

Australia's second generational approach to roadside drug testing

A report from the National Drug Driving Working Group
October 2018



© Commonwealth of Australia 2018
ISBN 978-1-925701-86-9
November 2018 / INFRA3728

Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to below as the Commonwealth).

Disclaimer

The material contained in this publication is made available on the understanding that the Commonwealth is not providing professional advice, and that users exercise their own skill and care with respect to its use, and seek independent advice if necessary.

The Commonwealth makes no representations or warranties as to the contents or accuracy of the information contained in this publication. To the extent permitted by law, the Commonwealth disclaims liability to any person or organisation in respect of anything done, or omitted to be done, in reliance upon information contained in this publication.

Creative Commons licence

With the exception of (a) the Coat of Arms; (b) the Department of Infrastructure, Regional Development and Cities' photos and graphics; copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia Licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, communicate and adapt this publication provided that you attribute the work to the Commonwealth and abide by the other licence terms.

A summary of the licence terms is available from <http://creativecommons.org/licenses/by/3.0/au/deed.en>.

The full licence terms are available from <http://creativecommons.org/licenses/by/3.0/au/legalcode>.

This publication should be attributed in the following way: © Commonwealth of Australia 2018

Contact us

This publication is available in hard copy or PDF format. All other rights are reserved, including in relation to any Departmental logos or trade marks which may exist. For enquiries regarding the licence and any use of this publication, please contact:

Director - Publishing and Communications
Communications Branch
Department of Infrastructure, Regional Development and Cities
GPO Box 594
Canberra ACT 2601
Australia

Email: publishing@infrastructure.gov.au

Website: www.infrastructure.gov.au

Australia's second generational approach to roadside drug testing

A report from the National Drug Driving Working Group
October 2018

National Drug Driving Working Group member agencies

Co-Chair – Representative from the Department of Infrastructure, Regional Development and Cities

Co-Chair – Representative from the Australian and New Zealand Policing Advisory Agency Road Policing Network

AFP/Australian Capital Territory Police

Queensland Police

New South Wales Police

Northern Territory Police

South Australia Police

Tasmania Police

Victoria Police

Western Australia Police

Commonwealth Department of Health

Commonwealth Department of Infrastructure, Regional Development and Cities

Australian Capital Territory Justice and Community Safety Directorate

Transport Canberra and City Services

Transport for New South Wales

Northern Territory Department of Infrastructure, Planning and Logistics

Queensland Department of Transport and Main Roads

South Australia Department of Planning, Transport and Infrastructure

Transport for Victoria

VicRoads

Western Australia Department of Transport

Main Roads Western Australia

Austroroads

The National Transport Commission

The Working Group appreciates the particular assistance of Professor Jeremy Davey.

Contents

Executive summary	1
Recommendations	4
Introduction	5
The past	7
The basis for our current approach to roadside drug testing	7
An overview of deterrence theory and our success at RBT	7
Certainty of apprehension	8
Severity of sanctions	8
Swiftness of sanctions	8
Specific and general deterrence	9
Extending deterrence theory: Punishment avoidance	9
Extending deterrence theory: Non-legal sanctions	10
RBT as an example of targeting cultural change	10
The present	12
Oral fluid testing	12
Reinforcing the deterrence underpinnings	14
The future	16
A driving offence, not a drug offence	16
Medications	17
What drugs to test for?	18
Medical marijuana	18
A strategy for the future	20
Technology	20
The testing process	22
Roadside confirmation testing	22
South Australia: Reducing the number of steps in the process	23
Industry forum/meetings	24
Deterrence	25
Media and education programs	29
Summary	30
Appendix I	31
Appendix II	32
Appendix III	33
Reference list	34



Executive summary

The most defining element of Australia's overall approach to drug driving is deterrence. Over the past fifteen years, Australia has pioneered this model of deterrence via the development of the largest roadside drug screening and testing program in the world. Operationally, this strategy is built around a high-visibility and high-volume mass roadside-screening program. This approach is deliberately designed to create a roadside environment that is at odds with an individual's belief that they are unlikely to be apprehended. Unlike many other international jurisdictions, which are vastly different in context, a program of this size and nature can only be undertaken via oral fluid testing. The National Drug Driving Working Group (Working Group) found no convincing evidence that justifies a significant shift away from this current operational testing method.

There is no doubt that Australia's overall model of roadside drug testing has been effective and efficient. This model has been underpinned by a deterrence approach to drug driving and has facilitated the growth of the program to where it will soon reach over 500,000 roadside screens undertaken annually, across all jurisdictions. It is this depth of experience that has not only placed Australia at the international forefront of combating drug driving, it has also allowed for a mature and meaningful examination of how current strategies can inform future program development.

Significantly, the size and extent of Australia's deterrence-based roadside screening program has presented and raised unique issues of efficiency and strategy for future growth. As we now move into the end of our second decade of roadside drug testing, we are questioning as to what will guide our 'second generational' approach to reducing drug driving on Australian roads, and what does a best practice model for the future look like.

Australian jurisdictions have historically been passive consumers of internationally manufactured roadside testing products and equipment. These products are not necessarily specifically designed for a roadside testing market, least of all the unique needs of the Australian scenario. As testing numbers grow across the country, the appropriateness of current testing products and technology is increasingly found to be 'wanting' within the Australian context. It was identified by the Working Group that collectively, Australian jurisdictions should seek to develop more of a proactive role in dealing with manufacturers and product developers. This approach can be potentiated by developing both formally and informally, a collective and collaborative approach when dealing with manufacturers and distributors.

In terms of strategic needs, the Working Group identified two key "technology items" that would significantly impact and benefit the growth of the nation's roadside testing program. The first is a roadside screening test that could be undertaken in less than one-minute, and the second, is a roadside evidentiary testing device. Both these items would offer significant system-wide cost savings, and increase efficiency and effectiveness. As yet, neither of these two items of equipment are available. Industry consultations have shown that manufacturers have not historically seen a need for such products and have been slow to respond, and at times dismissive, to Australian jurisdictions' calls for better products. If Australia is to continue to efficiently and effectively grow roadside testing

numbers, then this situation must change. More coordinated, formalised and forceful discussions, and relationships with product developers and manufacturers needs to be established and maintained.

With reference to a national purchasing approach, the Working Group found that such a formal purchasing approach, whilst seemingly a good idea, has historically been difficult to achieve for operational policing items. The Working Group proposes that The Australian and New Zealand Policing Advisory Agency (ANZPAA) act as a formal 'clearing-house' as to information about pricing across jurisdictions and, for any contracts negotiated by jurisdictions, the agreed pricing should be made available for other jurisdictions to utilise.

The issue of medications and drug driving was examined by the Working Group. Overall the Working Group felt that current approaches and legislation are appropriate for the present. In the future, medications are an issue that may be addressed with regards to drug driving. There is current legislation within most jurisdictions that can manage driving under the influence of medications. This type of approach does not involve oral fluid sampling. A more efficient, technologically based process, appropriate within the Australian context, has still to be developed. Once appropriate technology becomes available, the most important issue in a future strategy in this domain is to first thoroughly publically and politically debate the topic. Whatever course of action jurisdictions choose to adopt in the future in this domain, one essential criteria is that any change does not negatively impact on existing strategies and operations in roadside oral fluid drug testing.

One of the present and near future issues that needs to be considered, is the introduction of medical marijuana, which may contain THC as the active component. The Working Group found the medical marijuana issue non-problematic in terms of current legislation. The Working Group agreed that driving with THC above the specified limit is an offence and should remain so. Subsequently, the Working Group recognised the need for education programs around medical marijuana use to include information about drug driving.

