Victorian context. Limitations and barriers in linking data are also described.

4.2 PROCESS OF LINKING DATA

The key steps identified within the literature for the process of examining crime and crash data are:

Step 1 Data Supply – drawing on data sources summarised in Section 3.

Step 2 Data Matching – matching common field codes using automatic/manual matching, or middleware matching.

Step 3 Data Checking – basic descriptive analysis of data to ensure consistency across field codes, no outliers or errors in data.

Step 4 Data Analysis – having a reference year which is used as a historical marking point and years prior to this time are examined.

4.3 CONTEMPORARY APPROACHES TO LINKING CRIME AND CRASH DATA

Generally, crime and crash data has to be linked to be analysed simultaneously. It is rare that this information is contained in the one database. The linking of data sources is generally achieved by using data matching to link two sources of data to identify drivers with serious injury and/or fatal crash involvement and drivers who have criminal history. The previous key studies have linked crime and road safety data using two or more Government databases (see Table 2.4).

4.4 LINKING VICTORIAN DATABASES

The approach to data linking currently being implemented was summarised during the Road Safety Committee Inquiry into Driver Distraction:

> "(TIS) is a multi-agency system, which shows you that we have moved towards broadening it out from just Victoria Police. There are a number of parties involved in this and we are looking at producing a whole-of-government type approach (to)… lead on to the future."
>
> *Quotes from A/Inspector Jeff Cole, Victoria Police in the transcript of the Road Safety Committee Inquiry into Driver Distraction, 27 March 2006, Melbourne.*

After the review of the literature, existing types of data and databases, and discussion with the stakeholders, there were two main suggestions for linking Victorian data to explore the link between crime and road safety, in terms of fatal and serious injury outcome crashes.

The following options can be presented:

- A LEAP search could be run within TIS, with a person's name used in a search demonstrating their involvement in a road crash. One option could be to link the crash involved person's name and the date of birth back to criminal history. This activity would be appropriate for examining any subset of crash severity outcome recorded by the police.

- A LEAP search could be run for individuals involved in MCIU investigated road crashes. Using MCIU information would enable contributory factors in the crashes (from the police perspective) to be examined more fully than by using any other source, which would provide useful detail.

In terms of exploring other links, such as crime and traffic infringement, which has not currently been done in Australia, the following options can be presented:

- A LEAP search could be run for individuals identified within the Traffic Infringement Database as incurring penalties.

4.5 LIMITATIONS IN LINKING DATA

The following sub-section discusses some of the issues and limitations that arise in linking data sources. The documentation of these issues is based on the discussions with many stakeholders and researchers from Victoria, nationally and internationally, and, the methodological issues that have been cited in the scientific literature.

4.5.1 Privacy and ethics

One stakeholder commented that "privacy would be a nightmare to enforce" if combining data from LEAP and TIS, for example, due to the need to explore multiple variables to ensure reliable linking of data. It was suggested that even this approach would result in some missing data and would only give a "rough" match. The nomination of an agency to be the custodial of linked databases and access issues for other relevant agencies would need to be investigated.

There was uncertainty amongst the stakeholders over exactly which process would need to be followed for obtaining ethical consent and meeting ethical standards, e.g. privacy commissioner, Victoria Office of Public Prosecutions, and this would need to be investigated, specific to any linking strategy adopted. Therefore, the key issues are:

- Stringent privacy legislation

    - All data requests for Victoria Police must be authorized by Victoria Police's Research Coordinating Committee and/or other bodies

    - Data would have to be de-identified and unidentifiable (as most data linking would rely on name or date of birth the Victoria Police would have to do the data matching internally)

4.5.2 Matching of data

It was suggested by stakeholders that variations in data entry, e.g. spelling errors, within the TIS and LEAP systems could cause difficulties in obtaining reliable data from queries. Indeed this was an issue in the Bailey (1993) study. Additionally, it is common for the criminal population to frequently change their names, removing the common thread. To overcome this issue, it was suggested that variations on multiple variables would need to be run, e.g. name, address, date of birth, aliases. Therefore, the key issues are:

- Issues with data matching
    - Not many common variables to link traffic data with licensing data and crime data
    - Common variables are identifiable e.g. name, DOB, again this may cause privacy issues
    - Matching rates are often poor
    - Common variables not a reliable source for cross matching variations in DOB, spelling of name, use of alias
    - Difficulties have even been experienced when common variables exist e.g. when matching crash data with VicRoads registration data
    - The closest data we currently have exploring repeat offences is road traffic recidivism data held by VicRoads however data extraction complications have hindered access to this type of data
- Difficulties with operational definitions
    - Challenges when defining what constitutes criminal history and how to categorize crimes, e.g. Police department uses 27 offence categories (see Crime Statistics 2005/06 for examples)
    - Relevance of criminal history would need clear definition e.g. first offence, all offences, offences that occur when licensed
    - Whether a database contains information on the details of an offence and sentence imposed, and whether serious traffic convictions are contained within such a system

4.5.3 Analysis issues

The longer a person has held a driving licence, the more likely they are to have obtained a criminal history, as this is time dependent. When we consider past criminal offences, what information should be used, how should data be examined? E.g. do we look at all offences, the worst offences, violent vs. non-violent, repetition of offending, property/drug related offences only, age of onset of offences?

