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ROAD SAFETY ENFORCEMENT: A LITERATURE REVIEW

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**Abstract**

The report examines the application of resources and means of maximising enforcement strategies for road safety. Human factors, the law, policing, and mechanical design are analysed as part of the road safety system. Contributions from police in Australia and other countries are included. The results of the analysis identify the complex interactions between human factors and the road environment, and the conclusions list a number of strategies for the development of road safety enforcement policy which takes these into account.

**Keywords**

Enforcement, Road Safety, Human Factors, Deterrence, Police, Accounting

**NOTES:**

- (1) FORS Research reports are disseminated in the interests of information exchange.
- (2) The views expressed are those of the author(s) and do not necessarily represent those of the Commonwealth Government.
- (3) The Federal Office of Road Safety publishes two series of research report
  - (a) reports generated as a result of research done within the FORS are published in the OR series;
  - (b) reports of research conducted by other organisations on behalf of the FORS are published in the CR series.

**ROAD SAFETY ENFORCEMENT:  
A LITERATURE REVIEW**

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## INTRODUCTION

The Federal Office of Road Safety (FORS) is an office within the Department of Transport and Communications. Its principal role is to advise the Federal Government on its responsibilities in road safety. The Office's principal objectives are to:

- ◆ co-ordinate, formulate and implement safety standards of vehicles.
- ◆ identify target groups and develop strategies for improving road user behaviour.
- ◆ identify engineering and environmental measures to reduce accident risk, by making roads and their environment safer.

In its role as a major co-ordinating body on road safety activities in Australia, FORS is conducting research into the question of the effectiveness of law enforcement in road safety.

The method and extent of enforcement of traffic laws has become an important policy question in road safety, as part of an increasing emphasis on human factors rather than on vehicle/road elements. However the relationship between enforcement and safe (or unsafe) behaviour of road users is not well understood. Does greater enforcement produce stable modification in road user behaviour in the desired direction; or not at all? Do high conviction levels mean successful enforcement? Are current enforcement practices cost-effective, adequate, or even appropriate? Is traffic law enforcement, or are enforcement agencies, respected by the road user? Are there some laws that are more effective than others?

There is also the question as to whether available resources would be more effective in reducing the incidence of road accidents, deaths and injuries if devoted to building safer roads and vehicles, improving the physical environment or changing the social and economic environment in ways which resulted in reduced road accidents.



## **Aims and Objectives**

The **AIM** of the project was to undertake a comprehensive literature review as the first step in a research program on law enforcement and road safety.

The **OBJECTIVES** of the literature review were to ascertain from the Australian and international literature on traffic law enforcement:

1. What studies have been done on the relative effectiveness of resources directed to enforcement of traffic law and the subsequent effect on road safety.
2. What are the most appropriate enforcement strategies to achieve the maximum road safety benefits?
3. Studies on the relative effectiveness of legislation.

## **Methods**

The literature review commenced with a background document which had been prepared for FORS by the Australian Institute of Criminology - Homel and Wilson (1987), Law, Law Enforcement and Road Safety (an amended version of which has since been published by them as: Death and Injuries on the Road: Critical Issues for Legislative Action and Law Enforcement, Homel and Wilson, 1987b).

The search was then extended to include :

1. References and unpublished information made available by Mr Roy Wilson, Investigative Consultant to FORS.
2. Australian research literature.
3. Reports and literature of recent origin through personal discussion by telephone with experts in Britain and the United States.
4. Statistical data.

The literature search concentrated on obtaining documents which reflected valid research procedures and/or analysis and provided an overview of specific issues.

## Contents

The report commences with Conclusions which itemise major issues in road safety enforcement which have been analysed in the report. The conclusions are directed at legislators and police. The description of the interaction of legislation, policing and road user behaviour identifies critical factors which may assist planning to maximise road safety.

Chapter 1 defines enforcement and describes its effectiveness in road safety.

In Chapter 2 the road accident problem is identified, describing behaviour contributing to road accidents, vehicle occupant issues and the problems for unprotected road users.

Chapter 3 describes Australian police operations with practical examples from the States of procedures and the evaluation of their effectiveness. Enforcement is defined from a police perspective and traffic enforcement compared with police deployment elsewhere.

In Chapter 4 police community based programs in Australia and overseas are described to show the various levels of involvement of police with other organisations.

Chapter 5 concentrates on police operations in other countries describing road safety enforcement procedures and evaluation techniques.

In Chapter 6 the cost effectiveness of enforcement procedures is analysed using Australian and overseas data. This chapter also includes information on mechanical devices and police enforcement.

Chapter 7 describes human factors which affect the operation of enforcement programs and the achievement of legislative goals.

## CONCLUSIONS

The conclusions identify issues in road safety enforcement from each of the chapters in the report. Major research themes and the gaps in current research information are identified from the literature review and discussions with police in Australia and the United Kingdom on current issues in road safety enforcement.

In general the pattern of road safety research on enforcement is difficult to follow because of the many contradictory findings and the lack of a clear theoretical structure within the social science research on road safety. The field has been developed from many different areas of expertise and as a result there is a plethora of information which is difficult to tie together into a coherent picture of road user behaviour and the effectiveness of law enforcement strategies.

Two conclusions emerge from the literature review on road safety and law enforcement. Firstly, while considerable work has been done on specific issues there is more to be learned about the behaviour of particular groups of road users. Secondly, the use of a combined physical and social science research base in close co-operation with police may generate practical information for road safety enforcement.

## ROAD SAFETY ENFORCEMENT

1. Road safety enforcement is defined as a formal process of applying sanctions or the threat of sanctions to road users who break the law.
2. Social research on road safety contains many inconsistencies from attempts to evaluate enforcement as a direct line relationship between enforcement actions and road user behaviour. The real interaction may be much more indirect and subtle.

3. There are at least seven dimensions to the road accident problem:

Police operations.  
 Legal procedures.  
 Road user behaviour.  
 Social influences.  
 Road design.  
 Vehicle design.  
 Local environment.

These dimensions require multidisciplinary research whereas road safety research on enforcement has tended to concentrate on social behavioural changes without broad consideration of additional factors influencing changes in fatalities and serious accidents.

4. Deterrence is defined as the outcome of enforcement which modifies road user behaviour with a subsequent reduction in deaths and injuries from accidents.
5. Deterrence is described as the outcome of an individual's subjective estimate of risk of detection which includes his assessment of the effects of the penalty against the benefits of breaking the law. An individual's reaction is also affected by the factors of personality type and past experience with enforcement and/or accidents. The differences in personality may be that while the majority of people internalise most road safety laws and are mostly compliant, others have not internalised the laws and exhibit anti-social behaviour.
6. Deterrence is associated with many different types of enforcement. A summary of the literature suggests the following list contributes to a reduction in deaths and injuries on the road:

Large-scale police operations such as RBT requiring high proportions of all road users to be monitored (up to one in three road users in any year).

Large-scale publicity on police campaigns.

Licence suspension.

Warning letters (personalised).

Driver training programs.

Specific licensing regulations which obtain high standards.

Special regulations for probationary drivers (speed, alcohol limits, times of driving).

Server intervention programs (with monitoring of alcohol intake by the liquor industry).

Use of brief, say two-day, prison sentences as a deterrent instead of longer sentences. The effective deterrence of the sentence is achieved in the first two days.

7. The review of the literature suggests the following issues have not been fully addressed by road safety research:

How enforcement programs affect specific risk groups in the population

Attitudes of different groups in the population to different types of enforcement.

## THE ROAD ACCIDENT PROBLEM

An analysis of behavioural research and road safety research suggests that a number of factors may be involved in the road accident problem:

1. Risk perception can be increased by education of the public but increases in risk perception do not always lead to safer driving. Risk of personal injury or death is denied by some individuals unless there has been a previous "near miss" or accident.
2. Deterrence has little impact on some individuals unless there is an immediately visible threat of police action. Behaviour changes which will reduce the road accident problem are the result of a combination of factors:

- (a) Internalisation of safe driving attitudes.
  - (b) Community norms on protecting others and the self against road accidents.
  - (c) Excellent public relations by the police.
3. It is possible to modify behaviour by raising an individual's anxiety levels in relation to the threat of injury or death to the self or others. This may be achieved through physical evidence in films (and other forms) of road accidents, the destruction to the body, and grieving family. Indirectly it can be achieved by attaching first aid education to road safety education where the young person learns about the vulnerability of the body to road accidents.
4. The road accident problem needs to address methods of enforcement for sub-groups of the population who exhibit anti-social behaviour predisposing them to road accidents. Some specific methods may be by:
- (a) Use of licence suspension to reduce death and injury to these anti-social drivers and to protect the rest of the population. This may be particularly useful with the driver who has a history of alcoholism and the young person who has a socially immature personality. Licence suspension keeps alcoholics off the road for a period. With young people it allows them to mature over the period and reduce risk-taking behaviour, i.e. by regaining the licence at a later age.
  - (b) Use of special strategies by the police to catch recidivist drink drivers who exhibit avoidance behaviour and are not likely to be caught in traditional RBT and other enforcement measures.
  - (c) Use of blood alcohol limits at zero levels for young drivers in the maximum age risk group, e.g. drivers aged 20 and under. This means the young person is not in a conflicting situation trying to make decisions on his body weight and alcohol capacity, particularly when he may be at a social event and under peer pressure to take risks.
5. The road accident problem is one which can be addressed by both prevention and enforcement. An evaluation of enforcement can show that in certain areas prevention is most effective in

reducing accidents: for example, where advertising and police public relations are directed at achieving public co-operation with drink driving laws or at getting parental supervision of young cyclists.

Some prevention may be achieved by giving the driver more information on warning cues that tell him that he is at risk. This may overcome the driver's personal feeling that he is not at risk. The driver may learn that certain cues tell him he is fatigued or that the road environment is dangerous because of poor visibility or that he is in a suburban area where children may run across the road. Prevention programs which emphasise to the driver that he can in some situations control the risk of an accident can increase co-operation of the public with road safety laws.

6. International research suggests that an important direction for road safety is in the physical design changes to roads and vehicles as well as consideration of social behavioural factors. The solutions to road safety appear to consist of a broad range of programs with enforcement supplemented by pure research on vehicle and road design. Design factors include analysis of road design throughout an area with integration of social usage patterns by pedestrians, cyclists, motorists with the physical design of roads, pedestrian malls and bikeways.
7. Human factors research and road safety research have at present some limitations. The measurement of behavioural change is difficult in road safety evaluations because of intervening factors. It remains for the development in the future of operational research methods to optimise the mix of enforcement measures, public education measures and physical design measures that are most successful in reducing the road accident problem.
8. There are several conclusions in relation to the effectiveness of enforcement:

- (a) There may be an indirect relationship between social science measures and outcomes in road safety in terms of reductions in deaths and injuries. Although some of the findings from road safety research point to little or no effect from police enforcement measures, the possibility may be that police enforcement measures are affecting road safety. This is not showing up in the research because (i) the research is not focusing on the way in which the police work; (ii) it is not able to measure the small, but nevertheless still significant, changes that are occurring; and (iii) significant changes at the local level can sometimes be missed when local data is absorbed into national or state totals.
- (b) More success might come out of social research if the researchers accepted small data gathering tasks in local areas in association with police and worked through with the police the ways in which they are measuring effects. Many of the research projects are looking at large statistical data bases and although these have an important place in analyses the other areas may have been neglected and consequently police have not been involved.
- (c) The outcome of lack of police involvement in research efforts in road safety is that they do not listen to "academic" findings. This leads to little direct impact on enforcement by academic research on the road accident problem.
- (d) Research on risk perception is rather crucial to any strategies for community education as this shows that contrary to popular beliefs there cannot be an assumed relationship between risk perception and subsequent behaviour.

## AUSTRALIAN POLICE OPERATIONS

The major issue in the assessment of Australian police operations is that of evaluation.

Evaluation of road safety programs is a procedure which requires not only a correct design but also decisions by police departments to devote scarce resources to close scrutiny of their operations.

Evaluation of enforcement has the obvious benefit of increasing police operational effectiveness. There are two aspects to the assessment of operational effectiveness in road safety:



1. Whether the service has been effective in preventing accidents.
2. How effective is the resource allocation area in manpower deployment and expenditures on strategies such as radar, police cars, cameras, and RBT?

An overall assessment of police operations in the various Australian states suggests that an increased effort in localised evaluation of road safety programs in police areas could assist operational effectiveness.

One of the outcomes of increased police operational research capability may also be to increase the inputs of police into State, Federal and Local Government road safety policy.

A stimulus to police research is the constant interaction between police departments and learning through the experiences of other forces.

Police departments throughout Australia have their own national police research facility (the National Police Research Unit) and in addition there are other research services which can regularly provide information on road safety - the Federal Office of Road Safety has a research program.

## **POLICE COMMUNITY BASED PROGRAMS**

Policing in Australia is slowly moving into the community. Police are becoming known in schools and through community programs such as Neighbourhood Watch and Safety House schemes.