It was widely recognised that historical and recent roadside strategies relating to testing have focused mainly around a model that operated within a 'specific deterrence' approach to testing via specific targeting of roadside testing. This has yielded large numbers of drug drivers. This targeted strategy is understandable and is a logical approach given the resource intensive nature of roadside drug testing. For general deterrence to be successful overall, there is a need for emphasis to be given to the impact and of testing in regional Australia and requirements for trained personnel. However, it was also noted that jurisdictions recognise the limited nature of these operations and that potentially by focusing on the bulk of their resources within specific targets e.g. geographical areas, times of day or night, age groups, venues or activities, they were not necessarily addressing general deterrence within a broader population. Such a broader general deterrence approach would most definitely not yield the positive detection rates of those achieved via targeting. However, general deterrence is more focused on preventing the behaviour from initially occurring and/or reoccurring. The Working Group strongly supports continuing the growth in testing numbers and to focus this increase in testing within a general deterrence framework, whilst maintaining the current level of targeted testing.

In conclusion, there is a clear identified strategic path for roadside drug testing in Australia. As opposed to focusing on a single piece of technology, a testing device, numbers of tests, where and

when to test, who to test, what type of offences and punishments; the actual mechanisms, logistics, process, legislation and operations around roadside drug testing should be conceptualised, within the overarching theory and construct of deterrence. A deterrence approach gives sense, reason and purpose to what we do on the roadside.

Australia is already the world leader in drug driving enforcement and deterrence. Our 'first generational' response to drug driving was to establish and develop a roadside testing ability and ongoing capability. Australia has historically had a harmonised approach to drug driving enforcement and this was built on the notion of deterrence. As we move into developing our 'second generational' approach to drug driving it is important, at this juncture, to reaffirm and clearly articulate this theoretical and philosophical underpinning. It is this clearly defined and strategic deterrence approach which will underlie and guide jurisdictions individual future responses and maintain our international leadership in this area of reducing the impact of death and injury on our roads.

Recommendations

The following recommendations have been proposed by the Working Group for consideration by all Australian jurisdictions:

1. Continue to develop, educate and reinforce the importance of an overall drug driving program based on deterrence as our core and collective approach.
2. Continue to use oral fluid screening as the major roadside testing methodology and maintain the current approach based on presence.
3. Support current legislation and testing operations for THC and to keep a watching brief on legislative developments in this area and potential impact on drug driving and drug driving legislation.
4. The Australian and New Zealand Policing Advisory Agency (ANZPAA) act as a formal clearing house as to information about pricing across jurisdictions and, for any contracts negotiated by jurisdictions, the agreed pricing should be made available for other jurisdictions to utilise.
5. Work towards developing a roadside evidentiary confirmation analysis and subsequent charging procedure, similar to drink driving, where specific offenders (e.g. some first time offenders) can be charged and processed at the roadside.
6. Immediately and formally pursue product manufacturers and distributors to ensure appropriate product development and supply of a suitable roadside evidentiary testing device that meets Australia's needs.
7. Encourage and facilitate more Australian based research into understanding drug driving and delivering research that provides information which can lead to more efficient and effective implementation of deterrence based roadside testing.
8. Increase the number of drug driving roadside screens/tests, and continue to develop and pursue high-volume roadside drug testing, so as to create a roadside environment that makes it increasingly more difficult to avoid detection and to focus this increase in testing within a general deterrence framework, whilst maintaining the current level of targeted testing, noting the importance of ensuring the effectiveness of a general deterrence model in regional Australia where additional trained personnel will be required.
9. Support the development of an education program for courts, health workers, policy makers and other stakeholders, which details not just the offence but importantly, the program rationale including the central notion of deterrence theory and how it is incorporated into an overall approach to drug driving.
10. The National Drug Driving Working Group continue working towards a national best practice model of roadside drug testing and deterring the drug driver with the group meeting at a minimum every six months to update the group on operational and policy developments.
11. That Transport Ministers share the report with Attorney Generals, Police Ministers, and other relevant agencies and departments in their respective jurisdiction.

Introduction

The National Road Safety Strategy 2011–2020 represents the commitment of the Australian and state and territory governments to an agreed set of national goals, objectives and action priorities and is overseen by the Transport and Infrastructure Council.

The purpose of the National Drug Driving Working Group (Working Group), as detailed in its Terms of Reference (Appendix I), is to bring together the knowledge, experience and resources of governments and other parties to work towards a national best practice model of roadside drug testing as well as to provide advice to the Transport and Infrastructure Council on more efficient and cost effective options for roadside drug testing, through coordinating national research efforts and liaising with industry (2018).

Within the Terms of Reference of the Working Group, four key tasks are identified. These are:

- Key Task 1:** Establish a better understanding of modes of operation for deterrence from drug-impaired driving in Australian jurisdictions through research and trials, and work towards development of a best-practice deterrence model.
- Key Task 2:** Explore the scope to save on the cost of drug testing through national bulk purchasing and other arrangements.
- Key Task 3:** Liaise with industry and develop research proposals to encourage development of testing products that would reduce the time taken at the roadside to conduct tests.
- Key Task 4:** Liaise with industry and develop research proposals to encourage development of testing products that could in time be accepted as confirmatory (evidentiary) with no additional laboratory testing required for a conviction.

This report overviews the key issues discussed in the meetings and other relevant topics within the remit of both the specific and broader key tasks and Issues. Overlap between each of these directives is recognised. The report provides an analysis of the Working Group's significant key activities including associated discussions, findings, and recommendations. The Working Group held its initial meeting on 1 March 2018 and since, has met on two subsequent occasions on 11 May 2018 and 12 July 2018.

This report considers the future of drug testing within the historical context of past and present drug testing strategies, operations and programs. Firstly, the key historical foundations of roadside drug testing in Australian jurisdictions are dealt with, including the historical influence of our successful Random Breath Testing (RBT) approach to drink driving. This is used as the key reference point in the design and implementation of current roadside drug testing methodology. Most importantly, it outlines and describes the underlying theoretical philosophy of deterrence strategy, which underpins both our current Australian drink driving and drug driving approaches, and operations.

Next, is a continuation of the discussion of the notion of deterrence and how it is currently operationalised in Australia. It notes that Australia is an international leader in roadside drug testing and that no other international jurisdiction has a similar program in terms of its scope, impact, history

or experience. It reacts to those critics of the Australian drug driving enforcement model and responds to a number of criticisms of our current approach, and identifies the key strengths and characteristics of roadside drug testing within the unique Australian context.

The final section of the report proposes that deterrence remains the key strategic framework for future program development. It notes that the total number of roadside drug tests conducted across all jurisdictions will soon reach half a million tests per year. This growth is essential and is a key strength in our current strategy to reduce and prevent drug driving. Many of the future issues for roadside drug testing in Australia stem from the increasing numbers of tests and the resource allocation required to maintain and grow such a strategy. In response, a number of operational issues have been identified as strategic, if Australia is to remain at the international forefront of drug driving prevention.

The past

The basis for our current approach to roadside drug testing

Across all Australian jurisdictions, both historical and current legislation, and roadside testing operations for drug driving, have been developed on the back of a 30-year, highly successful and internationally recognised, history of Random Breath Testing (RBT). The cornerstone to the success of RBT was Australia's pioneering deterrence based-approach to enforcement and legislation around drink driving. While deterrence based initiatives form the theoretical underpinnings of many road safety initiatives around the world, it is Australia that internationally leads in operationalising this approach to drink driving, and more recently, drug driving.

Not only has the understanding and operationalisation of deterrence theory and associated approaches been the foundation of jurisdictions' current roadside drug testing programs, it is cornerstone to the development of future strategies, operations and legislation in this area. It is important that policy-makers and key-stakeholders have a strong understanding of this approach and how it has been developed and operationalised within the Australian context. One could propose that a current lack and depth of understanding of this deterrence approach by many critics of current roadside drug testing operations and key stakeholders in policy development, has led to some of the questioning of present operations and future directions.

Historically, the early stakeholders and original policy-makers in drug driving developed their knowledge by strategically drawing on the experience and historical initiatives of past drink driving interventions. Subsequently, these 'pioneers' fully understood the components of a successful deterrence strategy. Since the first introduction of roadside drug testing some fifteen years ago, this key understanding of deterrence has possibly been lost or diluted over time. A full understanding of deterrence theory and its approach within the Australia context of both drink and drug driving interventions, is essential, and forms the framework for our program development in the future.