While it is possible to link some existing databases using one or more variables (depending on the databases concerned), this linking is often limited to a retrospective linking of individual cases. For road safety research purposes it is important to be able to link whole databases for exploration of the overall extent of problems and to analyse the influences of several variables.

Database records do not show the type of vehicle being driven when a traffic offence was committed which also affects the analysis and interpretation of the data. Therefore, the key issues are:

- Issues with data analysis
    - When undertaken any retro/prospective research considering crime it is important to incorporate time spent in jail. Individuals in jail will not be accruing any road traffic offences
    - Similarly, research should also consider the treatment of demerit points after a certain period. That is, whether demerit points are erased from the data sources after a set time. If so, an archive may need to be created to preserve this data.
    - Individuals with criminal histories are often a transient population who seek interstate licenses and registration in attempts to avoid detection (thus changes in address and registration data)
    - The link between criminal activity and mental health and/or substance abuse history further complicates clear identification of factors involved and adds complexity to any treatment recommendations

4.5.4 Cost/Resource issues

- Limited resources within Victoria Police
    - Staff resources – may take a long time to complete our request or may refuse altogether
    - Staff may not have time to de-identify data for our research purposes
- Associated costs
    - Fee for service (unless can find way around this, may suggest as they are baseline sponsors we may be exempt from this or alternatively if the research is commissioned from departments such as the Victoria Police)
    - MDN is an example of data linking with its links between VIMS and LEAP however this linkage cost approximately $120,000,000 to undertake
    - If data was linked into a middleware type database the agency that would fund the associated maintenance and data requests would need to be determined

4.6 SECTION SUMMARY

There are a variety of limitations and barriers for linking crime and road safety data in Victoria, predominantly concerning privacy and ethics, matching of data, issues with data analysis and cost/resource factors.

In the majority of Departments and organisations approached during this project, data accessibility was an issue. It seemed apparent that Privacy Legislation was being over interpreted making it virtually impossible to access data (even when de-identified). Large amounts of data are collected by each individual agency however much of this data is not used for research or evaluation purposes. When external bodies are contracted to conduct research they often cannot access the necessary data. MUARC for example has to adhere to strict University ethics protocols when conducting research which should satisfy any confidentiality concerns of these departments. With the trend now being that evaluative research is tendered out to external organisations the importance of developing a workable protocol to provide data access while preserving confidentiality needs to be devised. Large delays in waiting for data access approval and barriers to even de-identified data are both costly to research projects and often make important road safety research impossible.

5 KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

A number of recommendations have been made as an outcome of the key findings of this work. The recommendations can be grouped into those for data collection, data management and analysis. It should be emphasised that the current database systems are not designed or used with research purpose as their priority. Therefore, several of the recommendations refer to improved coordination between practice and research.

5.2 KEY FINDINGS OF THIS WORK

The specific objectives of the research were:

- To examine and document the link between crime and road safety from an international/national perspective, with particular emphasis on the relationship between criminal history and involvement in fatal and serious injury crashes.
- To examine the best practice approaches to examining the link between crime and road safety in Victoria and internationally.
- To determine the existing barriers and facilitators to examining the issue of crime and road safety in Victoria.
- To develop strategies to overcome the existing barriers and present a set of recommendations for data collection, data management and analysis.

The key findings of this research suggest that:

- There is a positive relationship between:
    - General negative behaviour (e.g. involvement in antisocial behaviours) and risky driving behaviour;
    - Criminal behaviour and traffic offences (specifically violence, theft & burglary and recidivist/drink driving, driving whilst disqualified;
    - Risky traffic behaviour contributing to a crash and criminal history (particularly for violent crime, vandalism, property crime, and involvement in traffic crime);
    - Crash involvement, drink driving and general criminal history including theft, car theft, drug and alcohol related crimes, violence and property damage.
- There are a variety of approaches that have been adopted internationally to examine these relationships, although such work has not been undertaken in Victoria to date.
- There are a variety of limitations and barriers for linking crime and road safety data in Victoria, predominantly concerning privacy and ethics, matching of data especially across agencies, issues with data analysis and cost/resource factors.
- A number of recommendations have been presented to overcome these factors and to explore the relationship between crime and road safety in Victoria (see below).

5.3 RECOMMENDATIONS FOR DATA COLLECTION AND RECORDING

5.3.1 General comments

- A broad recommendation is that the relationship between crime and road safety, specifically the link between criminal history and crash involvement, be examined within the Australian context.

5.3.2 LEAP

- A LEAP search could be run within TIS, with a person's name used in a search demonstrating their involvement in a road crash. One option could be to link the crash involved person's name and the date of birth back to criminal history. This activity would be appropriate for examining any subset of crash severity outcome recorded by the police.

- A LEAP search could be run for individuals identified within the Traffic Infringement Database as incurring penalties.