### **"NEIGHBOURHOOD ROAD WATCH"**

In road safety the neighbourhood concept has still to be developed. However the community remains the largest unused resource for road safety programs: that is, research findings that show conclusively that broadly based attitude changes in the community are a most effective way of reducing the number of accidents.

Road users, including motorists and child and adult pedestrians, can be much safer on the roads if there is a well developed community consciousness of road safety. This extends to the concept of community action in the neighbourhood to ensure that unsafe road user behaviour is identified. In association with the police the neighbourhood's concern can lead to safer road user practices.

Simple examples are:

The erratic riding and "chicken" games of school cyclists of an afternoon outside a school may be stopped through community concern and school action.

Chronic speeding through neighbourhood areas by cars or motorcycles which threaten the safety of children at play or travelling to or from school.

Identification of danger spots in the neighbourhood where pedestrians or other road users feel threatened. Changes may then be suggested to the local authority to make these areas more safe.

Identification of the neighbourhood area as a "Road Watch Area", thereby reducing the threat of anti-social driving.

The objectives of a community based program centred on the neighbourhood would be:

1. Protection of children so that play and travel to school become safer.
2. Developing community attitudes so that people take responsibility for acting safely on the roads and identifying others who do not.
3. Raising general community awareness of road safety.
4. Reporting by the community of unsafe locations on roads.

Initiatives such as neighbourhood road watch programs would complement existing community programs run by well established organisations such as the road safety councils. The development of this type of program would also provide another avenue for successful police community relations.

Another outcome of this type of program is that there can be a reduction in risk to children through increased parental awareness and parental controls.

### **Advertising, Education and Training**

There are a number of different avenues for reaching the community through large-scale programs of advertising, education and training.

#### **1. Use of advertising to increase the deterrent effect of enforcement and the adoption of safe road user practices**

The information from the literature suggests that radio advertising may increase an individual's perception of being caught more than other media.

One reason for this may be that a driver has a direct identification with radio road safety information while he is driving and it thereby influences his behaviour. This would suggest that, depending on the proportion of the population in cars who become exposed to radio road safety information, the medium of radio may be effective in influencing behaviour.

#### **2. Development of material for school curricula - video games which concentrate on attitudes as well as road rules, competitions, cartoon books for the young, and other diverting material using educational games**

One of the difficulties with road safety education is that there is a combined educational goal of not only teaching rules of behaviour but also attitudes which will be internalised early in life and continue with the child into adulthood.

**3. Driver and rider training programs in the community to provide opportunities for road users to upgrade their skills and motivate them towards safe practices**

The involvement of police and community organisations in bicycle safety or "bikesafe" projects and skills training for motorists, motorcyclists and cyclists is a way of increasing individual capabilities on the road. These projects do not have the same capacity to reach large numbers of road users in the community and to some extent offer education to individuals already concerned about road safety.

However, there is an argument for providing the opportunity to increase driving and riding skills, but this training should emphasise defensive driving/riding techniques and stress road safety. Training courses should not be vehicles to give trainees overconfidence in manipulative skills, possibly leading to dangerous driving/riding practices.

Training programs that are organised through the police also provide an opportunity for raising the public's co-operation with the police on road safety and increased goodwill.

From the police perspective training programs provide a reason for upgrading of police skills for training purposes and opportunities to get to know the attitudes and habits of young road users.

**4. Re-education programs for road user offenders**

A diversion of offenders from the courts to re-education programs is a cost-effective way of managing certain categories of road user offender when compared with using the courts. However, the research literature does not provide clear information on the effectiveness of these programs in reducing offences. An inbuilt evaluation component by police could provide information on a program's effectiveness in terms of cost and reduction of subsequent offending.

Re-education programs can be directed at all types of driving behaviour including speeding and drink driving. The use of films and lectures, questionnaire tests, and group discussions on dangerous situations can expose the offender to information and group pressures which give him a chance to change his behaviour and attitudes.

One type of film that may have a conditioning effect on behaviour of certain types of young offender is the aversion film. This exposes offenders to sights that police see daily in road accidents. Recall of these scenes may influence some of them as the young driver has not had the experience on the road to realise the outcomes of drink driving and speeding.

## **5. Police/community relations techniques**

Another way of affecting community attitudes and encouraging co-operation in road safety is a successful police/community relationship. In the area of road safety this may involve:

1. Skillful relations with the media with constant programs to reach the public.
2. Police training in communications - training police receive in managing road users when they stop them for drink driving or other checks or because of an offence. The successful management of the public through effective communications in these situations can be an important determinant of the community's attitude towards the police.
3. The use of warnings and advice by police to the public as an alternative to prosecution is a further strategy which may be used with sensible discretion by the police and present a balanced approach to the public.

## **Leadership from Politicians and Local Government**

Politicians are leaders in the community who have an opportunity to be involved in any new road safety initiatives and to promote special programs.

Similarly local government is an important participant in these community programs, particularly where the identification of dangerous areas for road users and changes in the local environment may be possible outcomes of community action.

## **POLICE OPERATIONS IN OTHER COUNTRIES**

A brief review of overseas operations shows that there are many different police operations and evaluations of road safety programs that have an application to Australia.

Specific applications include:

1. Use of large population data bases to identify trends in road user behaviour which are not evident because of small numbers or gaps in Australian research
2. Use of overseas data to assess practicalities of piloting new police enforcement procedures for road safety
3. Modification of overseas evaluation strategies to add to existing Australian techniques to assess the effectiveness of law enforcement.

In addition to these applications there are cost savings for Australia in constantly updating internal research with the findings from the very large road safety research budgets overseas.

## **COST EFFECTIVENESS OF ENFORCEMENT PROCEDURES**

Planning, Programming, Budgeting Systems (PPBS) can be used in police departments to ensure an effective system of enforcement in road safety. These systems allow measurement of the relative benefits to the community compared with the costs of the police road safety operations.

A simple outline of the applications of PPBS is for the costing of programs by outputs. The advantage is that it allows less historical influences on the police budget as a direct comparison of

the benefits from each sub-program forces each activity to be justified in relation to the objectives of the police force. The flexibility in the system with constant monitoring of operations also allows sub-programs to be changed when there are no measurable results to justify continuation.

An international review of costing of road safety programs shows that most countries have a wide variety of measures to assist with road safety, ranging from law enforcement to road and vehicle design work and use of computerised systems to ensure traffic flow. The overseas work in the vehicle design area shows that there are significant benefits still to be gained from vehicle design including motorcycle protection, driving lights for cars, seat belt design and braking systems and accident absorption systems for trucks.

#### **ENFORCEMENT AS A MEANS OF CHANGING BEHAVIOUR**

##### **Behaviour Change through the Law**

There is an interface of the law with:

Individuals.

Groups.

Community.

There are two methods of changing behaviour through the law - the direct application of sanctions through the courts and changing the community's perception of risk of detection.

In addition to community reaction to the direct threat of sanctions the presence of the law itself is a factor in influencing the community's perception of expected road user behaviour.

There appear to be several critical factors in the success of law enforcement in reducing accidents:

1. Motivation of police to enforce the road law.
2. Effective enforcement programs.
3. Periodic review of the law to ensure that it remains sensitive and credible.
4. The perception by the public that there is a real risk of detection by the police.
5. A co-operative approach by public and police to the law.

### **Behaviour Change through Education, Training and Advertising**

There are several levels of intervention in the community for road safety:

1. Education curricula with audiovisual materials, games and literature which provide information on the law, law enforcement processes, road user behaviour, and the negative outcomes of accidents (deaths, injuries and sanctions).
2. Training has an application in two areas - firstly with young people. The development of many different types of community program - training on bicycles, motorcycles, cars and pedestrian skills - may all contribute to an upgrading in skills of those who participate. In addition to this the involvement of community groups in these programs has the effect of increasing community commitment to road safety.

Retraining is also important and may be used by the police or community groups as a special program for drivers involved in road offences to give special attention to those people who are at risk of reoffending.

3. Advertising has a broad application to the community as a way of reaching large population numbers with information which (a) may change perception of risk; and (b) may change behaviour.

Advertising can be used in many different ways. It can be a method of obtaining better police public relations and increasing community co-operation. It is also important in deterrence. When publicity accompanies road safety campaigns it is the critical factor ensuring a change in road user behaviour.



## **Research on Behaviour Change**

Changes in road safety programs, law enforcement and the law could be further assisted by more detailed information from national surveys of Australians on their attitudes to road safety and risk of detection. The objective of research on behaviour change is to obtain information on community attitudes towards road safety and specifically road user behaviour. It would be useful to know:

1. Which groups of the population respond to community education, visible policing, large scale RBT measures.
2. Which groups deny risk and require special types of warning messages or special types of police enforcement to reduce chronic road offending.

At present there does not seem to be adequate information to separate out the needs of different groups in the population either by age, socio-economic status, or psychological profiles.

Current research tends to measure 'after the fact' information on offenders and does not tell us about behaviour of particular groups in the population in relation to road laws, law enforcement, or media campaigns for road safety.

In short, the general impact of the road safety measures is not known.

## **Research on the Effectiveness of Law Enforcement**

There are two areas of research which would supplement existing work on law enforcement.

1. The development of procedures within police departments to allow local as well as broad scale evaluations of road safety programs.
2. The development of PPBS as an alternative method of accounting for police road safety work with a rigorous accounting of expenditures on road safety programs and the outcome benefits to the community.

## CHAPTER 1

## ROAD SAFETY ENFORCEMENT

## SUMMARY

The research on road safety enforcement and human behaviour suggests that:

1. Enforcement procedures need to be visible and immediate in their application and exaggerated in their effect.

Infringement notices with 21 days to pay are an immediate sanction on drivers.

Media co-operation (and liaison through police trained in media relations) is essential for any reduction in road accidents.

Police/media road safety committees at state level could annually assess the impact of enforcement programs.

2. The effect of deterrence is the culmination of many different factors so that groups in the population will behave differently depending on factors such as: previous experience, type of warning procedure, social characteristics. Previous experience may be one of two potentially powerful variables in influencing behaviour. The second variable is personality. Personality differences explain why individuals react in different ways to the same conditioning process from enforcement to lack of enforcement. Thus according to personality type individuals come to think they have a high or low risk of apprehension if they break the law.
3. Past experience is a combination of personal contact or lack of contact with police enforcement. This may be a negative result for the person who has not strong internalised values, unless the individual has seen a real risk of being caught every time he has offended, i.e. every time he drives without being apprehended or seeing the risk from police, he reverts to the norm of ignoring

police risk. Anti-social behaviour is therefore reinforced every time this type of person escapes detection.

However the intervening variable is personality and it is this factor which probably causes the final decision to be made on whether the subjective risk is great. The perception of subjective risk may be influenced by:

Law abiding habits.

Fear of apprehension when offending.

Denial of the offence and normalising the behaviour.

4. Sanctions are divided into legal and non-legal, with the latter referring to informal interpersonal pressures and other pressures (e.g. economic) which act for and against formal sanctions. Exposure to sanctions can be modified by different interpretations by individuals. Interpersonal influences (e.g. peer group pressure) can also act against the deterrent effects of the law.
5. Specific deterrence is also differentiated from general deterrence. While general deterrence relates to the public at large specific deterrence is the impact on the individual. Absolute specific deterrence is the effect on the offender who is caught.
6. There is some general evidence that once caught few offenders reoffend and the implications for this are that large programs against drink drivers will increase public safety, as those caught will have been deterred by the police response and court action.
7. Permanent deterrence appears to require extremely heavy policing with one recommendation being that one in three drivers be detained to ensure deterrence of drink drivers. At the extreme end of the spectrum there is evidence that very heavy penalties give no noticeable results.

8. The deterrent effects of imprisonment have been difficult to measure but the efficacy of two day short-term sentences has been proven in the United States to reduce recidivism by up to 40% over two years.
9. Well publicised campaigns have been found to deter for a short term.
10. Licence suspension appears to work as a measure which reduces risk to the population and the offender for a period of time.
11. Measures of deterrence over periods as long as two or more years have been contradictory in the research literature. This suggests that factors not susceptible to enforcement are contributing to accidents.

## INTRODUCTION

This chapter addresses the problem of defining enforcement and deterrence. In research terms the question is whether the relationship between enforcement, deterrence and changes in statistics on road accidents can be measured.