An overview of deterrence theory and our success at RBT

Within Australia and internationally, deterrence theory underpins many road safety interventions and countermeasures. Deterrence theory has its foundation in and is central to criminal justice policy (Piquero et al., 2011). The basics of the model were developed in the 18th century by Italian criminologist, Beccaria, and in its simplest form, proposes that individuals are deterred from offending if they fear the consequences of the act and the offending behaviours are inversely related to the certainty, severity and swiftness of punishment (Homel, 1988; Von Hirsch et al., 1999; Freeman and Armstrong et al., 2015).

Scientific efforts to understand deterrence processes and impacts for road safety were most common and intense during the 1970s and 1980s. It was during this period of growth in theoretical understanding and roadside application that approaches to deterrence were expanded to include, not just the actual consequences, but also the perceived consequences. Homel (1988) at this

time, with particular reference to Australia's developing mass screening RBT programs, argued that the threat of legal sanctions was most effective when individuals perceived a high likelihood of apprehension when committing an illegal act, and believed that the impending punishment would be both severe and swift.

Certainty of apprehension

Within this approach, a number of researchers have asserted that the most powerful deterrent effects on offending behaviour are produced by the perceived threat of the certainty of apprehension. Certainty, in the present context of Australia's RBT programs, has been a key underpinning of a successful strategy to mass roadside testing (Harrison, et al., 2003; Henstridge, Homel & Mackay, 1997; Watson et al., 2005). The goal of the approach was to build a context where for 'fear of punishment' to be effective and have a positive effect on deterring possible offenders, individuals must believe the likelihood of apprehension to be relatively high (Davey and Freeman, 2010). Importantly, a high volume mass-screening roadside approach, deliberately set about to create a roadside environment which is at odds with historical beliefs that individuals were unlikely to be apprehended.

Severity of sanctions

The second aspect of classic deterrence theory is that of severity of sanctions. In this instance, the theory proposes that individuals will be reluctant to commit an offence if they consider that the penalty for such an offence is severe. Research into the impact on behaviour of perceived severity of legal sanctions has, at times, been conflicting. In explaining this variation in studies, Freeman and Armstrong et al. (2015) point out that this domain has not received the same level of attention in research as that of the construct of certainty. Interestingly, severity of punishment associated with a road safety offence is still a key consideration in policy makers and legislators' consideration as to what is appropriate and expected within society. Again, when examining the history of drink driving offences, all jurisdictions generally have a graded approach to offences, with more severe outcomes associated with offences of impairment, as to lesser offences of over-a-prescribed limit. Within the overall classic model of deterrence, Freeman and Armstrong et al. (2015) report that research has found that the impacts of sanctions are increased when the perceived likelihood of apprehension is high (Grasmick & Byrjak, 1980; Howe & Loftus, 1996). This again, within the drink driving context, underlines the importance of high volume roadside enforcement.

Swiftness of sanctions

The third characteristic of the classic deterrence approach refers to the deterrent effect associated with the swiftness of imposing the sanction, that being as close as possible to the time of the offending behaviour. It is proposed that the application of punishments for the offending behaviour will carry the most impact when administered soon after being apprehended for the offending behaviour (Davey and Freeman, 2010). This construct is associated with notions of learning and experimental psychology, for example conditioning, which demonstrates that the time between stimulus and response is vital in regards to learning new behaviours (Davey and Freeman, 2010; Nagin and

Pogarsky, 2001). This is particularly the case in the road safety arena where researchers such as Homel (1988) and McArthur and Kraus (1999) identify that the swiftness of impending penalties is an important aspect for achieving deterrence. This has particularly become the operational roadside situation for drink driving in Australian jurisdictions. Within most jurisdictions, large numbers of first offenders charged with drink driving over-a-prescribed-limit offences are processed immediately on the roadside or at the police station, and are generally ticketed through an infringement notice type approach. Importantly, this is essential in terms of deterrence, efficiency, resourcing and offence processing when dealing with tens-of-thousands of offenders apprehended. Interestingly, this is one area within the criminal justice system where penalties can be swiftly applied. Even for second-time and high-reading offenders, court proceedings (where required) are on-the-whole undertaken relatively expeditiously.

Specific and general deterrence

Within the general framework of deterrence, writers generally talk about 'specific' or 'general' deterrence. In the criminological literature, the most common reference is made to specific deterrence. In its simplest sense, specific deterrence can be understood as the process whereby an individual who has been apprehended and punished for a criminal act refrains from further offending behaviour for fear of incurring additional punishment (Davey and Freeman, 2010). This construct is focused on the offender and deterring them from reoffending. For example, within a road safety context, the application of legal sanctions for a drink driving offence has a number of purposes, including punishment and reform, through to loss of license, fining or incarceration. The primary goal of this sanctioning is to deter offenders from repeating the same or similar offence in the future. Consequently, important to the notion of specific deterrence, is that the resulting penalty should be perceived as certain, severe and swift.

In a similar yet broader approach to deterrence is the notion of general deterrence. Within this construct, deterrence is structured around those who are not currently offending and occurs when an individual refrains from engaging in an offending behaviour. This is generally achieved as a result of understanding or observing others being punished for the offending behaviour. Individual knowledge or understanding of potential apprehension and penalties can also be reinforced through media campaigns or community engagement (Davey and Freeman, 2010). It is this general deterrence approach which has historically been, and still is, the core of high visibility, high volume roadside RBT (Watson, 2007). Although the apprehension of drink driving offenders is important, it has been argued that the main purpose of RBT is to deter the general driving population from drink driving (Homel, 1988; Watson, 2007). It is the prevention of potential offenders from offending in the future that represents the biggest gain in road safety by preventing the behaviour from occurring in the first place.

Extending deterrence theory: Punishment avoidance

An extension of classic deterrence theory of particular relevance to road safety and which is a major influence on the operations of Australian RBT programs, has been Stafford & Warr's (1993) reconceptualised model of deterrence. This incorporates the notion of punishment avoidance

and takes into consideration the effect of avoiding punishment by being exposed to others avoiding punishment.

Stafford and Warr (1993) proposed that the impact of deterrence comes from the:

- (a) direct experience of punishment
- (b) direct experience of punishment avoidance
- (c) indirect, also known as, vicarious experience of punishment, and
- (d) indirect (vicarious) experience with punishment avoidance. These four factors can operate within both a general or specific deterrence framework.

Incorporated into this extended model is the notion that the effect of deterring offenders, or possible offenders, is dependent not only on an individual's actual personal experience of punishment, but also on their avoidance of apprehension (punishment). Integral to this model are both individuals' real experiences and the perceptions of the experiences by others, which significantly impacts both present and future behaviour. Again, this is an important construct within deterrence theory and is behind Australia's high visibility and mass screening RBT programs. Put simply, the more an individual perceives they can avoid detection, or that others are able to avoid detection, the more likely they are to drink and drive.

Extending deterrence theory: Non-legal sanctions

Deterrence theory has also been extended to include the effect that non-legal sanctions have on decisions to commit an offence. This has been particularly relevant to the road safety area, in terms of social disapproval (Davey and Freeman, 2010). Driving behavior and driving offending behavior does not occur within a social vacuum. Social pressure, cultural and social norms, stigma, peer and social sanctions may produce a stronger impact on a driver's offending behaviour(s) than traditional legal sanctions (Berger and Snortum, 1986; Freeman 2003; Homel, 1988).