5.3.3 MCIU

- A LEAP search could be run for individuals involved in MCIU investigated road crashes. MCIU should record the information that they retrieve from LEAP on criminal history within their Take-Ons database (or similar). Even simple data recording (e.g. yes/no criminal history, category/brief description) for each individual involved in a crash would enable analyses to be run to examine the relationship between crime and road safety. Using MCIU information would enable contributory factors in the crashes (from the police perspective) to be examined more fully than by using any other source, which would provide useful detail. Additionally, if the data on criminal history can be examined for the individuals involved in road crashes investigated by MCIU for a reasonable period (e.g. last 10 years), an approximate figure can be obtained to compare the road crash involved population with the general population in terms of their likelihood of having a criminal history.

5.3.4 VIMS

- As part of the new tender, VIMS is scheduled for replacement/modification over the next 12 months. Discussion is taking place between interested parties such as DOJ and Victoria Police regarding the possibility of including minor summary offences e.g. offensive language, minor thefts into the VIMS system. This would then involve forming links with the LEAP System. When developing this tender, consider links and ways of capturing crime and road safety data with an automatic lookup and automatically generated report. Include road safety research stakeholders in this process to aid effective research tool development.

5.4 RECOMMENDATIONS FOR DATA ANALYSIS

- Create clear definitions for what constitutes criminal history and how to categorize crimes

- When conducting searches, run variations on multiple variables to aid high levels of data matching.

- Devise sound, statistically valid approaches for overcoming influencing factors in the data, e.g. age, time held licence etc.

5.5 RECOMMENDATIONS FOR DATA MANAGEMENT

5.5.1 General comment

- The need to extract summary data for research purposes is currently overlooked. A process for improving the potential for research use and access to data should be implemented, e.g. by including key research stakeholders in the design and development of new data systems in the future.

5.5.2 Data output

- It appears from comments made by stakeholders and from MUARC's past research experience that there is often difficulty in producing data output in a useable form/file type, e.g. MS Excel. If a more useable output could be produced, this could dramatically reduce time taken for data conversion cleaning leaving more time for analysis.

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APPENDIX A: MAIN TIS VARIABLES COLLECTED BY VICTORIA POLICE

The computer based forms include a variety of requests for variables, embracing environmental, vehicle, and road-user related facts. A brief introduction to each form and the few variables relating to factors contributing to crashes are commented upon below:

1. TIS Checklist (quick reference guide) – officers use this on scene to prompt them as to what data to collect
2. TIS Notification Sheet – is used to automatically populate another IT System, the 'Incident Fact Sheet' system (IFS). This system is used for policing incidents of a significant nature, such as serious crimes, major events and serious collisions, where other police may need to monitor or know about the incident or incidents of that kind. Specific variables to crash causation are:
    a. Probable main cause of death (if category is fatal)
    b. Additional factors
3. TIS Fatal/Injury Collision Notes – completed for all fatal or injury outcome crashes. Specific variables to crash causation are:
    a. Incident detailed description
    b. FOR THE (SOLE) LOCATION OF THE CRASH
        i. Light conditions [1 response allowed from:] (daylight, dark – street light on, dark – no street lights, other)
        ii. Atmospheric conditions [up to 4 responses allowed from:] (clear, dust in the air, fog, raining, smoke, snowing, strong winds, not known)
        iii. Offending unit (yes, no, unknown)
        iv. Scene plan
    c. FOR EACH CRASH-INVOLVED VEHICLE
        i. Prescribed lamps on (yes, no, not known/not applicable, other)
        ii. Driver's intention [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iii. Driver's actual movement [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iv. Road surface type (gravel, paved, unpaved, not known)
        v. Road surface conditions (dry, icy, muddy, show, wet, not known)
        vi. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
        vii. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
        viii. Traffic control status (operational, not applicable, other (specify))
    d. FOR EACH CRASH-INVOLVED DRIVER AND PASSENGER [Occupant 1, 2, 3, etc, respectively] details gathered on:
        i. Licence number, state
        ii. Statement taken (written statement taken, not known/not indicated)
        iii. FOR DRIVER ONLY - Licence type [1 response allowed from:] (learner, probationary, standard, not applicable, never licensed)
        iv. PBT conducted and PBT result (if conducted)
        v. FOR DRIVER ONLY - Mobile phone used (yes, no, not known)

vi. FOR DRIVER ONLY - Purpose of journey (at work, commuting to/from work, private, not known)
vii. FOR DRIVER ONLY - At fault (yes, no, not known) and reason (if at fault)
viii. IF FATAL - Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))