TABLE 1:1

### DEATHS AND INJURIES ON THE ROAD 1986

(Federal Office of Road Safety, 1987)

	Fatalities (N = 2,874) %	Serious Injuries (N = 28,600) %
Drivers	39	38
Passengers	25	29
Pedestrians	18	12
Motorcycle Riders and Passengers	14	16
Bicyclists	3	5

Road accidents were the largest killer of children, and young road users are over-represented in road accidents. **The age group 17-25** represents 15% of the population and 35% of the fatalities from road accidents. **International comparisons show that fatalities per 100 million vehicle kilometres travelled for Australia were 2.1 in 1985 compared with 1.5 in the United States and 1.9 in the United Kingdom (Federal Office of Road Safety, 1987).**

The road accident problem is a very broad one which has at least seven dimensions:

1. POLICE OPERATIONS.
2. LEGAL PROCEDURES (DRAFTING OF LAWS AND COURT SENTENCING).
3. ROAD USER BEHAVIOUR.
4. SOCIAL INFLUENCES.
5. ROAD DESIGN (INCLUDING FOOTPATHS).
6. VEHICLE DESIGN.
7. GENERAL ENVIRONMENT.

Police operations include deployment, special programs such as RBT and Black Spot programs, technical assistance used to analyse road accident causes and locations, and mechanical devices. Police management techniques in defining road safety priorities, manpower deployment and interactions with the public are also important. Enforcement sanctions used by the police include the courts, warning letters and oral warnings.

Legal procedures cover the design of laws to enforce road safety and the operation of the courts in applying sanctions to road offenders. Offenders may receive licence suspension, probation, community service, fines, and jail sentences.

Road user behaviour is the behaviour of road users including drivers of cars and other vehicles, pedestrians, motorcyclists and cyclists.

The social dimension covers the social environment of road users. This may determine the times at which they are at risk on the roads, the learning of social norms on road user behaviour, economic and other pressures, and attitudes towards enforcement agencies. This dimension also covers the individual's psychological state which may determine the degree to which he follows road laws or the way in which he handles an accident situation as it develops.

Road design involves both the scientific techniques for road building and policy decisions on road expenditures for safety purposes.

Vehicle design similarly involves scientific technology and policy decisions on expenditures on safety. The aim is to reduce the risk of an accident from vehicle failure and minimise injury to the occupants and other road users.

The environment surrounding the road user has both macro and micro qualities which include the weather, road surface and many other environmental factors.

## **Enforcement**

Enforcement is the formal process of applying sanctions to road users who break the law. However, the relationship between enforcement and road safety is such that the question becomes, "What mix of formal enforcement and other measures is optimal in reducing road offences, road accidents, and injuries and deaths to road users?"

One of the major difficulties in understanding much of the literature on road safety results from drawing a direct line relationship between fatalities or accidents and varying methods of enforcement. The interaction of police operations and court enforcements with road users may, in reality, be subtle and less well defined than presently assumed.

In discussing causation in road accidents the question is: "How are road accidents directly related to the offender breaking the law?" An understanding of the process of accidents and analysis of behavioural factors is necessary to prove that law enforcement can be effective in reducing the number of accidents.

Furthermore there is the question of whether road accident fatalities are a continuum of other road accidents and road offences or whether they are the result of an unexplained set of circumstances, i.e. "Are road death accidents the same as road accidents which do not cause fatalities and are they also a continuum of road user offences?"

The outcomes of various enforcement procedures may be to reduce certain types of offences, accidents or road injuries and fatalities but not to reduce others. Enforcement should realistically be directed at those offences which lead to serious accidents. The same objective must also apply to road safety legislation so that realistic goals which are relevant to road accidents are addressed in law.

Enforcement procedures also depend on political decisions on resource allocation to police and the courts and to the priorities within the police departments for road safety enforcement. Decisions on levels of enforcement can be ineffective when priority is given to revenue collection or arrest statistics. When priorities are not directed at protecting road users the outcome must necessarily be diluted and other goals achieved.

Ross (1982) has found that the probabilities of apprehension of drink drivers are very low. Generally the public overestimate the perceived risk of apprehension and Ross suggests that the apparent deterrent effect of Scandinavian type laws and enforcement campaigns is due to an exaggerated perception of the probability of apprehension with media publicity. Laws which are unpopular and attract criticism appear to have success in deterrence because they attract a lot of publicity.

## Measurement of Enforcement

Enforcement through police operations and court sanctions is generally measured against gross statistics on road deaths or road accidents. As a result the international literature, which is reviewed in this report, is sometimes conflicting. This is because there are a host of unknown variables that interfere with attempts to measure the outcomes of specific programs.

At best, the international literature on road safety provides information on police programs which can be pilot tested in Australia and assessed under specific conditions. At worst, there are so many conflicting results in the evaluation of programs that basic questions on the causes of road accidents and the effectiveness of enforcement procedures remain unanswered.

The answer to the problem of which enforcement procedure is effective lies in part in priorities given to the seven different dimensions which have been listed above as contributing to road safety. The answer is also in part in the application and evaluation of enforcement operations by the Australian police forces. There are currently many procedures used by police forces in Australia and overseas, some of which will be described in this review, but the resources that police need for road safety and police commitment to objective program evaluations still need to be addressed.

In a review of research on the effects of enforcement, Spolander (1977) described three types of study - experimental, non-experimental and behavioural effects. The experimental studies assessed the effects which would have occurred on roads if no enforcement was implemented. Most of the studies were not able to control the experiment effectively and only four out of twenty-six studies reviewed showed that accident reductions could have been assumed as a result of enforcement. Research on behaviour changes has been in two forms - first, the immediate local effects from visible police patrols and second, where the police can detect the road user first. Most studies have concentrated on the first type of behaviour and in these studies effects are very short in duration. With persistent offenders, non-visible enforcement has been found to be effective as



it reduces the opportunity for these offenders to identify the police presence and evade detection.

British research (Matthews, 1984) has suggested that road safety efforts have reached a plateau in all advanced Western countries with no obvious new directions. In the United Kingdom in 1983 there were 5,600 fatalities in 20 million vehicle miles.

Matthews (1984) reports on United States findings that fatality rates over the past 60 years have been on a constant trend line for the whole time. Injury rates have levelled off and been at constant rates for some years. In the United States there are more than forty thousand deaths a year from motor vehicle accidents, mainly young people.

In Australia there are approximately 3,000 deaths per year on the roads. A comparison of age rates for road fatalities with the general population shows that young people aged 0-16 years and people aged 30-59 years have a lower than average fatality rate, whereas those aged 17-29 and over 60 have a higher rate of fatalities (Federal Office of Road Safety, 1987).

In Australia there has been a constant decrease in fatalities to 3.1/10,000 vehicles. The statistics for fatalities per 100,000 people however have not shown the same trend. These gradually peaked in 1970 at 30.4 fatalities/100,000 people and declined by 1983 to 17.9 and then started to rise to 18.1 in 1986 (Federal Office of Road Safety, 1987c).

Homel and Wilson (1987) quote a statement made in 1974 by the Organisation for Economic Co-operation and Development:

"There is an air of uncertainty surrounding traffic law enforcement as a means of effecting the safe and efficient movement of traffic ... Most of the experimental work reviewed in the report appears to strongly suggest a positive road safety value in increased police enforcement. However it cannot be stated categorically that such is the case."

## **Enforcement and Police Image**

Homel and Wilson (1987) say that conventional policing on the roads has been blamed for the lowered police image in many nations. The argument is that personalising law enforcement has laid the foundations for accusations of inefficiency, bigotry and corruption. As there is police discretion, motorists view citations as evidence of police prejudice and warnings as police inefficiency.

More recent information from the United Kingdom (Dix and Layzell, 1983) suggests that police-motorist encounters do not stimulate generalised anti-police sentiment except in exceptional circumstances. Respect for the police, based on the behaviour of the reporting officers, was reinforced. Hostility towards police was found when motorists were stopped and searched for crime checks.

The finding that the police image is not affected by enforcement of road safety may be limited to the country of the study.

## **Deterrence**

A simple definition of deterrence is the outcome of enforcement as it changes road user behaviour so that road offences, accidents, injuries and deaths are reduced. The central theme is behaviour change through:

Behaviour modification as a conditioned response to cues of police presence.

Attitude change so that road safety laws are followed from an internalisation of the rules.

Acceptance within social norms so that road safety laws are reinforced through informal group interactions. These include the control of social behaviour such as drinking and driving which may lead to accidents.

Deterrence may be simply defined as the outcome of enforcement which modifies road user behaviour with a subsequent reduction in accidents.

Deterrence can be described as the outcome of the individual's subjective estimate of risk of detection which includes his assessment of the effects of the penalty against the benefits of breaking the law. The individual's reaction is also affected by the factors of personality type and past experience with enforcement and/or accidents. Differences in personality may explain why the majority of people internalise road safety laws, and are compliant, and why others have not internalised the laws and exhibit risk-taking behaviour.

### **Deterrence Research**

Ross (1973) says that the theory of simple deterrence is that legal threats can change behaviour by teaching right and wrong and building habits and respect and rationalising conformity.

Ross (1982) says that deterrence is one of the functions of criminal law. He defines simple deterrence as the efficacy of a legal threat when it is a function of the perceived certainty, severity and swiftness or celerity of punishment in the event of a violation of the law.

The greater the perceived likelihood of apprehension, prosecution, conviction and punishment the more severe the perceived eventual penalty, and the more swiftly it is perceived to be administered the greater the deterrent effect of the threat.

Modification of behaviour through legal punishment has been shown to decay over a period of time possibly because of an initial overestimation of the probability of punishment (e.g. a fine may not automatically follow) and the severity (e.g. first offenders may receive only a warning) followed by drivers learning that the risks of being caught are negligible. Enforcement publicity and increased enforcement campaigns can produce deterrent effects by increasing public perception (i.e. over already learned responses) of the likelihood of punishment.

Ross (1982) says that experience in the United States and elsewhere does not support the deterrence model in the matter of severity of penalty. If the probability of punishment is low then the effect of severity of penalty is negligible.

## **Deterrence through Legislation**

Homel and Wilson (1987) state that research on the impact of imprisonment in the United States has been difficult because when measuring recidivism those who are jailed are a different population from those who receive less severe penalties. General evidence on the effects of imprisonment is that short two day terms do reduce recidivism by up to 40% over two years and do have general deterrent effects. Similar research in Scandinavia has found that prison does not achieve any deterrent effects and may be counterproductive.

However, Homel and Wilson (1987), in a review of the literature, state that there should not be heavier penalties for young people as there is no relationship between heavier penalties and reoffending.

Homel and Wilson (1987) have said that in Australia there tends to be a dichotomy in deterrence with public debate on drink driving and speeding being left to the "experts". Gusfield (1981a) has said that legal measures other than drink driving are rational administrative instruments whereas drink driving legislation is moralistic. The drinking driver is perceived as a villain.

Homel and Wilson (1987) say that in the United States there has been a steady decline in the proportion of drivers with readings over 0.10 in road accident deaths and a decline in impaired drivers detected through roadside surveys. The analysis of the data found that this appeared to follow intense legislative activity initiated as a response to pressure from MADD and other groups, but that the cause-effect relationship is not proven.

One measure of deterrence is its long-term impact, i.e. does it permanently change behaviour? Homel and Wilson (1987) give the example of United States drink driving evaluation in two states - Maine and Massachusetts. In Maine the initial success was not continued and in Massachusetts no results were found at all.

Homel and Wilson (1987) also state that one problem is the cultural need to blame the driver.

In the United States the use of rehabilitation programs of up to a year with drivers with two or more drink driving convictions found (after a four year evaluation) that there was no reduction in the number of accidents. In contrast suspension of licences did reduce accidents (Matthews, 1984).

Matthews (1984) also describes a Driver Improvement Program where letters are sent to the individual after he has had an accident or committed one violation, and after two incidents a warning letter of intent to suspend licence if a third is committed. With three incidents the driver is advised that his licence will be suspended for six months after 34 days and then he will be on probation for 12 months. If the driver attends an administrative hearing within the 34 days, suspension is deferred and he has a personal discussion and is given educational material. Drink driving in California has led to legal provisions for mandatory jail sentence though the person may not be admitted to jail if it is full. With three convictions for driving under the influence the driver has his licence revoked or suspended in addition to the penalty from the Court.

Matthews (1984) describes drink driving programs in the United States where the main thrust of the programs is deterrence though it is assessed that only 1/200 drivers who have a BAC of over 0.16 are apprehended. Licence revocation is an important element. There is also a component for graduating students to encourage alcohol-free parties for young people which are nationwide and sponsored by youth. Another community program has parents and children making a contract to drive each other if over the limit.

The concept of punishment as an effective technique has been severely criticised by sociologists. Homel and Wilson (1987) state that this approach argues that on the grounds of invasion of civil liberties and cost, the emphasis should be on environmental approaches and quote Ross and Hughes (1986):

"We should persist in condemning drunk driving and in prosecuting those who are caught. But an obsessive concern with this single phenomenon carries two dangers. It promises much more than it can deliver in terms of public safety and it diverts attention from the corporations that ignore the harm caused by their products and the government officials who fail to initiate action to correct defects that threaten lives."

Deterrence may be defined as the success of a threat through perceived sanctions. Homel and Wilson (1987) quote a definition used by Gibbs in 1975 which is:

The omission of an act as a response to the perceived risk and fear of punishment for contrary behaviour.