RBT as an example of targeting cultural change

The influence of social and non-legal sanctions extends to and sits well, within the outcome of targeting cultural change. Overall, research has found that the implementation of deterrence-based approaches can create lasting behaviour, attitudinal and cultural change, in regards to high-risk driving behaviours (Davey and Freeman, 2010). This is evidenced by Australia's success in creating behaviour and cultural change even within established, entrenched and previously accepted cultural behaviours such as drink driving. Underpinned by deterrence theory, Australia's RBT strategy is credited as the primary reason why over the years Australia's reduction in alcohol-related crashes is the envy of many international jurisdictions (Davey, 2016; Harrison and Newnam et al., 2003; Freeman and Armstrong et al., 2013). Compared to 30 years ago, drink driving is no longer an acceptable behaviour and the historical saying of 'one more for the road' is absent in the modern day Australian lexicon. Drink driving is not tolerated by our Australian community, with ninety-seven percent of Australians in support of RBT enforcement by police.

Although the apprehension of drink driving offenders is important, it has been argued that the main purpose of RBT is to deter the general driving population from drink driving. RBT built around a deterrence framework has been the key strategy in influencing community perceptions of the social unacceptability of drink driving and increasing the perception of being caught. The program targeted and achieved change in not only the specific behaviour, but just as importantly, changed the cultural climate in which that behaviour sat and was supported.

It is reasonable to assume that a country's drink driving enforcement and legislation programs have, and will, influence the development of the nation's drug driving response. Compared to Australia's success in drink driving, countries such as the UK, the Netherlands, Canada and the US have had only limited success in reducing drink driving. This international comparison of drink driving is important as it helps to explain and identify the origins and history of the differing models of drug driving enforcement and legislation that have been developing overseas. Overseas jurisdictions are different to Australia, and consequently, our current drug driving legislation and enforcement programs have developed from a very different historical context.

A key to the success of Australian jurisdictions' RBT program has been the ability of the police to stop a driver anywhere or any time for the purposes of a random drug or alcohol test. No other requirement is needed to stop the vehicle and test the driver. For example, the police do not need to observe signs of impairment or inappropriate driving behavior. This random stopping legislation associated with roadside alcohol or drug testing does not exist (or isn't even fully understood) in many international jurisdictions. The lack of such legislation among overseas jurisdictions makes roadside alcohol and drug testing operationally very different to the Australian scenario and has substantially contributed to the success of Australian approaches.

As we shift into a period of further development of, and maturity in, roadside drug testing, it is essential to remember that our success in RBT has been operationally underpinned by creating and maintaining a strong deterrent effect where testing operations are high volume, highly visible, sustained and widespread.

Recommendation 1: Continue to develop, educate and reinforce the importance of an overall drug driving program based on deterrence as our core and collective approach.

The present

Oral fluid testing

The key screening and laboratory confirmation methodology for drug driving in Australia is oral fluid testing. This approach uses an oral fluid screening device to first screen the driver's oral fluid for the possible presence of one or more of the nominated substances. These may include THC, Methamphetamine, Ecstasy and from mid-2018, the addition of cocaine in NSW legislation. In general, with some slight variations in some jurisdictions, this process is again repeated on the roadside to confirm results; with the exception of South Australia which only uses one roadside screening test. If this second screening (in New South Wales it only requires the initial screening) indicates a likelihood of one or more of the nominated drugs present in the sample, then a sample of the driver's oral fluid is sent to the laboratory for confirmation. If the laboratory confirms the presence of the drug, then the charging process commences.

Some of the key issues as to why oral fluid screening was adopted by Australian jurisdictions include, but are not limited to: that the technology could be easily deployed on the roadside; it was a similar process to roadside breath testing; mass screening could be undertaken without overly complex training of the operator; it was reflective of a roadside process (RBT) that the community were experienced with; it was able to indicate the presence of THC (the active component in cannabis); it was able to identify the most common illicit drugs that are used in the community; it was not sensitive to many of the medications currently in use by the Australian population; and, it was reflective of very recent use and final confirmation analysis could be undertaken in a laboratory.

Prior to the introduction of oral fluid testing into Australian jurisdictions, the most common method used internationally was the use of roadside sobriety/impairment testing. This approach is now less frequently used in Australia, however internationally, is still more often used to detect drug driving. In these tests, an expert (e.g. specially trained officer or medical officer) observes, records and synthesises a range of behaviours and abilities of suspected drivers who undertake set tasks that they are required to perform. This may involve examining speed of reaction, physical appearance, unusual physical signs (e.g. shaking, vomiting, sweating), orientation, speech, mood, behaviour, mode of walking, smell of alcohol, appearance of eyes and pupils, and so on (Walsh et al., 2008). This evidence is often presented in court for the purposes of prosecution. The process is extremely time consuming and requires intensive training of personnel. More importantly, within the Australian context (for both drink and drug driving), it does not facilitate mass roadside screening as an officer (medical or police) can only process a few drivers every hour. Interestingly, many international jurisdictions that operate via a physical impairment assessment protocol for drug driving, are also still operating such a protocol as part of their drink driving prosecutions.

Another approach to roadside testing that is operating within international jurisdictions is that of blood testing. Again, it is worth noting that many international jurisdictions implementing drug driving legislation are still based on blood sample analysis and also operate their drink driving charges,

based in the most part, on blood sample analysis. While blood sampling is still an option within jurisdictional frameworks for drink driving prosecutions, the number of drivers prosecuted based on blood sampling, when compared to breath testing, is minor. There are obvious logistical and time considerations that limit the number of blood tests that can be undertaken.

Furthermore, when critics of the Australian drug driving model refer to the UK and Netherland's blood testing approach to drug driving as being a desirable model for Australia to adopt, they fail to recognise that Australia's current approach is based on mass screening. Such screening of hundreds of thousands of drivers cannot be achieved through a blood sample analysis approach. Blood sample collecting is time consuming and highly inefficient in terms of policing hours and numbers of drivers able to be tested on the roadside. Oral fluid is less invasive and easier to undertake for both the testing officer and the driver. Furthermore, blood sampling is highly problematic to access in a timely manner in many regional and rural areas of Australia. In fact, high volume and highly visible screening has been the cornerstone of Australia's success in reducing drink driving in the population. The rationale for such an approach is the focus on deterring potential future offenders. The same mass screening approach and rationale underpins the Australian model for drug driving.

Critics of the Australian jurisdictions' current approaches have recently proposed the UK and Netherland's models of 'threshold limits for impairment' as being more appropriate for Australia's intervention into roadside drug testing (Vic Law Reform Committee, 2018; Quilter and McNamara, 2017). These models use blood testing threshold levels (for nominated drugs) to specific legislated identified amounts within the sample, and this legislation, in effect deems that a reading above a specified level would be indicative of impairment and a certain crash risk (Wolff, 2013:37). However in the scientific, social and political reality, the final decisions about actual cut off levels in legislation, are somewhat arbitrary and a compromise. What many fail to realise is that there 'is no technology currently available which can accurately detect the level of impairment caused by drug-taking' (NTC 2018:9). Furthermore, as the UK's Report from the Expert Panel on Drug Driving (Wolff et al., 2013:37) wrote that even though 'risk thresholds' have been determined in the scientific literature, it is noted that they remain approximations. For instance, having a drug concentration in the blood over a set risk threshold, does not automatically mean that the drug can be the explanation for the impaired driving behaviour. It is also important to note that as discussed, Australia does not use blood tests as part of its mass screening approach to drug driving enforcement. In fact, Wolff et al., 2013, and later Johnstone, Wolff and Agombar et al., 2017, identify that oral fluid screening is highly appropriate for particular types of legislation such as that operating within Australian jurisdictions.

Within this context of international comparison, it is important to note that it is scientifically inaccurate, and inappropriate to make strict comparisons between levels of drug concentration in oral fluid drug analysis, such as used in Australia, and level of drug concentration in blood based samples, such as in the UK or the Netherlands model (a point that Wolff et al., identify in their own UK report). Furthermore the notion of threshold is not only complicated by individual differences but further by poly drug use and use of drugs in combination with alcohol, both of which are a regular occurrence.

Jurisdictions will look for a roadside process that best supports legislated enforcement models, detection of the most prevalent substances, historical, cultural and operational needs, and context.