4. TIS No Injury Collision Notes – completed for no injury crashes that result in police action, and no injury crash that do not result in police action. Specific variables to crash causation are:
    a. Incident detailed description
    b. FOR THE (SOLE) LOCATION OF THE CRASH
        i. Light conditions [1 response allowed from:] (daylight, dark – street light on, dark – no street lights, other)
        ii. Atmospheric conditions [up to 4 responses allowed from:] (clear, dust in the air, fog, raining, smoke, snowing, strong winds, not known)
        iii. Offending unit (yes, no, unknown)
        iv. No Scene Sketch as not a serious crash, therefore does not warrant this
    c. FOR EACH CRASH-INVOLVED VEHICLE
        i. Prescribed lamps on (yes, no, not known/not applicable, other)
        ii. Driver's intention [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iii. Driver's actual movement [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iv. Road surface type (gravel, paved, unpaved, not known)
        v. Road surface conditions (dry, icy, muddy, show, wet, not known)
        vi. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
        vii. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
        viii. Traffic control status (operational, not applicable, other (specify))
    d. FOR EACH CRASH-INVOLVED DRIVER AND PASSENGER [Occupant 1, 2, 3, etc, respectively] details gathered on:
        i. Licence number, state
        ii. Statement taken (written statement taken, not known/not indicated)
        iii. FOR DRIVER ONLY - Licence type [1 response allowed from:] (learner, probationary, standard, not applicable, never licensed)
        iv. PBT conducted and PBT result (if conducted)
        v. FOR DRIVER ONLY - Mobile phone used (yes, no, not known)
        vi. FOR DRIVER ONLY - Purpose of journey (at work, commuting to/from work, private, not known)
        vii. FOR DRIVER ONLY - At fault (yes, no, not known) and reason (if at fault)
        viii. Non-fatal outcome, therefore no – Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))

5. TIS Police Incident Notes – completed for incidents of a minor nature with no third party involved (used for minor collisions in car park etc.). Specific variables to crash causation are:
    a. Incident detailed description
    b. FOR THE (SOLE) LOCATION OF THE CRASH
        i. Light conditions [1 response allowed from:] (daylight, dark – street light on, dark – no street lights, other)
        ii. Atmospheric conditions [up to 4 responses allowed from:] (clear, dust in the air, fog, raining, smoke, snowing, strong winds, not known)
        iii. Offending unit (yes, no, unknown)
        iv. No Scene Sketch as not a serious crash, therefore does not warrant this
    c. FOR EACH CRASH-INVOLVED VEHICLE
        i. Prescribed lamps on (yes, no, not known/not applicable, other)
        ii. Driver's intention [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iii. Driver's actual movement [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
        iv. Road surface type (gravel, paved, unpaved, not known)
        v. Road surface conditions (dry, icy, muddy, show, wet, not known)
        vi. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
        vii. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
        viii. Traffic control status (operational, not applicable, other (specify))
    d. FOR EACH CRASH-INVOLVED DRIVER AND PASSENGER [Occupant 1, 2, 3, etc, respectively] details gathered on:
        i. Licence number, state
        ii. Statement taken (written statement taken, not known/not indicated)
        iii. FOR DRIVER ONLY - Licence type [1 response allowed from:] (learner, probationary, standard, not applicable, never licensed)
        iv. PBT conducted and PBT result (if conducted)
        v. Not asked - Mobile phone used (yes, no, not known)
        vi. Not asked - At fault (yes, no, not known) and reason (if at fault)
        vii. Non-fatal outcome, therefore no – Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))

6. TIS Police Collision Notes – completed for police crashes resulting in either fatal, injury or non-injury outcomes and where there is another vehicle or 3rd party involved in the collision. Specific to crash causation are the following variables:
    a. Incident detailed description
    b. FOR THE (SOLE) LOCATION OF THE CRASH
        i. Light conditions [1 response allowed from:] (daylight, dark – street light on, dark – no street lights, other)
        ii. Atmospheric conditions [up to 4 responses allowed from:] (clear, dust in the air, fog, raining, smoke, snowing, strong winds, not known)
        iii. No Scene sketch? Why not?
        iv. Offending unit (yes, no, unknown)

c. FOR EACH CRASH-INVOLVED VEHICLE
    i. Prescribed lamps on (yes, no, not known/not applicable, other)
    ii. Driver's intention [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
    iii. Driver's actual movement [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
    iv. Road surface type (gravel, paved, unpaved, not known)
    v. Road surface conditions (dry, icy, muddy, show, wet, not known)
    vi. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
    vii. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
    viii. Traffic control status (operational, not applicable, other (specify))
d. FOR EACH CRASH-INVOLVED DRIVER AND PASSENGER [Occupant 1, 2, 3, etc, respectively] details gathered on:
    i. Licence number, state
    ii. Statement taken (written statement taken, not known/not indicated)
    iii. FOR DRIVER ONLY - Licence type [1 response allowed from:] (learner, probationary, standard, not applicable, never licensed)
    iv. PBT conducted and PBT result (if conducted)
    v. FOR DRIVER ONLY - Mobile phone used (yes, no, not known)
    vi. FOR DRIVER ONLY - Purpose of journey (at work, commuting to/from work, private, not known)
    vii. FOR DRIVER ONLY - At fault (yes, no, not known) and reason (if at fault)
    viii. IF FATAL OUTCOME, FOR EACH OCCUPANT – Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))