Homel and Wilson (1987) describe the deterrence model as proposing that official legal activities and a specific traffic offence are linked through exposure to law enforcement. This leads to perceptions of sanctions and avoidance of offences. General deterrence is applicable to all drivers. Other non-legal sanctions which can also influence behaviour are feelings of guilt and informal peer group punishments.

The perception of deterrence means that avoidance behaviour by the road user reduces offending. However the road user must be exposed to the threat of legal actions to ensure that he has a perception of the sanction. Thus the more intensive or frequent the official activity the more intense or frequent is the exposure. Exposure includes observing enforcement or experiencing it in the form of a conviction. Informal sanctions (guilt, social stigma, losses) can have a directly opposite effect to legal sanctions and Homel and Wilson (1987) argue that individuals also put different constructions on exposure.

General deterrence is described by Homel and Wilson (1987) as the threat of punishment to the public at large. Specific deterrence is the impact of legal punishments on the individual. Absolute specific deterrence is the effect on the offender who is caught. Marginal specific deterrence is the comparison of the effects of one type of penalty with another. There is no research on specific deterrence for any class of crime. Some authors maintain that general deterrence has greater accident reduction potential than specific deterrence. This is because only a minority of offenders are caught.

Homel and Wilson (1987) state that there are limitations to deterrence policies aimed at the individual motorist, i.e. well publicised campaigns emphasising the certainty of arrest have a short-

term deterrent impact and extremely severe penalties distort the criminal justice system without achieving notable safety benefits.

The success of deterrence is related to premeditation and Homel and Wilson (1987) state that the role of premeditation in traffic offences is unclear, e.g. not all driving under the influence of alcohol and drugs and not wearing seat belts is premeditated. However deterrence models assume that deviant subgroups such as alcoholics can be influenced by sanctions.

Homel and Wilson (1987) suggest that when future legal sanctions are competing with social needs such as income it is possible to use legal means to manipulate non-legal sanctions. Warning letters are a method of strengthening internal control mechanisms. Another method is to legally require bartenders to intervene if patrons have had too much to drink. Other deterrent measures include reducing exposure, for example by night curfew laws for young drivers.

Homel and Wilson (1987) review the literature on deterrence for the young driver. They state that the literature generally does not provide much information about effective enforcement strategies directed specifically at youth. The OECD (1975) report has generally been implemented in Australia (driver training, driver licensing, special speed limits for probationary drivers and some drink drive countermeasures).

Homel and Wilson suggest that any program which increases the perceived likelihood of apprehension to realistic levels will influence young drivers.

### **Strong Enforcement Measures**

In Australia one program where deterrence has been closely evaluated is drink driving. Homel and Wilson (1987) state that there is evidence that the work by the New South Wales police RBT program has been effective in permanently reducing alcohol related fatalities.

This program combined intensive police operations and a large sustained media campaign, but Homel and Wilson (1987) state that the

threshold has been reached and to continue to be successful one driver in three will have to be tested each year.

In a 1986 study of RBT in New South Wales, Homel found that a very high proportion of motorists were aware of RBT and more than one in ten had been tested within three months of the enactment of the law. The individual's perception of his chance of detection was found to be strongly influenced by his friends being tested. It was also found that direct exposure to RBT corresponded with increased modifications to travel arrangements, perceptions of increased penalty severity correlated with reduced drink driving. Homel suggested that significant police presence was a more powerful variable influencing behaviour of the road user than intensive media.

Homel described New South Wales as a state where the great majority of motorists drink and nearly one in ten motorists could be classified as a heavy drinker, while many drinking lesser quantities have "binges" - particularly young men in their early twenties. Driving after drinking is common behaviour and nearly half of all driving licence holders admit to driving while intoxicated some time in the past and one in ten have driven while drunk at least twice in four months since the introduction of RBT. Homel found that the deterrent effect of RBT was short lived among heavy drinkers. However 40% of drinking motorists had found it easier since RBT to resist peer pressure to drink.

### **Appropriateness of the Law**

Dix and Layzell (1983) have commented on there being a case for relating fines more closely to income. They also state that there is a large inequality between sanctions for professional and non-professional drivers. It threatens the livelihood of the professional driver but not the other groups.

There is the question of whether the law is effective if individuals remain in ignorance of its sanctions and of its intent. Dix and Layzell (1983) state that the dangers of many driving offences are under-rated by the public, e.g. where drink drivers premeditated their action but thought themselves to be perfectly fit to drive.



Dix and Layzell identify several different types of offending:

1. Ignorance of the law.
2. Ignorance of law breaking (e.g. defective light).
3. Unconscious offending.
4. Conscious offending.
5. Consensus offending (police no longer enforce it, unable to enforce because motorists constantly doing it as they believe law is unreasonable or police have decided there are higher priority goals).
6. Interlude offences where motorist has to take time to correct the offence and is vulnerable to detection in interim, e.g. worn tyres.

## CHAPTER 2

## THE ROAD ACCIDENT PROBLEM

## SUMMARY

1. The public are warned of the risk of road accidents through information on the general risks of drink driving, speeding and other offences. In some situations there may also be visual and other cues (e.g. fog) which warn the driver of the risk of an accident. The problem is that individuals find it hard to believe that they are vulnerable to an accident.

Human factors determine the degree to which warnings are received and the reaction that people take to avoid an accident, e.g. by not drinking and driving, slowing down in poor weather conditions.

2. The road accident problem is not influenced just by enforcement and other physical factors are important in reducing road accidents. Some examples are:
  - (a) In Germany there were 0.17 accidents per million kilometres travelled on autobahns outside built up areas. Thus four-lane divided roads which are wide and well designed may reduce the road accident problem.
  - (b) Pedestrian protection has been increased by malls given up totally to pedestrian use.
  - (c) Motor cycle protection has come through the use of helmets and research suggests headlights in daytime driving add a safety factor.
  - (d) Cyclists have some protection from bicycle paths but not when these create dangerous intersections with roads.

3. Child protection has come mainly through seat belt legislation and the placement of children in less vulnerable seating in the rear of the vehicle.
4. Licensing regulations have some effect on the road accident problem when these demand high level skills and create special conditions for professional drivers. The latter reduce the potential risk to the public from lack of skill or health problems.
5. Drink driving increases the risk of accidents and is particularly evident in serious injury and fatality accidents. The preponderance of young males who drink and drive is explained partly by the importance of drinking as part of social intercourse. A combination of actions is important in reducing road accidents from drink driving - tough penalties, more enforcement and changes in public attitudes.
6. A report of British research conclusions (Matthews, 1984) stated that there were no "magic solutions" and future developments were more likely to be in the engineering field. It was easier to solve behavioural problems by engineering than to try for behaviour change.

## INTRODUCTION

The aim of this chapter is to analyse the road accident problem and enforcement procedures.

The analysis is divided into several sections covering: human factors research on speeding, drink driving, and use of seat belts; regulations to reduce road accidents through licensing and other laws; unprotected road users who are identified as cyclists, motorcyclists, pedestrians and child passengers.

## HUMAN FACTORS IN THE ROAD CRASH PROBLEM

Behavioural research has shown that there are many factors which interact in decision-making, particularly when individuals are given warnings of danger.

The public are warned of the risk of road accidents through information on the general risks of drink driving, speeding and other offences. In some situations there may also be visual and other cues (e.g. fog) which warn the driver of the risk of an accident. The problem is that individuals find it hard to believe that they are vulnerable to an accident.

Human factors determine the degree to which warnings are received and the reaction that people take to avoid an accident, e.g. by not drinking and driving, by slowing down in poor weather conditions.

The following factors may intervene in the individual's reaction to warnings about the road accident problem:

- Age
- Sex
- Marital Status
- Life Cycle Stage
- Social Environment
- Time of Travel
- Social Attitudes
- Social Activities
- Personality
- Decision Making.

There are a number of different strategies used to give the public warnings about road accidents:

- Public education
- School curricula
- Limited licences
- Licensing strategies including requirement for skills training.

Research in recent years has widened the road accident problem beyond the motorist to a perspective which includes all road users, both the motorist and the unprotected road user who may be a cyclist,

motorcyclist, pedestrian or child passenger. Unprotected people on the roads are at risk either from having no physical protection from a vehicle or being unable to make choices on how best to protect themselves, i.e. where children have to be supervised for protection.

Matthews (1984) identified three main factors in the road accident problem from German research: children, two wheel riders and young drivers aged 16-25.

Alcohol is given a pre-eminent place in most road safety research and some of the Australian work on drink driving is covered in this chapter.

### Speed

#### Germany:

Matthews (1984) found that, per million kilometres, accidents on autobahns were 0.17, other roads outside built up areas 0.68, and 2.3 in built up areas. There were no general speed limits on autobahns and the Germans had found that imposing speed limits did not reduce accidents. However they attributed 30% of their accidents to inappropriate speed including travelling too slowly.

Federal roads in Germany outside built-up areas had no speed limits but were the safest roads in the country. The recommended maximum speed on the autobahns was 130 km/h and the average speed was 100-110 km/h with few drivers exceeding the recommended maximum. Traffic density on these roads reduced the opportunities for speeding for any length of time.

## Drink Driving

### United States Research:

Ross (1982) suggests that drink driving leads to serious accidents and single vehicle accidents, and, in multiple vehicle accidents, the driver responsible has usually been found to have been drinking. Drink driving has been found to be prevalent among young drivers, night time drivers and weekend drivers. The risk of accident from alcohol consumption is quite high at blood alcohol levels well below that needed for intoxication.

Ross (1973) says that the relation between blood alcohol impairment and accidents may be subject to some kind of threshold, i.e. where there is no impairment below 0.05 and an accelerating relationship between accidents and alcohol over the 0.08 level leading to an extreme susceptibility to accidents for drivers whose blood alcohol exceeds 0.15. This suggests that the problem is not the social drinker but the alcoholic.

Ross shows from an early study of alcohol/accident relationships that there cannot be a large drop in the number of accidents from drink driving prohibitions at the 0.08 level (for example) because, although the relative probability of accident involvement with elevated blood alcohol is high, the absolute number of drivers with concentrations above 0.08 is quite small. Thus in the Grand Rapids study it was found that laws limiting drinking and driving to under 0.08 could not expect more than a drop of 6% in the total number of accidents as this was the group driving with the high blood alcohol levels.

### United States Research:

Matthews (1984) reports on United States research that alcohol in the blood was found to be related to more fatalities and serious injuries as alcohol worsens the effect of trauma. Passengers with alcohol in the blood, as well as drivers, have a higher incidence of death because alcohol makes the trauma much worse.

In California, Alcohol Safety Schools have been tried where the attendee pays \$100 and attends a 10-15 hour course on the effects of alcohol on driving. An evaluation had shown that the course participants had worse records subsequent to the course than others who did not attend though it was accepted that those who were not given this penalty were not a proper control group.

Limited licences have been suggested by the University of North Carolina Highway Research Centre (Matthews, 1984). These would limit driving to going to work and church for a year. Evidence had shown that these led to lower accident rates because of reduced exposure.

Raising the drinking age of young people to up to 21 has also been suggested in the United States though pressures have been evident from fears of revenue losses (Matthews, 1984).

The Michigan Transport Research Institute had concluded that the best deterrence for drink driving was not heavier enforcement but influencing bartenders to refuse service, locating bars within walking distance of houses, and raising the drinking age to 21. This has been found to reduce alcohol related accidents in 18-21 year olds by 15-20%.

#### Australian Research:

New South Wales research reports that there is a convincing picture of alcohol in accidents - 6% of drivers in non-injury accidents, 9% in non-fatal injury accidents, 14% drivers surviving accidents where others were killed, and 45% drivers killed. In general research shows that alcohol is related to successive decrements in skills necessary for competent driving (Cashmore, 1985).

Alcohol use is high among Australian drivers with drinkers preferring beer and having a per capita consumption of 134.1 litres in 1980-81. These figures rank fourth in the top twenty beer drinking nations. Wine sales have increased significantly with 18.3 litres per head being consumed in 1980/81. Men aged 25-44 in capital cities have a higher incidence of alcohol use and it is more prevalent in men in administrative, clerical and managerial and mining occupations and women in professional occupations. Australians are also heavy users

of medications with 8.9 prescriptions dispensed per adult in 1981 with 20% of those prescribed affecting the central nervous system (Hendtlass, 1983).

Hendtlass (1983) surveyed drivers in Victoria and found that in the metropolitan area drinking tended to be prevalent among 30-49 year olds and was least likely among the 18-19 year olds and those aged over 49. There was a difference in consumption between urban and rural drivers with two and one-half times as many drivers surveyed in metropolitan Melbourne having been drinking compared with those surveyed in rural Victoria. The survey tested drinking of drivers on a Friday and Saturday night. Overall nearly 11% of all drivers had used alcohol or medication or both. Use of medication was nearly twice as high among drinkers than non-drinkers in the metropolitan drivers.