While research on the link between levels of substance in the driver's system and crash risk is growing (Crompton, 2018), there is still very little as compared to the knowledge of crash risk and alcohol consumption. This dearth of research was present when Australia's first jurisdictions established their oral fluid testing legislation and relatively little has significantly changed in knowledge over time. In consideration of this relatively short and limited research history, Australian lawmakers' response to drug driving and roadside testing has been a deterrence based approach and methodology using oral fluid. This approach involving a mass screening strategy is not only aimed at catching offenders, but more importantly, is undertaken to deter people from taking up (general deterrence) or continuing to undertake the inappropriate behaviour (specific deterrence), and to decrease the opportunity to go undetected (punishment avoidance) and increase social compliance.

Reinforcing the deterrence underpinnings

Australia chose oral fluid testing as it, among other factors, facilitated such a mass testing approach. No other method is currently suitable within our Australian context to achieve this deterrent goal. Additionally, Australian jurisdictions chose the current 'any detectable' levels as the cut offs as there was at the time, and still is, very little evidence as to what are appropriate cut offs. There is also a lack of evidence from international jurisdictions to provide a strong empirical base to change levels within the Australian context as it is very different, historically and contextually, to many overseas jurisdictions. Following a review of international literature and practice in overseas jurisdictions, a recent NTC report concluded that, 'There is no evidence available which we believe justifies a shift away from the current 'presence based' position currently adopted by all states and territories' (NTC, 2018:9).

It is important to be cognisant that when considering appropriate cut off levels for many psychoactive drugs, these drugs can exert pharmacological effects at very low concentrations, typically in the order of nano grams. Drug driving limits will reflect this, and are many orders of magnitude lower than those for drink driving (Wolff et al., 2013). Deciding between any cut off level, is a difficult and somewhat arbitrary decision and cannot necessarily be applied to all drivers, with equal meaning, at all times, and across all circumstances. Additionally, in most cases, the current substances addressed in Australia's roadside screening are illicit and a user cannot accurately be assured, down to the nano gram, the purity of the drug or the unique metabolism of the drug at any specific time. Therefore, there is enormous room for error if a driver is attempting to assess the level of a substance in their oral fluid. Policy makers and key stakeholders were historically, and are still, aware of this, so sensibly current legislation was developed around the detection limits of the laboratory's lowest limit of detection. This also strongly aligns with Australia's deterrence approach. The goal of this approach is to have drivers separate drug use and driving. It is a potentially high-risk situation to try and calculate one's oral fluid drug level if one has recently used one of the legislated substances. This is not a specific approach that offers an overall benefit to road safety; in fact, it is the opposite.

Interestingly, some critics (e.g. Quilter and McNamara, 2017) of Australian jurisdictions' legislation, while recognising similarities between drink driving and drug driving, argue that the current 'presence type' offence for drug driving is not reflective of Australia's successful drink driving approach, which has differing threshold levels for Blood Alcohol Concentration (BAC) type offences, based on a

correlation to impairment. In fact what some commentators fail to recognise is that 'presence based' drink driving legislation is included in current Australian jurisdictional approaches. It is an offence for many Australian drivers to operate a motor vehicle above a BAC of 0.00 (i.e. 'P' plate drivers and professional drivers). It is also interesting to note that the legislative limits for drink driving have decreased over time. For example, the historical shift from 0.08 BAC limit to 0.05 BAC limit, and then the introduction of 0.00 BAC limits for specific types of drivers. This recognises that alcohol like many other drugs will have an impairing effect on many drivers at extremely low levels and that in the social and political reality, the final decision about actual cut off levels in legislation are somewhat arbitrary and a compromise.

Given the current state of knowledge and within the Australian context, the present policy approach to drug driving enforcement is highly suitable, common sense and appropriate. Within this background, jurisdictions across Australia have been cautious not to base their legislation on prescribed levels associated with impairment, as this could be said to be still a somewhat inaccurate and ever-changing science with so much personal variation to render any level useless. Much is still unknown about the impacts of drug use on driving so Australian jurisdictions have focused on separating the behaviours of drug use and driving. There is a clear message that if a person consumes any of the 'identified legislated' drugs then they cannot drive. This is the safest position. In a similar finding to the NTC (NTC, 2018:9), the Working Group cannot identify a compelling reason to shift from current jurisdictional approaches.

Recommendation 2: Continue to use oral fluid screening as the major roadside testing methodology and to maintain the current approach based on presence.

The future

As Davey and Armstrong et al. (2017:41) commented in their 2017 Roadside Scoping Study report that the past 15 years has been a period of legislation and policy development related to drug driving, and the subsequent development and implementation of significant roadside testing programs. This period was originally marked by a 'follow the leader' (i.e. Victorian) approach by the various jurisdictions. Testing programs are now well established and widely supported by police and the community. However, it could be said, to use the words of one senior police officer, 'There is no nationally cohesive model to document the way to the future for the next five or ten years...where are we collectively going?' The report also recognised that while there are individual differences between jurisdictions, overall, there is a relatively consistent approach to drug driving legislation and enforcement across the country.

One outcome from this research is that there needs to be a better overall understanding of deterrence theory among those who develop policy and operations. The recent work undertaken by the Working Group supports this, and has recognised that all jurisdictions have basically the same intent within their drug driving legislation and roadside operations. This intent is built on the framework of a deterrence approach to drug driving which has been a historical strength. Australian jurisdictions are increasingly aware that collectively, Australia is leading the world in drug driving legislation and enforcement. Australia has had over 15 years of experience, whereas the key European jurisdictions have only introduced roadside testing programs in the last few years. Whilst being aware of developing international approaches and research is essential, the Working Group understands that this underlying historical jurisdictional collaborative intent, built around deterrence, has not only been the historical strength to its international leadership in this field, it is now more importantly the platform to build Australia's next generational response to drug driving.

A driving offence, not a drug offence

The Working Group has identified a number of issues that can inform and reinforce future responses in drug driving. One of the key foundations taken into consideration when drug driving legislation was first adopted was that the legislation was to be focused on a traffic or driving offence and not associated with a drug offence of possession or use (for example within a 'Drugs Misuse Act' type legislation). This was at the time and still is currently, in line with and supportive of, Australia's national approach of harm minimisation in regards to drug related policy. Those present at the time of early jurisdictional discussions with relevant Ministers, will recall that this was an important policy approach to gain support for roadside drug testing within governments and the community. Investigations as part of this research, and Davey and Armstrong's (2017) earlier work, show that this is rightly still the underlying case and belief.

Some critics comment that the current legislative and operational approach criminalises the drug driver. In fact, this is not the case. Importantly, the historical development of roadside testing in Australia has deliberately avoided doing so within both the actual legislation and the auspicing of

the legislation. Drug driving legislation centres around the operation of a motor vehicle and not the possession or use of a drug. It is focused on the harms associated with drug use and deals with the offender in terms of a traffic offence. This is also in line with a harm minimisation approach.

In general, present legislation across jurisdictions deals with a drug driver under two separate charges. The first and more common charge is an offence of detecting the drug in the driver's oral fluid. This offence is the less serious of the two, and in most jurisdictions is equivalent to a lower-level drink driving charge, or similar charge of driving a motor vehicle over-a-prescribed limit. The second type of offence is more serious and is based around the general notion of driving whilst impaired, and is similar to the higher order and more serious drink driving offences.

Medications

A question often raised with regard to Australia's current and future drug driving strategy, is what to do with prescription and over-the-counter medications, and roadside drug testing. This is a complex social, medical and political debate, which has yet to fully occur within the Australian context. Such an extensive debate is appropriate, if future legislation is to go down this path at a more rapid tempo. However, the characteristics unique to this topic should not be used as a critique of current roadside practices and legislation.

It could be regarded that historically the ability of stakeholders and legislators to have this 'medication debate' separate from current roadside operations could be considered a strength of the Australian operations. One of the reasons why many international jurisdictions have been slow to develop, or still have not developed roadside testing programs, is that they included medications in their initial iterations of proposed legislation. Consequently, decisions about what medications should and could be tested for, and what the appropriate levels are, is complicated and has stalled decision-making in many international jurisdictions.