7. TIS Pedestrian Notes – completed if pedestrian involved in crash. Specific variables to crash causation are:
    a. Mobile phone used (yes, no, not known)
    b. At fault (yes, no, not known) and reason (if at fault)
    c. Movement at time of crash (crossing carriageway; not on carriageway, e.g. on footpath; working, playing, lying or standing on carriageway; other)
    d. Road surface type (gravel, paved, unpaved, not known)
    e. Road surface conditions (dry, icy, muddy, show, wet, not known)
    f. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
    g. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
    h. Traffic control status (operational, not applicable, other (specify))

8. TIS Additional Vehicle Notes – completed if there are more than 2 vehicles involved in a crash. This form is therefore completed for each additional vehicle. Specific variables to crash causation are:
    a. FOR EACH CRASH-INVOLVED VEHICLE
        i. Prescribed lamps on (yes, no, not known/not applicable, other)
        ii. Driver's intention [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)

iii. Driver's actual movement [1 response allowed from:] (going straight ahead, parked – illegally, turn left, turn right, other)
iv. Road surface type (gravel, paved, unpaved, not known)
v. Road surface conditions (dry, icy, muddy, show, wet, not known)
vi. Direction of travel (east, north, north-east, north-west, south, south-east, south-west, west, not applicable, not known)
vii. Traffic control [1 response allowed from:] (give way sign, intersection signals operating (stop/go), roundabout sign, not applicable, other (specify))
viii. Traffic control status (operational, not applicable, other (specify))

b. FOR EACH CRASH-INVOLVED DRIVER AND PASSENGER [Occupant 1, 2, 3, etc, respectively] details gathered on:
   i. Licence number, state
   ii. Statement taken (written statement taken, not known/not indicated)
   iii. FOR DRIVER ONLY - Licence type [1 response allowed from:] (learner, probationary, standard, not applicable, never licensed)
   iv. PBT conducted and PBT result (if conducted)
   v. Mobile phone used (yes, no, not known)
   vi. At fault (yes, no, not known) and reason (if at fault)
   vii. IF FATAL OUTCOME – Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))

9. TIS Additional Occupant Notes – completed if there are more than 2 occupants (i.e. Driver plus one passenger) in a crash-involved vehicle. This form is therefore completed for each additional vehicle occupant. Specific variables to crash causation are:
   a. Licence number, state
   b. Statement taken (written statement taken, not known/not indicated)
   c. PBT conducted and PBT result (if conducted)
   d. FOR FATAL OUTCOME – Deceased cause [1-3 response allowed from:] (alcohol, driving behaviour (careless/reckless), speed – exceeding the limit, other(s))
10. TIS Witness Notes – completed if non-crash involved witnesses are available at scene of crash. Specific variables to crash causation are:
   a. Statement taken (written statement taken, not known/not indicated)
11. TIS Object Notes – completed if object or animal involved in crash (e.g. fence, trees, kangaroo) – documents ownership and notification process. No specific information collection on crash causation.

APPENDIX B: MAIN VIMS FIELD DESCRIPTIONS IN TENIX DATA WAREHOUSE

Field Name	Field Description
Address Line 1	Debtor's Address Line 1
Address Line 2	Debtor's Address Line 2
Address State	Debtor's Address State
City	Debtor's Address City
Confirm Date	Debtor's Name & Address Confirm Date
Country	Debtor's Address Country
Date of Birth	Debtor's Date of Birth
Debtor Id	Debtor Id
First Name	Debtor's First Name
IPP Plan No	IPP Plan No if there is an IPP Plan
IPP Plan Status	*6.1.1.1.1.1 IPP Plan Status* A=Active, C=Cancelled D=Defaulted F=Fulfilled J=Rejected P=Pending R=Revised V=Void 4=Balloon Respread
IPP Plan Status Date	For IPP Plan Status = C, D, F, J and R, it is the IPP Plan Cancelled/ Fulfilled Date. For IPP Plan Status = A, it is the IPP Plan Approval Date
Last Name	Debtor's Last Name
Licence No	If the Licence State = 'XX', it is the Debtor's Company's

Field Name	Field Description
	ACN Number. If the Licence State = 'LL', it is the Debtor's Liquor Licence Number. If the Licence State is any of the states (Note: list of states is in Appendix B) , it is the Debtor's Driver's Licence Number.
Licence State	Debtor's Licence State. Note: See Appendix C for the list of states.
Nixie Date	Date of the last nixie status changed at Debtor's Level
Nixie Status	6.1.1.1.2 Debtor's Nixie Status IT HAS VALUES OF '0' TO '9' STARTING FROM '0' OR SPACE. AN "EVEN" VALUE OR SPACE INDICATES IT IS A GOOD DEBTOR ADDRESS AND AN "ODD" VALUE INDICATES IT IS A BAD DEBTOR ADDRESS.
Open Infringement Amount Due	Sum of Amount Due of all OPEN infringements for Debtor
Open Infringement Count	Count of all OPEN infringements for Debtor
Open Interest Indicator	'Y' denotes there is interest accumulating for open civil warrants
Open Order Amount Due	Sum of Amount Due of all OPEN court orders for Debtor
Open Order Count	Count of all OPEN court orders for Debtor
Open Ticket Count	Count of all OPEN obligations for Debtor
Open Warrant Amount Due	Sum of Amount Due of all OPEN warrants for Debtor
Open Warrant Count	Count of all OPEN warrants for Debtor
Postcode	Debtor's Address Postcode
Sex	Debtor's Sex
Total Amount Due	Include Amount Due for all obligations
Total Unapplied Cash	Include Unapplied Cash for all obligations