Homel and Wilson (1987) report that despite the success of RBT campaigns in New South Wales, alcohol-related fatalities still account for one-third of all deaths. In Australia there is still a strong emotional overlay associated with drink driving campaigns.

In an early study of alcohol and accidents by McLean et al. (1980) a survey of over 3,000 drivers in Adelaide found that the highest percentage of drinking drivers were observed in the six hours from midnight for all days of the week. Almost one-third of all drivers in these hours had been drinking, one-fifth were above 0.05 and 14% above 0.08. One driver in 30 was above 0.15. It was found that the 12 hours from 6 a.m. to 6 p.m. contained only one-seventh of drivers who were above the legal limit.

#### German Research:

Matthews (1984) reports drink driving figures in Germany which show that only 1 in 300 drink drivers are caught (at levels of 0.08).

#### British Research:

Homel and Wilson (1987) have described the British work on drink driving which originated out of the British Crime Surveys of 1982 and 1984. The data on drink driving offences as analysed by Riley (1985)



suggested that one in four male drivers and one in thirteen female drivers were above 0.08. High risk groups were the ignorant, those under social pressure to drink-drive and those not fully aware of the penalties.

In Britain the legal limit is set at 0.08 as research has shown that degradation of driving performance is small up to this level and still moderate at 0.10, with a steepening problem after this. One-third of all drivers killed in Britain are over the legal limit but within the drinking hours (10 p.m.-4 a.m.) this rises to two-thirds. There is not a testing procedure for all injury accidents so the role of drink driving in this area has not been assessed (Matthews, 1984).

The main thrust of recent Home Office research on drink driving has been the social context of drinking. RBT can influence this but the more important long-term changes come if the social patterns of drinking can be influenced. If drink driving is a subject of conversation because of a campaign then the number of occasions young males drink is reduced (Riley, 1987).

These findings point to a situation where offending is not generally related to risk perception and the traditional interpretations of crackdowns and new legislation are not directly related to driver behaviour but to the more diffuse pattern of social drinking habits.

A range of interventions are thus seen to work with the public (Riley, 1987):

1. Tough penalties
2. More enforcement
3. Public attitude changes.

The application of social research to the evaluation of RBT effectiveness is described by Riley (1987) as a good idea but one which has not really measured the ways in which these factors have influenced the community to change driving behaviour.

Seat belt wearing has been an example of a situation where social research could not work out ways to convince the public of the need for personal safety but the sledgehammer approach through the law made it immediately successful, i.e. the law can be a powerful weapon in enforcing road safety where other measures may not be succeeding.

The situation in Australia was different. Because a significant minority of people started voluntarily wearing seat belts, there was little opposition to the introduction of mandatory laws. The law was successful in bringing non-wearers into line.

#### Canadian Research:

Matthews (1984) describes findings by Transport Canada which were - between 10 p.m. and 3 a.m., 6% of drivers were legally impaired 0.08 and 20% of drivers had been drinking. Records of blood alcohol for all drivers killed in accidents since 1973 revealed that close to 45% were over 0.08, 55%-60% had been drinking. Of injured drivers 20% were over 0.08 and 30% had been drinking. These levels had remained unchanged for 10 years.

The place of drink driving research has been questioned in Canadian research which states that rather than alcohol being the problem it is high risk behaviour and this combined with reduced competence due to alcohol causes accidents. People with deliberate risk-taking lifestyles have been identified as having more accidents (Matthews, 1984).

Household survey research nationally found that the total alcohol consumption of an individual was the major predictor of drink driving. High alcohol consumption drivers were a specific group with abnormal risk taking behaviour in all areas of life. As a consequence the Canadians feel that mass programs are of no use with this group and that stepped-up enforcement programs are the best method.

## Seat Belts

Trilling (1978) reported in a United States study of fatalities and injuries in 1977-1986 that mandatory seat belt use had the potential to prevent 89,000 fatalities over the decade (1977-1986).

Matthews (1984) reports on research in the United States in North Carolina where local community pressure raised seat belt compliance in local residents from 24% to 40%. **The community organised local merchants to donate prizes and inspectors stopped cars at random.**

The British experience has been that fatalities have dropped from the mid-1960s to 1983 by 30%. **Reasons for this change include seat belt legislation, though overall reasons are unclear. The Department of Transport in London reported that seat belt wearing rates were holding at 90% (Matthews, 1984).**

Canada has focused on making seat belts more safe and reducing abdominal injuries. **The Canadian approach is to prefer to increase the effectiveness of seat belt restraint than to use air bags. It is considered that seat belts should be anchored to the seat and a system to allow the upper torso anchor point to be adjusted to suit the wearer is important (Matthews, 1984).**

Matthews (1984) reports research from the University of Michigan Transport Research Institute which revealed that child restraint law had reduced child injuries by 20%-50%. **The major effect had been brought about by parents moving children into the back seat.**

## Fatigue

Fatigue has no simple definition. At its onset driver fatigue can affect drivers giving them slower reactions and reduced vision for which they can compensate by slowing down and changing the way they scan the road. **Eventually, as fatigue progresses, drivers fall asleep at the wheel, which may well lead to an accident. A detailed study of fatigue in the United Kingdom identified fatigue as a contributing factor in 7% of road accidents. Fatigue accidents are usually more**

severe than other accidents, and because of this, the number of fatal accidents, where fatigue is a factor, is likely to be substantially higher than the estimate given above. **Fatigue accidents are found to be more likely on rural highways and freeways and an estimate has been given of between 14% and 24% of all single vehicle crashes on rural highways being due to fatigue (Federal Office of Road Safety, 1987).**

Fatigue has also been described as lapses in concentration, sometimes called micro-sleeps. **Monotonous or boring driving conditions may possibly accelerate the onset of fatigue whereas more demanding driving conditions may possibly postpone it. Eventually, no matter what the driving conditions, fatigue will set in if the driver has driven for too long, had insufficient sleep, etc. It has been found that even when drivers have short rest breaks, involuntary short lapses in concentration tend to recur after 20 to 25 minutes of driving (Federal Office of Road Safety, 1987).**

Measures to counteract fatigue include reduction of alcohol, driver education to plan trips and stop when fatigued, avoidance of stimulant drugs, vehicle and road engineering, legislation (for professional and heavy vehicle drivers) and social changes, particularly the popular image of driving for long periods (Federal Office of Road Safety, 1987).

## REGULATIONS AND THE ROAD CRASH PROBLEM

### Licensing

#### (a) Medical Fitness

##### German Research:

German research reported by Matthews (1984) shows that older drivers had worse records and were a small but increasing proportion

of all drivers. Handicapped drivers had been assessed as well but it was considered that they compensated and avoided situations they could not handle. The Traffic Medicine and Psychology Unit at the German Federal Highway Research Institute has done some work on the effects of drugs on driving and has issued a manual for doctors in an attempt to standardise medical checks and allow licensing authorities to decide who should be allowed to drive. **Patients under psychiatric treatment and patients on kidney dialysis** were two areas of concern.

Heavy freight drivers, bus and taxi drivers are given a medical screening in Germany. This involves checks on heart and kidneys initially and then full medical checks if necessary.

#### British Research:

Matthews (1984) states that in Britain licences for heavy vehicles and public service vehicles require an additional licence and a medical examination. However he states that the medical profession has no fixed view as to the disorders which should disqualify a person from driving. Generally they do not accept evidence from the individual's general practitioner.

There is a practice of suspending the licence for one year for any medical condition thought dangerous and reviewing every three years thereafter if the condition has stabilised. **Diabetes and epilepsy** also have special treatments which will allow licence reinstatement. However, diabetics controlled by insulin cannot drive heavy vehicles or public service vehicles and any epileptic attack after the age of five disbars the individual from heavy vehicles or public service vehicles.

#### (b) Licensing Procedures

Licensing procedures are relevant to enforcement in road safety as these procedures determine firstly who is able to drive on the roads and secondly who can be integrated into the penalties which the courts impose on road safety offenders.

### Britain:

Matthews (1984) says that the driving test is difficult with a 52% failure rate and most fail on driving skills rather than on knowledge of the law. Concentrated difficult driving for 30 minutes is found to be more than most can handle. It has been found that the key to the system is examiner training and supervision.

Motor cycle learners are limited to 125 cc and mopeds to a maximum of 30 mph (48 km/h). There are tests, one off the road and one on the road, and both must be passed within two years.

### United States:

Matthews (1984) reports that in California it was found that there was no increase in accident rates when driver licence renewal notices were mailed to drivers with a clean record, rather than requiring them to attend the registry office for a simple test.

There was also no change in accident rates from using difficult driving tests which failed 50% of applicants even though this delayed licensing for several months.

A study on the use of road safety films and road tests with a group of drivers with a bad record of accidents and/or traffic violations found a 25% increase in fatalities and injuries. The research showed that there was no relationship between knowledge or test results and subsequent accident history.

In California truck and bus drivers have high accident rates from high exposure as most drive over 100,000 miles (160,000 kilometres) a year and accidents in these vehicles are generally more serious because of the mass of the vehicle. There has been no evidence that skilled drivers have fewer accidents. The same applies to motorcycles. More skills are required than to drive cars and motor cycles are less forgiving of mistakes. The Californian experience has been that a study of very tough testing in this area has led to improved driver performance. However, inexperienced riders in their first five months on a machine have a high risk.

The driver's licence issued in California is also used for financial security identification. The system uses a secure photographic (Dek) system with delayed processing costing 43 cents/card. Copies of the photo, signature, thumbprint and application term for each licence holder are held on microfilm.

The legal age for licences is 18 but 16 is allowed if the person has completed an approved course. The under 18s have a more difficult test and have a provisional licence until 18.

#### Graduated licences:

These have been recommended by the Federal Office of Road Safety (1986). The proposed scheme involves four 6-month learning stages which together extend the learner driver period to two years:

- STAGE 1    Driving under adult supervision with no passengers.
- STAGE 2    Day and night driving under supervision and passengers allowed during the day.
- STAGE 3    Solo daytime driving but night time driving only under supervision and passengers under supervision.
- STAGE 4    Solo day and night time driving but night time passengers under supervision.

Boughton et al. (1986) say that the model of a graduated licence scheme has been endorsed by Transport Ministers from all States and Territories in 1984. The model addresses the main problems of alcohol abuse, night driving and passenger carriage which are major factors in accidents involving young drivers. The aim is to build up experience in less risky situations. At present licensing of young people is over a brief period and there is not time for experience of risk situations to develop. A suggested starting age is 16 years to give

time separation from the legal drinking age. Community consultation led to a recommendation for a total ban on alcohol in the first two years of driving. Some exemptions would be required in this scheme for shift workers, education purposes and emergency carriage of passengers.

#### Raising Licence Age:

Homel and Wilson (1987) say that in Australia raising the licence age has led to heated debate. The question of whether the minimum licence age of 17 should be raised has been investigated in New South Wales as part of a larger inquiry into car driver licensing by the Parliament of New South Wales Joint Standing Committee on Road Safety (1984).

The age of 20 was considered as a minimum age but rejected as not feasible for social and employment reasons. Part of the problem in the consideration of the data was that casualty accident rates for young drivers in New South Wales rose from age 17-19. Homel and Wilson (1987) question the political reasons for not establishing 18 as the licence age and state that United States data on fatal accidents 1975-1985 and earlier figures show that raising the licence age to 18 would greatly reduce deaths among those under 18 and apart from motorcyclists unlicensed driving would probably not become a major problem.

In the United States research on licensing age has led to the suggestion that fatal accident involvement could be reduced from between 65% and 85% if the licensed age was raised from 16 to 17 years of age (Homel and Wilson, 1987).

This approach, however, would require an assessment of negative economic costs from raising licence age and removing 17 year olds who are dependent on transport, from the workforce.



## UNPROTECTED ROAD USERS

Unprotected road users present a problem for road safety enforcement. The following review of research shows that this group of road users can be protected through a number of measures, one of which is enforcement. Others include physical design work on vehicles and the road environment and community prevention of accidents. For unprotected road users the emphasis may be placed on the design of prevention programs - e.g. for young children riding bicycles it may be better to have a prevention program rather than expecting enforcement to be the most important factor in reducing accidents.

### Cyclists

#### Australian Research:

Bicycle fatalities in Australia account for 2%-3% of all road deaths. Injuries account for the same percentage of overall injuries reported but in bicycles there is evidence that injuries are grossly under-reported. There has been a lack of data on accident details of cyclists and this has hampered preventive safety work (Mathieson, 1984).

Bicycle trips are claimed to be about equal in number to public transport - for example one estimate in Melbourne was that bicycle use represented 3% of all trips. Young children have been found to have perceptual difficulties in making traffic decisions under the age of 12 and have serious difficulties under the age of 10. Poor riding and misuse are significant in the 5-9 year age group (Mathieson, 1984).

Research generally has shown that 60% of accidents were from a fall or collision with a stationary object after losing control, 30% from a collision with a moving object and 10% from collisions with fixed objects mainly due to lack of attention. Overall, 20% of accidents were estimated to result from poor road or bikepath surfaces (Mathieson, 1984).