It could also be argued that it has led international jurisdictions such as the UK, to have developed a very different roadside approach to that of Australia. Those stakeholders involved in Australian jurisdictions' original and ongoing historical deliberations around roadside testing would remember that 'medications' were discussed and recognised as an issue for road safety. However, at the same time it was recognised that such is the complexity of this issue with regards to technical, social, political and legislative surrounds, that it would complicate, and delay actions and roadside interventions that could easily and strategically be implemented. While not dismissing the medication issue, it could be said that Australian jurisdictions' historical and current approach to medications has proved overall, highly successful for implementation and ongoing development of current roadside operations.

Medications remain an issue to be addressed with regards to drug driving. There is current legislation within most jurisdictions, that drug driving associated with medications can be managed by the existing 'driving while impaired' type legislation. This type of offence for medications does not involve oral fluid sampling. Within this scenario, blood tests are used along with medical evidence regarding the levels and types of medications found in the blood; and, the appropriateness of these types and levels of medication with regard to the unique characteristics of the driver and situation. This is often supplemented by observational evidence from an authorised medical officer or arresting officer. This

is obviously a time consuming and resource expensive process, and yet is similar to many other international jurisdictions' approach to drug driving for both licit and illicit drugs. A more efficient process within the Australian context has still to be technologically developed. Once the appropriate technology does become available, it is essential that it is firstly thoroughly debated publically and politically. Whatever course of action jurisdictions chose to adopt in the future, one essential criteria is that this change does not negatively impact on existing strategies and operations in roadside oral fluid drug testing.

What drugs to test for?

Oral fluids are not necessarily a good medium to test for medications, particularly benzodiazepines which are the most common medication found to be associated with road crash. However, oral fluids are a good medium to test for recent substance use, such as those that have historically been targeted by Australian jurisdictional roadside testing programs including THC, methamphetamine, ecstasy and from 2018, cocaine in New South Wales. While some commentators remark that current roadside screening programs only target a limited range of drugs, these comments do not necessarily recognise the context and operational reality of the current roadside situation. THC, methamphetamines and ecstasy represent the three most commonly used illicit drugs in our community and cocaine use is increasingly becoming more popular within some specific populations. Logically, these drugs would represent a significant potential threat to road safety. Oral fluid screening allows for these drugs to be relatively quickly screened roadside, within a high-volume mass approach.

Roadside oral fluid screening is not an appropriate technology for all types of drugs. Nor is it appropriate to test for all types of drug on the roadside, simply because they may not be able to be detected. Increasing the number of drugs screened for on the roadside and eventually confirmed in laboratory analysis, is an expensive process, especially when one considers that Australia is fast approaching 500,000 roadside screens per year. What type of drugs to be screened for on the roadside is a policy decision based on technology, cost, appropriateness and need.

The types of drugs screened for on Australian roadsides has changed over time, such as the inclusion of ecstasy; and more recently, for unique jurisdiction needs, such as the inclusion of cocaine in New South Wales. Importantly, the future inclusion of additional drugs into the screening profile, should always be considered within the context of not having a negative impact on the current roadside approach. As opposed to alcohol, contemporary drug use, and consequently drug driving, is characterised by change. This change may be in the types of drug used, new drugs coming into the market, and types of drugs used within different geographical, cultural and age groups. At this point in time, future-wise, it is important to not necessarily identify new drugs to be included into the screening process, but to ensure each jurisdictions' legislation is responsive to meeting these needs, within an appropriate time-frame.

Medical marijuana

One of the present and near future issues that needs to be appropriately managed, is the advent of medical marijuana that may contain THC as the active component in the cannabis and is included

in Australian roadside testing. As discussed earlier in this text, drug driving legislation is focused on driving, and not the illegal or legal nature of drugs. For some there is an inference that once the usage of the drug is legal, it is no longer appropriate to deal with the drug within the current drug driving roadside screening process.

The Working Group found medical marijuana non-problematic in terms of current legislation. Within some sectors of the community there appears to be confusion and a lack of understanding between the legal availability of a substance and the ability to legally operate a motor vehicle with THC in one's system. The Working Group agreed that driving with THC in one's system is still an offence and could potentially place road users at risk. It should be noted that alcohol is a legally available drug and it is an offence for many drivers to operate a motor vehicle with any amount of alcohol in their system. Furthermore, one cannot be sure of the effect of any doses of medical marijuana on an individual, as there is a significant number of variables to take into consideration at any specific time.

Subsequently, the Working Group would recommend to keep a watching brief on legislative developments and medicinal marijuana's potential impact on drug driving and drug driving legislation. Additionally it is also recognised that there is a need for education programs around medical marijuana use to include information about drug driving.

Recommendation 3: Support current legislation and testing operations for THC and to keep a watching brief on legislative developments in this area and potential impact on drug driving and drug driving legislation.

A strategy for the future

There is no doubt that Australia's overall model of roadside drug testing has to-date been an effective and efficient base to build upon. This model has been underpinned by a deterrence approach to drug driving and has facilitated the growth of the program to where soon, there will be over 500,000 roadside drug screens undertaken annually, across all jurisdictions. It is this depth of experience that has not only placed Australia at the international forefront of combating drug driving, it has also allowed for a mature and meaningful examination of how current strategies can inform future program development. Significantly the size and extent of Australia's deterrence based roadside screening program has presented and raised unique issues of efficiency and strategy for future growth in roadside testing capacity and approaches.

Technology

When roadside oral fluid drug testing was first introduced into Australia, stakeholders' concerns were primarily focused on the ability of the technology to detect specific drugs, confidently and accurately. As testing programs increase over time and in use, the specificity and accuracy of testing will always be of concern. However, because of the large numbers of screening tests now being undertaken, issues associated with unit cost of testing kits and equipment, and time taken for roadside testing kits to run their analysis (i.e. how long a test takes) have become more pressing.

Specific to this issue, the Working Group was tasked within its Terms of Reference, to investigate *if roadside drug testing could be made more efficient and effective if the time taken for roadside tests could be reduced to within one minute. The working group will liaise with industry and develop research proposals as required to pursue this aim* (Terms of reference: Key task 3).

Depending on what 'brand' of test is being used, and how the individual jurisdiction is undertaking the screening/analysis, testing time is generally between three to eight minutes. While the length of time required to undertake a roadside screen has reduced since testing was first introduced, the total number of policing hours involved in undertaking half a million tests a year, is enormous. Consequently, a reduction in the time it takes to undertake a test can result in a massive overall reduction in resources associated with policing hours, over the year. There is also a public benefit in reducing the length of time drivers are held up on the roadside.

As noted in the 2017 Roadside Drug Testing Scoping Study report (Davey and Armstrong et al., 2017), police are operating with equipment that was originally developed to meet other needs, such as drug testing on worksites or in custodial environments. This does not necessarily suit Australian jurisdictional requirements for efficient roadside testing. Subsequently, the Working Group undertook consultation with suppliers of roadside drug testing equipment (this is further reported later in this document) with one of its goals being to identify and pursue the ability of future kits reducing the testing time to within one-minute (Terms of reference: Key task 3). At first, current suppliers were not necessarily confident or supportive of the idea, or of the technical ability of their product in the near future of being able to reach this one-minute testing time mark. However, as the conversation

developed between the jurisdictions and present suppliers, the suppliers became aware of the need and potential commitment, for such a product. Increased awareness concerning jurisdictions' ability to search the market place more widely for a suitable product, was also recognised. Whilst it could be said that current jurisdiction suppliers were not able to provide a 'one-minute' test in the near future, by the end of the meeting, they were more willing to consider the notion. There was also particular interest in a 'sweat analysis' type product presented by a manufacturer who is not currently supplying the Australian market. This product could warrant further investigation, due to the screening time being under one minute.