Obligations Folder

Field Name	Field Description
Account No	Account No for the latest payment. It is linked to Account Reference Folder. Please see field descriptions of Account Reference Folder for details.
Agency	Agency Code. This is linked to Agency Reference Folder. Please see field descriptions of Agency Folder for details.
Agency Court	Court Number linked to Court Reference Folder and it is displayed on the Revocation Screen in VIMS. Please see field descriptions of Court Reference Folder for details.
Amount Due	Amount Due of Obligation
Appeal Court	6.1.1.1.3 Appeal Court Code. It is linked to Court Reference Folder. Please see field descriptions of Court Reference Folder for details.
Appeal Date	6.1.1.1.4 Date of Appeal at Appeal Court.
Badge No	Badge Number of Infringement
Car Colour	Colour of Offending Vehicle
Charges Incurred for Criminal Court	Obligation's Charges Incurred for Criminal Court
Combined Date of Birth	It contains the Obligation Date of Birth and if there is no Obligation Date of Birth, it contains the Debtor Date of Birth. It will be empty if there is no Obligation and Debtor Date of Births.
Corro History Indicator	'Y' indicates if there are more correspondence in history.
Court Costs	Obligation's Court Costs
Court Interest Due	Obligation's Court Interest Due
Court Order Expiry Date	6.1.1.1.5 Expiry Date of Court Order
Courtesy Fees	Obligation's Courtesy Fees
Date of Birth	Obligation's Date of Birth
Debtor Id	Debtor Id linked to Debtor Folder. Please see field descriptions of Debtor Folder for details.
Demerit Points	Demerit Points for the Obligation

Field Name	Field Description
Demerit Process Date	Process Date for the Demerit Points
Division	Station Code
Due Date	Obligation's Due Date
Enforcement Certificate Date	6.1.1.1.6 Enforcement Certificate Date for infringements sent to Perin
Enforcement Certificate Fees	Obligation's Enforcement Certificate Fees
Error Code from SIPS	Error Code from the SIPS System
Fine Amount	Penalty Amount of Obligation
First Court Accept Date	6.1.1.1.7 Date of First Court Order
First Warrant Date	6.1.1.1.8 Date of First Warrant for 'PE' Warrants
Infringement No	Infringement Number if it has an Infringement Number
Input Type	6.1.1.1.9 Input type 1A=Analogue Camera Speed and Redlight Infringements 1B=On the Spot Moving/Parking Infringements 1C=Tolling and Digital Camera Speed Infringements 2=Inputs from Councils or Agencies 3A=Open Court Warrants 3B=Civil Warrants
Interest Due on Costs	Obligation's Interest Due on Costs
Interest Due on Fine	Obligation's Interest Due on Fine
Interest Rate on Costs	Obligation's Interest Rate used to calculate Interest Due on Costs
Interest Rate on Fine	Obligation's Interest Rate used to calculate Interest Due on Fine

Field Name	Field Description
IPP Indicator	6.1.1.1.10 Obligation IPP Plan Indicator (*** will be confirmed later) 6.1.1.1.11 0=Not in IPP 1=Active in IPP 2=Fulfilled 3=Cancelled 4=Defaulted
Issue Batch Date	Batch Date when obligation is added to VIMS.
Issue Batch No	Batch Number when obligation is added to VIMS.
Issue Date	For input type '1A', '1B' and '1C', it is the Infringement Issue Date. For input type '2', it is the Court Order Date. For input type '3A' and '3B', it is empty.
Issue Process Date	Process Date when obligation is added to VIMS.
Last Issue Fee	Current Issue Fee for Warrant
Latest Corro Code	Correspondence Code of the latest correspondence. It is linked to Correspondence Code Reference Folder. Please see field descriptions of Correspondence Code Reference Folder for details.
Latest Corro Date	Correspondence Date for the latest correspondence.
Latest Corro Mail Type	6.1.1.1.12 Correspondence Mail Type 0=Telephone 1=Mail 4=Walk M=Mail
Latest Dispo Code	Dispo Code of the latest disposition. It is linked to Disposition Code Reference Folder. Please see field descriptions of Disposition Code Reference Folder for details.