The relationship of age and accident causation is that the children are usually legally at fault but with adult cyclists 60% of motorists

are at fault. Head injuries dominate the reports of both fatalities and injuries. One of the common causes of accidents has been found to be that cyclists are not always easily seen (Mathieson, 1984).

In Victoria a successful Bike-Ed program for children aged 9-12 was started in the late 1970s and has spread to other states. It has been developed to introduce pedestrian safety in the earliest years in the education curricula and provides on-road skills in the older ages. The police in Victoria also developed a program with a Bicycle Offence Report which was sent to parents on the first offence and a formal caution on a subsequent offence. For adults on-the-spot fines were introduced for footpath riding (Mathieson, 1984).

Helmets have been assessed as being very effective in protecting cyclists from injuries and the better hard shell helmets are assessed as decreasing the total bicycle casualty rate by over 40%. A cost effectiveness assessment has shown that the annual benefit-to-cost ratio is at least 2.5 to 1, making the promotion of universal helmet use very attractive (Mathieson, 1984).

Road construction is also a factor in bicycle safety. Mathieson (1984) recommends that all new roads be built to be bicycle safe. Bike paths need to be constructed to high standards, with adequate width, sight-lines, large radius curves and where great care has been exercised in designing intersections with roads if adequate safety is to be achieved. However, it is clearly impractical to construct bike paths to cater for every bicycle journey and bike paths are not the answer to the bicycle safety problem. Bike paths can be an excellent facility catering for young children, recreational cycling, as a way of avoiding gradient or distance disadvantages of existing roads and as a way of reducing the number of intersections over selected routes.

#### German Research:

Matthews (1984) reports that cyclist fatalities increased to 10% of all fatalities in Germany in 1983 (from 1970). Bicycle usage had increased greatly in the time. Some of the preventive measures used to reduce accidents included separate paths alongside major roads, or part of the roadway and separated by a white line.

In villages the policy was to reduce the width of the roadway between kerbs to give a wider path for pedestrians and cyclists. By narrowing the road drivers are given a signal to slow down.

German law required children under the age of 8 to ride on the footpath and not on the roadway and over 8 they may not use the footpath.

German research found bike paths created more intersections and these were a location for bicycle accidents.

Matthews (1984) also reports that the main aim in cycle safety in road design should be to keep cycles in sight of the cars at all times so that drivers can predict their movements and not meet them unexpectedly at intersections. However cyclists may take the easiest gradient and will not use hilly paths.

Another research finding is that there are high accident rates at driveways into private property.

### **Motorcyclists**

#### **German Research:**

Matthews (1984) found that in Germany there had been an attempt to put young motor cyclists through driving courses and tests. The lowest class of bike with a maximum speed of 25 km/h for children aged 15 and over had no driver's licence requirement. A light motor cycle class of bikes capable of 80 km/h maximum was frequently involved in accidents but there were strong social pressures to retain the right to ride for 16 year olds.

#### **British Research:**

Matthews (1984) reported that in England motor cycles have become more popular and this has caused a significant problem as casualty rates are about four times as high as for cars. A lobby group has prevented measures such as having tough licensing standards that deter

young people from driving a motorcycle before a car and limit machine size. Measures were adopted to encourage better rider training and use of publicity to encourage training. Permits are cancelled if the cyclist is unable to pass his full licence test within two years of having a learners permit and another permit cannot be taken for a further year.

An attempt to require headlights on and high conspicuity jackets for motorcyclists has failed. However changed arrangements in the United Kingdom now require a higher standard to pass existing licence tests which has deterred ridership and usage of motorcycles with the effect of reducing motor cycle casualties.

Half the motor cycle casualties in the United Kingdom are 17-18 year olds and the major problems are that young people are attracted by the lower purchase cost of motorcycles and are inexperienced. Motor cycles do 2% of all vehicle kilometres and yet experience 20% of all accidents.

Matthews (1984) states that motor cycles are responsible for one-quarter of all fatal accidents, and this proportion is expected to rise as car occupant casualties decrease. Safety features such as anti-lock brakes are being investigated. Headlights on or twin running lights have been found to be effective in maximising conspicuity. Protection of the rider is seen to require leg guards as well as helmets as 60% of serious motor cycle injuries in the United Kingdom were to legs. (These cost £70 million annually.)

#### United States Research:

Matthews (1984) found that in the United States research showed that helmets were the single most effective action for saving motor cyclists' lives.

More than 50% of accidents are at urban intersections with the other driver found to be at fault but most evidence is that the other driver either does not see the motorcycle or could not accurately judge the closing speed.

Frequently the other driver has driven across the street or made a turn into a street in front of a motorcycle. It was found that reflective material on the rider of a motorcycle was more effective than on the motorcycle itself in reducing accidents. Recognition of the motorcyclist as a person changes the way in which other motorists react and it also helps them to judge closing speed and distance better because they know how big a person is.

Headlights on were also found to be effective and cost effective in daytime running. It was thought that increasing the size of the rear light might help.

A unique pattern of lights for motorcyclists may be a method of assisting other road users to identify the type of vehicle.

#### Canadian Research:

Matthews (1984) says that the Canadian experience of motorcycle accidents was that the fatality rate was twenty times that of cars. A lot of work was put into licensing and training but it was found that levels of skill were not predictors and that formal training had no effect in reducing accidents or violations. Propensity to take risks was the main predictor of accident probability, i.e skilled drivers taking greater risks and failing.

#### Pedestrians

##### Australian Research:

A study of pedestrian accidents in Melbourne in 1981 (Hoque and Andreassend, 1985) found that approximately half pedestrian accidents occurred at intersections and mid-block locations. The highest number of intersection accidents occurred in local streets with 94% of these on arterial approaches. Secondary arterial roads, however, had the highest frequency of pedestrian accidents at intersections and mid-block locations.

A recent report by the Federal Office of Road Safety on the "Safety of Older Pedestrians" reviewed statistics on pedestrians and consulted with community groups. A number of changes were suggested:

Additional medians as refuges

Traffic signal timings

Speed limits reduced in urban areas

Street lighting to be enhanced near social facilities

Design of pedestrian facilities in co-ordination with public transport

Placement of pedestrian crossings to be upgraded or drivers given special signs

Enforcement directed at drivers who fail to give way at crossings and when turning

Vehicle design to reduce pedestrian injury

Community education.

#### German Research:

Matthews (1984) reports on programs for children under 6 in Germany which concentrate on educating parents and teachers on how to impart appropriate knowledge to children. The program included training teachers on a special school traffic course to teach children road craft on bicycles.

Older cities with narrow streets have introduced pedestrian zones in the town centre. This has stopped roads being physical barriers to cross movement in cities. The aim now is for city streets and residential streets to become multi-functional, i.e. equally available to pedestrians, cyclists and cars with easier pedestrian access to shops. Additionally visual cues are used to tell drivers to slow down (cobblestones and trees).

When there are bicycle paths there need to be measures to keep car speeds low and the German experience has been that it is not enough to put in barriers or trees but there need to be offset alignments, physical barriers, road width restrictions and curved alignments.

The policy also needs to extend to treating whole areas not just single streets and diverting traffic through ring roads as part of an overall strategy for the town. There is also the problem of buses which can be slowed down so much in multifunctional streets that the result is customers do not use them.

It has been found that if a whole area is designed for multifunctional use then drivers recognise much more clearly the need to slow down. An aim is also to make it possible for people to have a conversation in the streets and for people to prefer to park and walk short distances rather than use the roads.

Matthews (1984) has reported on pedestrian protection in car design by trying to get a standard for better pedestrian protection on the front of cars.

In Germany half of the pedestrians killed in built up areas are over 65 and analysis of accidents with elderly pedestrians suggests that they have wrongly perceived the speed of the car that hit them or else thought it was further away. It has been found that the elderly are four to five times more likely to be hit by a car than the young and are more likely to die from injuries. The elderly have problems with vision in the dark, at dawn and at dusk.

There is also an assessed pedestrian risk for people who use public transport. When the total journey of a public transport system is assessed, i.e. with lower risk on public transport plus risk of being a pedestrian at both ends of the trip the risk is the same as going by car and at times is higher.

Some research has shown that multifunctional streets are not successful if all traffic vehicles exceed 80 km/h. If the traffic cannot be kept below 80 km/h the road should be treated as arterial.

Matthews (1984) concluded after assessing many different street treatments for pedestrians that the only safe methods were plazas which allowed no motor vehicle traffic.

### British Research:

Matthews (1984) reported that the British were also looking at area wide traffic measures to put through traffic onto main roads and out of residential streets to reduce pedestrian accidents.

Matthews (1984) reported that the British in 1984 were considering experimenting with children's traffic safety clubs.

Research on BAC in fatal pedestrian accidents has found a large proportion have very high levels (Matthews, 1984).

### Children

Elliott (1985) reports that over 400 children are killed on Australian roads each year and at least 4,000 are seriously injured. Child vehicle passengers account for the greatest number of deaths and injuries. Child pedestrian accidents account for approximately 17% of all reported accidents and child cyclists for the same number. In the three largest states of Australia the largest category of child accident is 13-16 years and especially males. More children 0-4 are involved in road accidents than 5-7 and males outnumber females in this younger group.

Elliott has made a number of road safety recommendations aimed at child safety:

Mass media campaigns for child restraints and adult and child pedestrians.

Cyclists "Bike Ed" and helmet wearing.

Graduated licensing with restriction of passengers.

Changed status of residential streets and engineering for lower vehicle speeds.

Education for pre-school, primary, and secondary children.

Child training harness.

Vehicle reversing warning system.

Community agenda setting using media and mail.



A broad overview of prevention of child injuries is described by Gunnarsson (1982) as follows:

Eliminate the risks.

Separate the child from the risks.

Isolate the risks (e.g. with barriers).

Modify the risks.

Equip the child for survival.

Instruct the child for survival.

Warn or restrict the child.

Install an alarm.

Watch the child.

Start the rescue.

## CHAPTER 3

### AUSTRALIAN POLICE OPERATIONS

#### SUMMARY

Evaluation is an important part of police work in road safety. It provides information on the success of programs in reducing accidents, how to effectively deploy manpower and the cost effectiveness of operations. Other outcomes of successful evaluation programs include an increased input by police departments of information on road design, traffic planning and emergency medical services.

There have been so many difficulties in finding a significant causal inference between enforcement and numbers of accidents that broad statistics may not be the best medium for judgements on road safety and police enforcement procedures.

Evaluation strategies appear to be most successful when they target specific aspects of road user behaviour. Historical information on road accidents appears to be necessary before any judgements can be made on the effectiveness of enforcement. This is because there may be other variables which affect the measurement of change in road user behaviour.

Simple evaluation strategies are recommended for police in developing local area enforcement strategies. Part of an evaluation strategy is the use of a small group of people to decide on what is to be evaluated and which procedure to use. Simple observations by police on duty are included in the methods that can be used to evaluate the success of an operation.

Case examples of Australian police operations show that there have been many different attempts to evaluate the success of large programs such as the RBT program in New South Wales.

This type of program can be evaluated in many different ways: for example - looking at the change in BACs in drivers which may show

significant falls when the program is successful; changes in deaths and serious injuries; using multivariate analysis to control for intervening variables such as changes in the economy; using surveys to look at public attitude changes; costing the effects of a program through changes in alcohol sales; and evaluating police operational effectiveness in reducing accidents in black spots.

Other case examples drawn throughout Australia show that the states have many different ways of evaluating their strategies and in collecting data for evaluation purposes. One sophisticated attempt at this is the South Australian Traffic Intelligence Centre which processes statistics to provide an effective manpower deployment and use of equipment.

Another example of police operational techniques is the use of a wide range of constantly changing methods by Queensland police to identify offenders. An evaluation of police operations shows that the statistics are important but that the presence of good command systems and high morale in traffic divisions are also important for an effective road safety effort. Personnel management may therefore be a hidden variable affecting the success of enforcement programs.

## INTRODUCTION

The aim of this chapter is firstly to review general road safety procedures and some statistical and other types of methods which are unable to link specific police enforcement procedures to changes in road accident figures.

The second aim is to review operations throughout Australian police forces which are directed to road safety. Some of the general questions which are asked in program evaluation for the police are:

How successful is a program at reducing the road accident problem?

What is the deployment of manpower for the operation?

What is the overall cost of the operation?

Can the cost be compared favourably with the law enforcement results?

## **EVALUATION STRATEGIES IN ROAD SAFETY**

Some of the strategies which can be used to evaluate road safety have been identified (see Ross, 1982, 1973; Homel and Wilson, 1987). However there are also many problems in relating law enforcement programs directly to changes in road accident statistics and these are also summarised below.

### **Evaluation Strategies:**

Use of fatalities and serious accidents to measure road safety.

Use of refined data series - for example, single vehicle accidents on weekend nights.

Use of series accident data.