While no 'one-minute' type oral fluid product was successfully identified in the industry consultation, it is important to consider that the jurisdictional collective should continue to vigorously pursue the development of a 'one-minute' product. As noted in the 2017 Roadside Drug Testing Scoping Study report (Davey and Armstrong et al., 2017), it is again suggested that Australian jurisdictional representatives contact international head offices of device manufacturers to more formally advise these companies of Australia's need for a specific type-product within a potential market of 500,000 testing units per year. This proposal to directly contact head offices is an attempt to deal directly with key decision-makers within the manufacturers' organisation and not necessarily Australian based staff or agents, who may not necessarily fully communicate Australia's determination in requiring such a product.

The goal of this interaction with manufacturers is for jurisdictions to drive what types of products are available in the market place, as opposed to being a passive consumer. Continuing work is required with appropriate suppliers and manufacturers to provide the technical solutions required for the Australian context. It is not guaranteed that the existing suppliers will have or can deliver, suitable alternatives in the future. It may be the case that technologists in alternate fields need to be engaged to adapt existing or alternative technologies, for roadside use in the future. Such is the case with the development of a roadside evidentiary testing device.

There appears to be scope for some or all states and territories to save on the cost of roadside drug testing kits by arranging national bulk purchasing with the assistance of the Commonwealth (Terms of reference: Key task 2).

Purchasing and the price of testing equipment remains a significant tangible cost and a barrier to further program expansion. The Working Group undertook an investigation in the prices paid by each jurisdiction for testing equipment. In order to keep confidentiality of each jurisdiction's purchasing agreement, only the price differential between jurisdictions is reported below. The investigation found that there was up to a 45% difference between the highest and lowest cost paid for the same testing device between different jurisdictions. In order to get maximum purchasing power for the same product, it was proposed that the Working Group investigate the possibility of national bulk purchasing, with the assistance of the Commonwealth (Terms of reference: Key task 2).

National purchasing for policing items used by individual jurisdictions, whilst seemingly a good idea, has historically been difficult to operationalise and achieve. While not dismissing the proposal as a worthy goal to actively pursue, the Working Group at this point-of-time proposed an alternative approach of more formally sharing information on pricing and product supply between jurisdictions.

This would allow each jurisdiction to operate independently within their unique set of needs and requirements, whilst at the same time, being more informed as to the collective national picture of pricing and product ability. It is suggested that the formal confidentiality agreements associated with purchasing be examined and modified if necessary, to allow sharing pricing and product information between jurisdictions. As one member of the group said, "Currently the suppliers are just playing one jurisdiction off against the other, with all jurisdictions being kept in the dark and only the supplier having all the information...it is all stacked against the jurisdictions in favour of the suppliers...it's all the wrong way".

It has been identified that the Australian and New Zealand Policing Advisory Agency (ANZPAA) within its structure facilitates the Collaborative Procurement Network. This group's current focus of collaborative procurement work is the Ammunition Program and Electronic Control Devices (Tasers). The secretariat of this group has advised that they will be able to include drug driver equipment and resources into the work of the network in the future.

Recommendation 4: The Australian and New Zealand Policing Advisory Agency (ANZPAA) act as a formal clearing house as to information about pricing across jurisdictions and, for any contracts negotiated by jurisdictions, the agreed pricing should be made available for other jurisdictions to utilise.

The testing process

The enforcement of drug-impaired driving could be much more effective if there was a roadside test that could be accepted as confirmatory (evidentiary), so that no additional laboratory testing is required for a conviction. The Working Group will liaise with industry and develop research proposals as required to pursue this longer-term aim (Terms of reference: Key task 4).

Roadside confirmation testing

As identified in 2017, the Roadside Drug Testing Scoping Study report (Davey and Armstrong, 2017) recognised there were perceived significant benefits in the development and introduction of a roadside device, capable of undertaking a court evidentiary analysis of a driver's oral fluid sample. It was proposed that it be used in conjunction with the current screening devices, and not as a replacement. This process would be similar to present roadside operations for drink driving where a driver is first screened by a 'hand held' device and then, if positive, is subsequently formally tested on a 'breathalyzer' from which the reading may result in a charge being laid against the driver. This process, if applied to drug driving, would yield considerable savings in-terms-of significant 'back-end costs' associated with laboratory analysis, sample collection, transfer and storage of samples, offender and charge management, and potential court appearance savings. In short, such a device would offer significant system-wide savings. Similar devices are used in other fields such as the military, fire investigations, and gas and toxin investigations. However, these devices currently appear not to be suitable for roadside oral fluid analysis.

In the original discussions of the Working Group, it was felt that this technology may be still somewhat distant in the future. However, due to the significant impact of such a device, and subsequent discussions with stakeholders, industry, potential providers and experts in the field, the Working Group considered that this goal is achievable in the near future and should be more formally pursued by the appropriate authorities. Interestingly, there has been no notable historical or international call or requirement for such a device. Again, this can be explained via Australia's pioneering leadership role in roadside testing, as no other country undertakes anywhere near the number of roadside tests compared to Australia. Consequently, there has not been a significant international requirement for such a device, and furthermore, now that Australia is approaching the half-million roadside drug screening mark, it is increasingly appropriate for such a device to be developed for, and operationalised within, an Australian context.

Recommendation 5: Work towards developing a roadside evidentiary confirmation analysis and subsequent charging procedure, similar to drink driving, where specific offenders (e.g. some first time offenders) can be charged and processed at the roadside.

South Australia: Reducing the number of steps in the process

In a recent change to roadside operations this year, South Australia has moved towards a single, roadside-screening test, prior to a sample being sent to the laboratory for confirmation. This is in comparison to all other jurisdictions undertaking two roadside screening tests, before proceeding to the next step of laboratory confirmation analysis.

This is perhaps the most significant change in the logistics of roadside testing operations since the original program introduction in Victoria, some 15 years ago. The rationale for deleting one of the roadside screening tests is primarily based on the following four key points.

- The equipment for the second-stage test used in South Australia was no longer commercially available.
- Expected increase in laboratory confirmed positives. The two-stage screening process in South Australia was allowing true 'positive' drivers, who had returned a negative result at the second screening, to return to the road and drive. Under a single-stage screening, with a sample collection for the laboratory, all these drivers will potentially be identified.
- Cost Saving. The equipment used at the second-stage in South Australia was expensive, both the instrument and consumables, and achieved no evidentiary value as the sample would still be analysed by a laboratory.
- Enforcement action is reliant on laboratory results. Other than receiving a direction not to drive for up to 24 hours, no enforcement action is taken against a driver for a drug driving offence until the laboratory result has been obtained.

To date, South Australia is the only jurisdiction that has acted to reduce the number of steps within the process. However, other jurisdictions are very closely watching the process and its outcomes.

The current, two-stage screening process was established by Victoria when it introduced the legislation in 2004, and has been essentially copied by all other jurisdictions. Two of the key reasons for the original introduction of this two-stage process were (a) that oral fluid roadside screening technology was a relatively new technology and had never been used before in Australia, and (b) key stakeholders were extremely cautious of obtaining false positive roadside readings which could very easily undermine public confidence and support for this new initiative.

Over the past 15 years the technology has improved and undergone extensive field operations and public exposure. The key concerns of early stakeholders about screening devices' capability and validity, may not be as critical or relevant at this current time. It may be appropriate for jurisdictions at this current stage of nationwide program implementation, to examine the present and future necessity for a two-stage roadside screening process. A one-stage roadside screening process may represent an opportunity for a relatively quick return in product savings and operational efficiency.

Industry forum/meetings

In conjunction with NSW Police, the Working Group undertook an industry forum in Sydney on 19 March 2018. This forum involved six manufacturers/distributors of roadside drug testing devices, demonstrating their products and presenting to a forum of multi-jurisdictional representatives and agencies. The industry representatives included those suppliers who are currently providing testing equipment to jurisdictions and other potential providers (i.e. Dräger, Securetec, Henley Health, Intelligent Fingerprinting, Alco-Drugalyzer).