Field Name	Field Description
Latest Dispo Date	Disposition Date for the latest disposition.
Latest Dispo Officer	Disposition Officer for the latest disposition.
Latest Dispo Process Date	Process Date for the latest disposition.
Latest Obligation Status Change Date	6.1.1.1.13 Date of the latest change in Obligation Status.
Latest Payment Amount	Payment Amount of the latest payment
Latest Payment Batch No	Batch Number of the latest payment.
Latest Payment Date	Payment Date of the latest payment
Latest Payment Method	Payment Method Code for the latest payment. It is linked to Payment Method Reference Folder. Please see field descriptions of Payment Method Reference Folder for details.
Latest Payment Process Date	Process Date for the latest payment.
Latest Payment Type	Payment Type Code for the latest payment. It is linked to Payment Type Reference Folder. Please see field descriptions of Payment Type Reference Folder for details.
Latest Suspend Code	Suspend Code of the latest suspend. It is linked to Suspend Code Reference Folder. Please see field descriptions of Suspend Code Reference Folder for details.
Latest Suspend Process Date	Process Date for the latest suspend.
Latest Suspend Till Date	Suspend Till Date of the latest suspend.
Licence Susp Process Date	Process Date for the Licence Suspension
Licence Susp Request Date	Licence Suspension Request Date to VicRoads
Licence Susp Status	Licence Suspension Status
Lodgement No	6.1.1.1.14 Obligation's Lodgement Number for Court Order.

Field Name	Field Description
Microfilm No	For input type '1A', it is a combination of film number (6 digits), session number (3 digits) followed by frame number (4 digits) starting from the left. For input type '1B', it is the Microfilm Number of the ticket. For input type '1C' and tolling offence, it is the CTCS Number. For input type '1C' and digital speed offence, it is the film number (9 digits) followed by frame number (4 digits) starting from the left. The film number is '1yymmddccc' where yymmdd is the date and ccc is the camera number.
More Dispo Indicator	'Y' indicates if there are more dispositions in history.
More Mail Indicator	'Y' indicates if there are more mail in history.
More Suspends Indicator	'Y' indicates if there are more suspends in history.
Name Reason Indicator	6.1.1.1.15 Name Reason Indicator Code 0 or space =No Request Made 1=Request Made but No Return C=Courtlink F=From FPPO M=Manual R=From RTA
Nixie Date	Date nixie status was last changed at Obligation Level
Nixie Status	OBLIGATION'S NIXIE STATUS It has values of '0' to '9' starting from '0' or space. An "Even" value or space indicates it is a good obligation address and an "Odd" value indicates it is a bad obligation address.
Nominated from Prior TIN	Nominated from old TIN Number if a nomination has been processed on the old TIN or Infringement Number
Nominated to New TIN	Nominated to new TIN Number if a nomination has been processed on this TIN or Infringement Number
Notice Date 1	Notice Date for the first notice.

Field Name	Field Description
Notice Date 2	Notice Date for the second notice.
Notice Date 3	Notice Date for the third notice.
Notice Date 4	Notice Date for the fourth notice.
Notice Date 5	Notice Date for the fifth notice.
Notice Process Date 1	Process Date for the first notice.
Notice Process Date 2	Process Date for the second notice.
Notice Process Date 3	Process Date for the third notice.
Notice Process Date 4	Process Date for the fourth notice.
Notice Process Date 5	Process Date for the fifth notice.
Notice Type 1	Notice Type Code for the first notice. It is linked to Notice Type Reference Folder. Please see field descriptions of Notice Type Reference Folder for details.
Notice Type 2	Notice Type Code for the second notice. It is linked to Notice Type Reference Folder. Please see field descriptions of Notice Type Reference Folder for details.
Notice Type 3	Notice Type Code for the third notice. It is linked to Notice Type Reference Folder. Please see field descriptions of Notice Type Reference Folder for details.
Notice Type 4	Notice Type Code for the fourth notice. It is linked to Notice Type Reference Folder. Please see field descriptions of Notice Type Reference Folder for details.
Notice Type 5	Notice Type Code for the fifth notice. It is linked to Notice Type Reference Folder. Please see field descriptions of Notice Type Reference Folder for details.
Obligation Status	Current Obligation Status I=Infringement O=Court Order W=Warrant

Field Name	Field Description
Offence Location	For input types '1A' and '1C', it contains the location code. This is linked to the Location Reference Folder. Please see field descriptions of Location Reference Folder for details. For other input types, it contains the actual offence location.
Offence Suburb	For input types '1A' and '1C', it is empty. For other input types, it contains the actual offence suburb.
Offender Category	6.1.1.1.16 Offender Category C=Corporate I=Interstate V=Victorian
Order Accept Date	Court Order Accept Date
Order No	Court Order Number if it has a Court Order Number
Ownership Type	6.1.1.1.17 Ownership Type C=Corporate I=Individual O=Owner
Payment More Indicator	'Y' indicates if there are more payments in history.
Red Seconds	Red-light Seconds of Red-light Offences
Reduction Amount	Obligation's Reduction Amount.
Registration Confirm Date	Obligation's Registration Confirm Date from VicRoads
Registration Expiry Date	Registration Plate Expiry Date
Registration Plate	Registration Plate Number
Registration Plate Colour	Colour of the Offending Vehicle's Registration Plate
Registration Plate Letter Colour	Colour of the Letters on the Registration Plate of Offending Vehicle
Registration Plate Year	Year Registration Plate is issued