Use of interrupted time series which analyses entire data series for presence of long term trends.

Use of commissioned surveys of driving populations.

Blood tests of fatalities.

Application of intervention to groups at random with control groups used to compare changes.

Use of correlational studies where different areas are compared and deterrent effects inferred.

### **General Problems in Causal Inference:**

Historical changes where economic effects and many other factors lead to changes in statistics.

Maturation where changes occur because of the passage of time and overall trends that have no relationship to any deterrent measures.

Instrumentation where the statistical measures themselves change the data.

Testing where the change in behaviour is really the result of the experiment.

Instability where there are random changes in the figures. When there are large numbers of factors affecting behaviour each one only makes a small contribution to the total rate.

Regression where unusual departures from the general trend revert to the mean. Failure to deal adequately with regression to the mean may mean that high accident locations can be naturally moving towards better accident results in observation periods without these really being a result of an enforcement program. (This can be overcome by extended observations before and after enforcement commences.)

Problems of causal inference where there are other variables affecting a result.

Problems in statistical significance to show effect of interventions, e.g. when very small numbers could be expected as the result of an intervention. For example, drink driving laws could reduce drink driving serious accidents and fatalities by a maximum of 25% which may be small in actual numbers.

Evaluation design may be defective.

Inference may be being made from external and unknown factors.

Test period may be too short.

Evaluation may not measure change, e.g. speeding may be reduced but if accidents are measured there may be no direct change in number of accidents due to an anti-speeding program.

All these factors may create difficulties in evaluating enforcement programs. One of the most difficult to assess is regression to the mean as the outcome is in the same direction as the goals of road safety, i.e. a reduction in accidents.

Homel and Wilson (1987) cite a research example reviewed by Raub (1980) where a police traffic unit in Illinois found a reduction in accidents over a year was related to their selective enforcement program. In the second year there was a significant increase such that for the two year period the number of accidents was higher than expected by trend. This problem can be controlled by time series analysis to control regression to the mean and cope with general randomness of data.

Another example of time series data (cited by Homel and Wilson, 1987) was an evaluation by Raub of a study in Evanston, Illinois which

compared the findings for the first year with accidents on streets that did not receive added enforcement. Subsequent data found accidents increased in subsequent years but were fewer in number than that predicted by the ten year trend. The findings in this study were that the success of the program was due to frequent and visible patrols on hours and days of high accident frequency; frequent stops of motorists at the rate of two per hour; and enforcement of a wide variety of traffic laws, not just speeding.

A further example of evaluation by comparison of different enforcement strategies is given by Homel and Wilson (1987) in a review of the literature on warnings. Evaluation of the effectiveness of warnings is an example of the use of evaluation procedures to obtain cost effective methods of policing.

These authors say that informal warnings by police have advantages over citations as they are cheaper, reach more offenders and perhaps increase the deterrent effect. Some research suggests that speeding drivers who are simply warned are more likely to speed again within the next five miles (eight kilometres) and oral warnings have no different effect to being taken to court.

However informal warnings vary in their effect on attitudes towards reoffending - and are partly related to whether the motorist thinks there is a record being kept. Written warnings are found to be more effective than oral warnings and court action.

Homel and Wilson (1987) citing research state that advisory letters sent to drivers who had accumulated more than a certain number of violation points reduced subsequent offending when compared to no action being taken. Warning letters were found to be especially effective for drivers under 25.

Homel and Wilson (1987) also cite research by Armour in 1984 on the effectiveness of deployment. An evaluation of Australian literature showed that deployment based on high risk times or locations is superior to a general increase in enforcement but there is insufficient evidence to optimise planning. Recommendations were made for:

Visible police enforcement.

Use of warnings as well as citations to increase police contact with motorists.

Publicity to accompany enforcement.

Presence of police vehicles to reduce driving speeds for up to 5 kilometres - up to 0.3 per mile.

### **Developing an Evaluation Strategy**

In road safety evaluations there is sometimes concentration on gross statistics such as all road accidents in an area over a specific time and comparisons with previous road accident figures. One of the difficulties in using these broad figures is that there are limits in measuring change caused by a specific program. Many different factors cause accidents and enforcement is only one contributor to safety.

It is therefore easier to attempt to target a specific type of road accident and if possible to specify it even further to a specific area or time or subgroup of drivers.

A basic strategy is to use evaluation to optimise the application of resources. In law enforcement for road safety this means choosing the optimum mix of law enforcement strategies for reducing road accidents. Enforcement resources cover manpower deployment, costs, and a multitude of strategies which the police use to control road user behaviour.

A simple method of evaluation is to divide up the service being evaluated into a number of specific dimensions and measure each dimension.

The use of subjective observations by police officers as well as statistical measures may also assist in obtaining better information on the law enforcement process.

There are some simple steps in decision-making on evaluation strategies (see Edwards, 1971 for the general principles) which

provide an example of an evaluation procedure that can be used in law enforcement:

1. Identifying who should be represented in the decision making process on evaluation. One option may be for the traffic branch in a police department to call in an outside person who is objective or someone outside the branch who can be objective. In addition to traffic branch personnel, internal research personnel within the police department and traffic engineers from other government sectors may be worthwhile participants.
2. Identifying which issue or issues should be evaluated, e.g. reduction of speeding offences.
3. Identify the entities to be evaluated, e.g. use of radar and visible police cars in specific police districts.
4. Identify the relevant dimensions to be evaluated. This involves simply listing all the goals without concern over their relative order, e.g. minimising number of offenders who have speeds of 20 km/h or above the limit in the area, reducing accidents in the area and reducing accidents involving pedestrians.
5. Rank the dimensions in order of importance.
6. Rate the dimensions in order of importance preserving ratios. This step assists assessment of the relative importance of some of the goals by giving everything a rank of one to ten.
7. Sum the importance weights, divide each by the sum and multiply by 100. For example 100 points are distributed over the three dimensions listed in Step 4. This procedure reduces the tendency to try to measure too many things at once.
8. Decide on measurement of each dimension. Some dimensions may be measured purely by subjective assessment by an observer in the area. For example a policeman observing on points duty may report that the radar program is reducing the danger of an intersection as people are consistently approaching at much lower speeds. Wholly objective dimensions may be measured by specific data collection.
9. Add up the measures on each dimension.
10. Decide on the final utility value of the procedures being evaluated, e.g. the three dimensions being measured when added up show that out of 100 points x points are being achieved.



## EVALUATION OF AUSTRALIAN POLICE OPERATIONS

Wilson (1987b) in a review of procedures used by Australian State Police Forces commented that there were;

1. Differences in reporting road accidents.
2. Lack of statistical detail in the collation of Infringement Notices as far as research and its application to road safety.
3. Seat belt legislation was not strongly enforced.
4. Police were dependent on other agencies for statistical data although they collect the base material.
5. There would be benefits to road safety from increased information exchange with traffic authorities.

### Case Examples - New South Wales

New South Wales introduced random breath testing in Australia with high levels of enforcement. Nearly 900,000 tests were conducted in the first year of operation in 1983 and 1.25 million in 1984. The testing is conducted mainly by Highway Patrol personnel with some support in country areas from general duty police. All Highway Patrol personnel (approximately 1,000) were directed to conduct random breath testing for a minimum of one hour on each shift and 22 mini-buses or vans were fitted with equipment to give each police district a vehicle (Cashmore, 1985).

By mid-1984 testing in early hours of the morning was increased to catch motorists who were staying out late to avoid the testing. The times of 10 p.m. to 6 a.m. were found to have a high level of alcohol related accidents and with the New South Wales random breath testing operations these times also were found to have the highest charge levels (Cashmore, 1985).

Electronic Alcometers or Alcotest "bags" were used and if this indicated a blood alcohol concentration of over 0.05 the driver has to undergo breath analysis and if this is 0.05 or more the driver is charged with an offence of low (0.05 - 0.079), medium (0.08-0.149)

and high (0.15 and over). In 1983, six out of every one thousand tests resulted in a charge and in 1984, 3.9 resulted in a charge (Cashmore, 1985).

#### Evaluation through Change in BACs:

Cashmore (1985) comments that roadside surveys of drivers have generally found higher percentages of drivers with illegal BACs than detected by police units and this is most probably explained by avoidance behaviour.

There was a sharp fall of 30% in the number of proven drink drivers between 1982 and 1983 in New South Wales. This was the only significant decrease since 1969 and it continued into 1984 though not at the same rate. There was also a drop in the BAC of convicted drink drivers.

#### Evaluation through Change in Fatalities and Casualties:

There was a reduction in the number of people killed and injured in accidents with the greatest reduction being for drivers (-16% in 1983) and passengers (-20% in 1983). The reduction was greater for fatalities than casualties and there was a reduction in the number of fatally injured drivers with high BACs (Cashmore, 1985).

#### Comparative Evaluation:

Cashmore (1985) gives figures of 2.18 million initial breath tests in New South Wales (population 5.3 million). This is compared in the first two years with 500,000 in Victoria in seven years to the end of 1983 and 159,000 tests in South Australia in the first two years. On a per capita basis Tasmania is nearly as strong as New South Wales in enforcement. Comparable figures overseas for breath testing show that France with a population of 54 million carried out 335,000 tests in 18 months and Sweden with 8.3 million carried out over one million in 35 months.

In a comparison of New South Wales figures with those of all states, New South Wales showed a greater decrease in fatalities than did the other states, and although other states also experienced a

change in the number of fatalities the New South Wales drop was more marked.

#### Control of Intervening Variables:

Cashmore (1985) has analysed the extent to which random breath testing has reduced the road toll in New South Wales. She comments that although it seems highly likely that it had reduced accidents other factors such as the state of the economy, number of cars on the road and population growth are also likely to have played a part. Statistical modelling techniques have been used to disentangle the influence of economic factors mediated by the demand for travel on the number of fatalities. **Using multivariate modelling one study** concluded that about 42% of the reduction was due to random breath testing. The most conclusive evidence however was taken to be the reduced BAC levels in fatally injured drivers with illegal BACs.

#### Evaluation through Surveys:

Another method of evaluation is by testing people's knowledge of the law and changes in behaviour. Survey results have found in New South Wales that being exposed to random breath testing and knowing others who have been exposed raise the perceived risk of arrest and the likelihood of changing drinking and travel behaviour.

A substantial proportion of drinking drivers also reported changes in their behaviour with a reduction of social pressure to drink and drive and it was found there was little wearing off of the effects on behaviour (Cashmore, 1985).

Cashmore (1985) stated that the major objective of random breath testing was to discourage drivers from drinking and those who had been drinking from driving so the measure of success was the effect on the amount of drinking by people who are driving and the travel arrangements of those who have been drinking.

Surveys found three main ways people have changed drinking behaviour to avoid drink driving - drinking less when driving,

drinking low alcohol beverages and drinking more at home and places closer to home.

#### Evaluation of Cost:

Extensive media publicity was begun in New South Wales in December 1982 and between this time and 1985 the costs were totalled at \$2.7 million. One effect of the random breath testing was to change the liquor industry promotions to emphasise low alcohol beverages. In advertising it was found that a threat of arrest was most effective. The advertising was then reinforced by news coverage.

Alcohol sales in New South Wales and Tasmania which introduced random breath testing almost simultaneously showed the same comparative figures with no increase in alcohol sales in 1982/83 though the rest of Australia had an upward trend.

#### Evaluation of Police Operations:

One of the evaluations of RBT (Homel and Wilson, 1987) has suggested that RBT reduces the discretion of individual police officers with respect to time, place and mode of operation. It is an accident prevention strategy without the aim of maximising arrests and a specialised mode of enforcement as it focuses entirely on one offence.

Homel and Wilson (1987) cite information on police operations from the Traffic Authority of New South Wales and New South Wales Police Department (1986) and Staysafe reports. These show that accident statistics are used to identify areas where greatest impact can be achieved and that action plans in police districts are developed according to a well defined process of:

Identifying nature and extent of problem.

Determining where it occurs.

Deciding on potential impact of police presence.

Determining need for supportive publicity for Highway Patrol Response Group.

Initiating action.

Homel and Wilson (1987) suggest that the factor that makes RBT successful is the visible preventive patrols which deter motorists from repeating drink driving offences, i.e. once caught the motorist is reluctant to drink and drive again because of the visible presence of the police.

In other areas of road safety work Homel and Wilson (1987) find that policing is cost effective but not directed entirely at road safety. These authors cite investigations of police enforcement of traffic law in New South Wales (Parliament of New South Wales Joint Standing Committee on Road Safety 1985, 1986, Reports 4 and 5). Although selective enforcement is the goal, it is not concentrated on high risk places at high risk times. Enforcement of speed laws on very safe roads consumes a high proportion of police resources and there is pressure on individual officers to produce high numbers of bookings.

#### Evaluation of the Impact of Legislation:

The legislative changes in New South Wales in 1982 were an important part of the overall drive to reduce drink driving. There was a three tier system of penalties, an increase in penalties and compulsory blood testing for all drivers, motor cyclists and pedestrians aged 15 and over admitted to hospital following road accidents.