Field Name	Field Description
Registration State	6.1.1.1.18 State of Registration Plate. Note: See Appendix C for list of States.
Rental Indicator	6.1.1.1.19 Rental Indicator C=Correspondence F=Fleet (**** Not used) R=Rental (**** Not used)
Revocation Status	6.1.1.1.20 Revocation Status A=Agency Withdrawal C=Agency to Court D=Default to Court G=Granted L=Appeal P=Appeal Posted R=Revocation Refused W=Withdrawn x=Revocation Refused, Costs Varied
Revocation Status Date	6.1.1.1.21 Date of Revocation Status
Sex	Sex of Obligation
Sheriff Licence Susp Date	6.1.1.1.22 Date of Sheriff Licence Suspension
Sheriff Licence Susp Effective Date	6.1.1.1.23 Effective Date of Sheriff Licence Suspension at VicRoads
Sheriff Licence Susp Status	6.1.1.1.24 Status of Sheriff Licence Suspension (*** will be confirmed later) NS=Not Suspended NLS=No Licence Suspension ULS=Unsuccessful Licence Suspension
Speed Actual	Detected Speed for speeding offence

Field Name	Field Description
Speed Alleged	Alleged Speed for speeding offence
Speed Zone	Speed Zone for speeding offence
Ticket Licence Number	If the first 2 characters = 'XX', the remaining details is the Obligation's Company's ACN Number. If the first 2 characters = 'LL', the remaining characters is the Obligation's Liquor Licence Number. If the first 2 characters equals to one of the states (Note: list of states is in Appendix C) , it is a Obligation's Driver's Licence number.
Ticket No	Ticket/Obligation Number
Unapplied Amount	Unapplied Amount of Obligation
Vehicle Make	Vehicle Brand e.g. Holden, Ford
Violation Code	VIMS Internal Offence Code. This is linked to Violation Reference Folder. Please see field descriptions of Violation Reference Folder for details.
Violation External Code	Offence Code of Obligation
Violation Date	Offence Date of Obligation
Warrant Accept Date	Warrant Accept Date
Warrant Expiry Date	6.1.1.1.25 Date when warrant expired.
Warrant Issue Date	6.1.1.1.26 Date when warrant is issued.
Warrant Issue Fee	Obligation's Warrant Issue Fee
Warrant Jurisdiction	6.1.1.1.27 Current Warrant Jurisdiction.
Warrant Jurisdiction Date	6.1.1.1.28 Date when Warrant Jurisdiction is last changed.
Warrant No	Warrant Number if it has a Warrant Number
Warrant Solicitor	6.1.1.1.29 Solicitor Code
Warrant Status	6.1.1.1.30 Warrant Status Code. It is linked to Warrant Status Reference Folder. Please see field descriptions of Warrant Status Reference Folder for details.

Field Name	Field Description
Warrant Status Date	6.1.1.1.31 Date when Warrant status is last changed.
Warrant Type	6.1.1.1.32 Warrant Type Code. It is linked to Warrant Type Reference Folder. Please see field descriptions of Warrant Type Reference Folder for details.
Zone	6.1.1.1.33 Fixed Speed Camera Zone e.g. Burnley Tunnel, Domain Tunnel

Field Descriptions for Reference Folders

Field Name	Field Description
Account Internal Code	Account Internal Code
Account External Code	Account External Code
Account Long Name	Account Long Description
Account Short Name	Account Short Description

Field Name	Field Description
Agency Code	Agency Code
Agency Short Name	Agency Short Name
Agency Long Name	Agency Long Name
Agency Status	6.1.1.1.34 Agency Status A=Active I=Inactive
Agency Type	6.1.1.1.35 Agency Type G=Government N=Non-Government
Agency Court No	6.1.1.1.36 Agency Court No. It is linked to Court Reference Folder. Please see field descriptions of Court Reference Folder for details.

Field Name	Field Description
Correspondence Code	Correspondence Code
Correspondence Short Name	Correspondence Short Description
Correspondence Long Name	Correspondence Long Description

Field Name	Field Description
Court No	Court No
Court Name	Court Name

Field Name	Field Description
Disposition Code	Disposition Code
Disposition Name	Disposition Description

Field Name	Field Description
Notice Type	Notice Type Code
Notice Type Long Name	Notice Type Long Description
Notice Type Short Name	Notice Type Short Description

Field Name	Field Description
Payment Method Type	Payment Method Type
Payment Method Name	Payment Method Description

Field Name	Field Description
Payment Type Code	Payment Type Code
Payment Type Name	Payment Type Description

Field Name	Field Description
Suspend Code	Suspend Code
Suspend Name	Suspend Description
No of Suspend Days	Number of Suspend Days

Field Name	Field Description
Violation Code	Violation Internal Code
Violation External Code	Violation External Code or Offence Code
Violation Description	Violation Description

Field Name	Field Description
Warrant Status Code	Warrant Status Code
Warrant Status Name	Warrant Status Description

Field Name	Field Description
Warrant Type Code	Warrant Type Code
Warrant Type Name	Warrant Type Description