It has been suggested in the literature that strict laws against drink driving have a secondary educative effect and can act as instruments of social change (Cashmore, 1985). The function of the successful New South Wales legislation against drink driving was to provide the basis for a wide net to capture all potential drink driving offenders who had been involved in accidents and to give penalties which would be interpreted by the community as a serious attempt to stop drink driving.

#### Evaluation of Permanent Behaviour Changes:

Homel and Wilson (1987), citing research, have commented on the success of the RBT campaign in New South Wales in achieving a permanent deterrent effect as well as temporary successes.

## Case Examples - South Australia

The South Australian police force has decentralised its traffic police manpower personnel and resources.

The Task Force consists of motor cycle units, escorts for VIPs and traffic control for special functions, and Accident Investigation Units specially trained. The Speed Detection Division consists of Random Breath Test Units, Radar Crews, Courtesy Cars (mainly used in the vicinity of schools or special functions to educate the community and for traffic control of pedestrians, and Highway Patrols (Wilson, 1987).

The Police Traffic Intelligence Centre is unique in its operations and research basis in Australian Police Forces. The computer resources in Adelaide are directed to analysis of various fields in traffic law enforcement including the issue of Infringement Notices, the use of devices for detection such as Radar and the Breath Analysis Units. The purpose of the Centre is to effectively deploy resources in the traffic fields.

The use of computer facilities with trained staff has produced:

1. Use of radar at locations where speed was accident causing factor and not for revenue.
2. Processing of accident records with programming of locations in highway sections.
3. A weighting system is used so that accidents caused by speed such as roll-overs, leaving the highway, or crashing into trees or embankments have a higher weighting than rear end collisions.
4. Tables are produced covering the causes of accidents as against the type of accident.
5. Computer results support selective enforcement and the placement of radar units with associated publicity to make the road users aware that speed was a predominant factor causing accidents.

Wilson (1987) comments that the South Australian Traffic Management is motivated by reason of the fact that it has the computerised records, causes and locations, categorised into day and night accidents, the total of Infringement Notices and for what offences. These statistics are fed into the Register of Motor Vehicles Department of Transport for consideration in regard to the points/demerit system. A terminal is located in the Traffic Intelligence Centre connected with the main consoles in Headquarters and with the Road Safety Division of the Department of Transport for their information in terms of assessing traffic engineering implications that arise in regard to fatal accidents.

#### Evaluation through Changes in Fatality and Casualty Rates:

McLean et al. (1984) (cited in Homel and Wilson, 1987) have evaluated the South Australian program and found RBT avoidance action by motorists has led to a rise in late night casualty accidents on back roads. The major success in the South Australian program was that there was a marked decline in impaired driving subsequent to RBT among drivers previously charged and the decline was sustained.

#### Case Examples - Victoria

##### Evaluation through Changes in Casualties and Fatalities:

RBT was introduced in Victoria in July 1976 and the annual rate of enforcement has increased considerably since that time. Evaluation showed that the increased testing reduced night time serious casualty accidents by approximately 24% in areas directly affected by RBT and by almost 11% in nearby areas. The effects lasted for two weeks afterwards.

An RBT campaign conducted between October and December 1983 involved preliminary RBT stations operating for 1,213 hours during which time over 63,000 drivers were tested. The campaign was supported by paid publicity on radio and television and extensive news media reporting. The evaluation indicated that night time serious casualty accidents were 18% below the expected value.

Serious accidents on the nights when there was most alcohol involvement (Thursday, Friday, Saturday) fell by 23%. An estimate of the benefits of the road accident reductions from concentrated RBT in Melbourne has been between \$5,400 and \$21,200 per hour of operation. These benefits are attributed to the concentration of operations to a specific area at the rate of about 20 hours per 100 square kilometres per week (Federal Office of Road Safety, 1986b).

Evaluation of fatalities and use of refined series data (see first section of this chapter for descriptions of these methods):

Ross (1982) says that Victoria adopted random breath testing in 1976 and police used roadblocks to test drivers for drinking. In 1977 two periods of intensified enforcement occurred in Melbourne when patrol hours were quadrupled. In late 1978 roadblock patrol hours were increased to 100 per week and concentrated in four distinct sectors of the city to increase local impact and strengthen the possibility of evaluation.

To evaluate this criterion the variables used included accident fatalities, serious casualty accidents and blood alcohol concentrations among night time driver casualties.

The perceived risk of detection for drinking and driving was measured by survey. Criterion levels were compared with levels for the area with the same area for the prior year corrected for change.

The findings supported deterrence from the enforcement with significant decreases during the campaign in night time accidents, serious casualty accidents and driver casualties with illegal blood alcohol concentrations. The public's perception of the likelihood of apprehension for driving and drinking increased in the time (this was controlled against perception of apprehension for speeding).

Homel and Wilson (1987) have questioned the effectiveness of the Victorian blitz approach and have stated that in comparison the New South Wales RBT program has shown conclusive long-term results in reducing alcohol related road fatalities.



## Case Examples - Western Australia

### Evaluation through Changes in Casualties and Fatalities:

Western Australia has had a system of random stopping whereby police are empowered to set up roadblocks to check drivers and riders for current licences and their vehicles for roadworthiness. **If they** detect alcohol they then do a test (Federal Office of Road Safety, 1986).

An evaluation of roadblock blitzing for a Christmas/New Year campaign in 1979/80 compared accident data with the previous year for the same period. **The blitz and its associated publicity resulted in a significant reduction (28%) in night time casualty accidents in Perth and a significant reduction of 37% in the rest of the State. The net reductions were highest on Thursday, Friday and Saturday nights.** There were also substantial reductions in casualties admitted to hospitals (Federal Office of Road Safety, 1986b).

### Evaluation of Level of Enforcement:

In an early evaluation study in Western Australia the levels of enforcement in patrolling were examined in a study using an experimental and a control area. **Patrolling was trebled in the experimental area.** There was no publicity for the experiment. The project found that the increased level of enforcement did not have a significant effect on the number or severity of accidents reported. There was also no significant variation in the number of casualties. However there was a significant decrease in accidents in the experimental area in a three week period after the experiment ended. Several factors were identified in the explanation of why the reduction in accidents was not significant (Saunders, 1977):

Number of accidents was too small.

Random fluctuations.

Increased enforcement level did not reach a threshold level.

There was wrong emphasis on the type of offences or location.

More supervision was required to get good results from patrolmen.

### Evaluation of Young Drivers:

In 1982 Western Australian law introduced a BAC limit of 0.02 for P-plate drivers. An evaluation by Maisey in 1984 (cited in Homel and Wilson, 1987) found a net reduction of 17% in number of drivers under 18 who were involved in night time casualty accidents. The conclusions however were not statistically significant, probably because of the low numbers. Homel and Wilson say that in another study (Smith, 1986) it was stated that low BAC laws should be regarded as a promising measure that is not proven.

Homel and Wilson have argued that low BAC laws are discriminatory and that vigorous enforcement of 0.05 and 0.08 laws for everyone would achieve the same result. They recommend that the minimum drinking age be increased to 21 throughout Australia and combined with zero BAC laws for drivers from licence to age 20.

Homel and Wilson (1987) state that one of the dangers of enforcement practices aimed at high risk groups is for police to be accused of bias or abuse of discretionary powers. Citing Kirkham and Landauer, Homel and Wilson (1987) say that Western Australian statistics have shown an over-representation of young men apprehended by police.

### Case Examples - Queensland

The Queensland Police Department operates a sustained road safety campaign through the Traffic Branch. The operations of this Branch and the police perception of successful road safety operations are summarised below (Queensland Police Department, 1987).

#### Police Perception of Drink Driving and Road Safety:

The police perception of the dangers of drink driving is that when people drink they drive faster and this leads to accidents.

One strategy which is used to prevent accidents is to operate within a short distance of hotels. This is resisted by the public but

the police feel that it is important to stop drink drivers close to the hotels rather than waiting for accidents to happen on the way home.

#### Police Strategies to Detect Avoidance Behaviour:

It is considered that in general people obey the law and that the large RBT campaigns pick up a lot of generally law abiding citizens. The main target of policing should be the persistent drinking offender who is a threat to safety on the roads.

The Queensland experience with Reduced Impairment Driving (RID) was to find a lot of arrests at first but then these dropped off. People were observed driving in other streets to avoid detection. The police then set up in these areas. **Certain areas of the city** have been found to funnel traffic to the different suburbs and these key points are used as bases. **Police have to keep moving their RID** surveillance as people get to know their locations.

It has been found that, when effective, the RID campaigns have typically been finding a sober driver and drunk male occupant. The police use a long cone type torch to direct cars onto the side of the road and the drivers find it easy to follow the path of the torch to pull over and do not seem to mind being pulled over - the police test only if they think there is evidence of liquor, i.e. they do not waste the general public's time.

#### Visible versus Non-Visible Policing:

Visible policing is effective in controlling the law abiding citizen. It is not effective against persistent offenders such as persistent drink drivers.

Visible policing has some effect when used to generate publicity through the presence of a number of police targeting driving offences. It also is effective in country towns when a blitz on a town leads to the presence of numerous offenders at the court house. This demonstrates to the whole town the risk of drink driving and other offences.

Both visible and non-visible policing need constant publicity to be effective as a deterrent.

The use of CB radio by road users is a particular problem that will identify any visible policing.

Driving while disqualified can be discouraged by the driver seeing a police presence as he comes from the court to drive his vehicle home after being disqualified, i.e. it is important that if a driver is under suspension he knows that it takes effect immediately and the police will arrest him if he attempts to use his car.

#### Police Morale and Staff Management:

If areas are constantly overpoliced the public becomes apathetic and also the police become bored. One method of management is to allow the team to go anywhere in the area - the men tend to:

1. Pick the areas where they think they will find drink drivers.
2. Pick local areas well known to them which means they know the roads usually being used for avoidance of police detection.
3. Change their areas as they become bored with repetitive work.
4. Establish a group resourcefulness to encourage total involvement by officers in their task.

The overall principle is a flexible policing approach encouraging initiative and creating no set pattern of policing which can be learned by the chronic drink driver.

The principles of commanding traffic police are:

1. Flexibility.
2. Overall control of all activities through day sheets recording individual police work. This allows the commander to assess which police are most suited to which tasks in traffic.

3. Personal patrolling and work by the commander on occasions to boost morale and establish a principle of surveillance of people on duty.
4. Using people to volunteer for tasks that are not popular.
5. Allowing officers to decide on their own operational strategies.
6. Evaluation by visual displays in Headquarters of the success of police work in reducing deaths and serious accidents.
7. Encourage optimisation of manpower use by not wasting time on testing all public, only those who appear to be under influence of liquor. With speeding the police concentrate on those significantly above speed limit, i.e. police on radar do not waste manpower pulling up people who are just over the speed limit as this can allow high speed vehicles to get by unapprehended.

The most serious problem in traffic police work is motivating police and it is important that traffic police get results and recognition through publicity. Departmental approval is also needed to manage men in a flexible way.

#### Policing in Rural Areas:

Methods used for policing drink driving and other road offences in rural areas:

1. Use of police from a major city in the area rather than expecting local police to act. Local police may be reluctant to act in a hard way when they rely directly on the local population for co-operation in police work, i.e. there is a more personal relationship with the local community which is important to the police whereas police coming into the area from outside are not personally known.
2. Use of small groups of police travelling around the country region at random creates high uncertainty in the public's mind on where there will be a blitz with a high concentration of manpower to catch road offenders.
3. Country drivers have problems of fatigue, speed and alcohol. Other drivers who are dangerous on country roads are people who are not accustomed to handling unsealed roads. They overcorrect on shoulders, leading to head-on or run-off road accidents.

### Evaluation of Police Effectiveness:

In Brisbane the Fortitude Valley area was targeted by the traffic police in the 1970s and the following statistics applied -

TABLE 3:1

#### ROAD ACCIDENT DEATHS IN THE VALLEY 1974-1977

Year	Deaths
1974	44
1975	35 Start of traffic program
1976	23
1977	
4 months	2
5th month	Headlines on Police being axed 9 (reversion to 1974 rates)

It was found in this program that publicity gave an immediate reduction in deaths and when it became known that the policing effort had been pulled out the deterrent effect immediately was lost to the area.

A more recent effort in Brisbane has shown the following figures for the period 2.11.86 to 29.6.87:

TABLE 3:2

COMPARISON OF ROAD ACCIDENT DEATHS AND NUMBERS OF ACCIDENTS  
IN BRISBANE IN FIRST SIX MONTHS 1986 AND 1987

Year	Brisbane	Queensland
<u>Deaths</u>		
1986	40	252
1987	25	205
	-15	-47
<u>Accidents</u>		
1986	38	219
1987	23	176
	-15	-43

The numbers of arrests for drink driving increased by nearly 100% in these two years.