It was noted amongst jurisdictional representatives that this was the first time jurisdictions as a collective group had met with suppliers. During the forum, it could be said that suppliers were put-on-notice by the group, as jurisdictions felt that the current selling practices of distributors were inequitable among jurisdictions and consideration was being given to a national purchasing approach. Suppliers were also advised by the collective jurisdictional group that the present products within the market were not satisfactory for future and increasing testing numbers and needs, in the Australian context.

As discussion continued during the day, it became evident that Australian jurisdictions collectively represent a major share of current providers' worldwide market sales. Also, through the day it was identified that while there had been an incremental advance in product technology and performance, there had been no major operational change or strategically significant advancement in product over the last decade. Additionally, some jurisdictional stakeholders commented there was relatively little evidence of the jurisdictions driving product development, as opposed to being passive consumers. One exception was noted, and this has been the inclusion of cocaine in the NSW screening portfolio. Although it should be pointed out that the technology already existed within the supplier's product range, it simply had to be activated or included in the packaged kit.

An unexpected outcome of the forum was discussions with some product manufacturers regarding developing a roadside evidentiary testing device. Interestingly, it was generally those companies who are not currently supplying jurisdictions with testing equipment, who were most interested in pursuing this line of discussion and possible product development. Although there was a relative small and

select group of product manufacturers present at the meeting, it became evident to some jurisdictional representatives and confirmed by later follow-up investigations, that manufacturers of evidentiary analysis capable type machines and devices, tend to be a different group of companies or industry as compared to roadside screening device manufacturers. They were more involved in the development and distribution of major laboratory, hospital or medical based analytical/diagnostic machines and devices.

As noted in previous sections, it is both important and essential, that formal coordinated discussions and deliberated engagement continue with distributors and manufacturers to ensure product development and supply meets the need of Australia's expanding program of testing. What has been the history of previous products in this area will no longer be satisfactory or efficient for Australia's increasing contextual need. There is a need for a national coordinated approach in both the pricing of equipment and the drive to ensure appropriate products are available in the Australian market place. This will require national leadership driven by governments in dealing with manufacturers, as Australia's needs are unique and different from other international jurisdictions. Continuing the uncoordinated and independent relationships with manufacturers and distributors undervalues the collective influence of jurisdictions as product consumers and importantly does not lead the strategic development of product that is necessarily appropriate and advantageous to the broader strategic Australian context.

Recommendation 6: Immediately and formally pursue product manufacturers and distributors to ensure appropriate product development and supply of a suitable roadside evidentiary testing device that meets Australia's needs.

Deterrence

The Working Group will be engaged in the ongoing development of a best-practice national model of roadside drug testing. There is a need to establish a better understanding of deterrence from drug-impaired driving in Australian jurisdictions through trials and research, working towards development of a best-practice deterrence model (Terms of Reference: Key task 1).

Although a theoretical construct, the most defining element of Australia's overall approach to drug driving is deterrence. This is built on our long and highly successful experience in drink driving, which was underpinned by internationally pioneering work on deterrence and roadside testing. Deterrence is not only the historical foundation of drug driving legislation and enforcement, it is highly appropriate for it to remain the core framework behind the future development and approach to legislation and enforcement in this area.

Learning from our previous drink driving experience, a key long term goal of our roadside drug testing program is to provide the foundation for broader long term behavioural and social change regarding drug use and driving.

It is now fifteen years since an Australian jurisdiction first legislated for roadside oral fluid drug testing. As we now move into the end of our second decade of roadside drug testing, we are questioning

what will guide our 'second generational' approach to reducing drug driving on Australian roads. Over the past fifteen years, Australia has pioneered the model of deterrence in this area via the development of the largest roadside drug screening and testing program in the world. Put simply, we are the experts and envy of many international jurisdictions.

As we grow to half-a-million and more roadside tests per-year, we will continue our international leadership by challenging ourselves to do better. The 2017 Roadside Drug Testing Scoping Study report into drug driving (Davey and Armstrong et al.) identified an agreed need for jurisdictions to take more of a general deterrent approach to roadside testing. This report also identified that it was widely recognised that historical and recent roadside strategies to testing have focused mainly within a model that operated within a 'specific deterrence' approach to testing via specific targeting of roadside testing. This has yielded significant numbers of drug drivers. Across the country our national detection rate is around one-in-every-ten drivers who are tested, confirmed by laboratory to be positive to one or more of the nominated substances. In some jurisdictions, the positive rate is much higher, for example in Queensland, the rate is around one-in-five.

Whilst recognising Australia's commitment to a deterrence approach and our international leadership in roadside drug testing it is also important to note that there is still a dearth of academic research into what is the most effective way, level and intensity of deterrence operations and impact. Currently many of our assumptions and practices have been translated from our research experience with drink driving. While this has served us well it is time to increase the level of specific research related to drug driving. More research is needed to gain a deeper understanding of the nature and practices of roadside drug testing and its deterrence impact in a variety of scenarios if we are to take advantage of our international leadership position and more effectively develop a second generation response to drug driving. There is a need to encourage and facilitate more Australian based research into understanding drug driving and delivering research that provides information which can lead to more efficient and effective implementation of deterrence based roadside testing.

Recommendation 7: Encourage and facilitate more Australian based research into understanding drug driving and delivering research that provides information which can lead to more efficient and effective implementation of deterrence based roadside testing.

The Working Group is aware of the current Austroads research SAG128: 'Optimising drug driving deterrence' research project and is currently in contact with Austroads regarding the timelines and outcomes of this research.

As was discussed in the 2017 Roadside Drug Testing Scoping Study report (Davey and Armstrong et al., 2017) this targeted strategy is understandable and is a logical approach given the resource intensive nature of roadside drug testing. Additionally, large numbers of offenders are being caught within these types of operations. However, it was also noted that jurisdictions recognised the limited nature of these operations and that potentially, by focusing the bulk of their resources within specific targets such as geographical areas, times of day or night, age groups, venues or activities, they were not necessarily addressing general deterrence within a broader population.

Such a broader general deterrence approach would most definitely not yield the positive detection rates of those achieved via targeting. However, general deterrence is more focused on preventing the behaviour from initially occurring and/or reoccurring.

A proposed strategy, and one that has naturally developed over time, is to allocate the current and future growth in testing numbers towards a general deterrence approach. As one police officer within a recent Working Group meeting remarked, 'Now that we are getting more tests we can undertake more general population testing.'

This proposed approach does not necessarily take away testing numbers from current targeted testing strategies. Rather, the program growth numbers are more aligned within the general deterrence domain. Additionally, it gives a focus for increasing testing numbers and strategies, whilst sustaining the benefits of a well-established target program that is addressing significant high-risk areas.

Some stakeholders have discussed the strategy of quantifying a defined number or percentage split between targeted and general deterrence operations. This topic is currently under-researched and may not be appropriate to all jurisdictions. In response, the Working Group recommends that by reinforcing the underlying understanding of all aspects of deterrence, and jurisdictions agreeing on the basic intent of an overall approach, it leaves the freedom to individually develop operational strategies that best fit their unique situations, while at the same time working within a nationally agreed, overall intent or philosophy. This is a clear, theory driven, approach to program development, and importantly, identifies the need for increasing the numbers of tests being carried out on our roadside, along with how to appropriately focus on where, when, how and why testing occurs.

Recommendation 8: Increase the number of drug driving roadside screens/tests, and continue to develop and pursue high-volume roadside drug testing, so as to create a roadside environment that makes it increasingly more difficult to avoid detection and to focus this increase in testing within a general deterrence framework, whilst maintaining the current level of targeted testing, noting the importance of ensuring the effectiveness of a general deterrence model in regional Australia where additional trained personnel will be required.

Both now and in the future, deterrence philosophies and strategies not only underpin when and where testing occurs, but importantly, provide an overall context of how testing fits within an overall broader strategy of dealing with drug driving. As discussed earlier, deterrence strategies are built around the notion of both 'apprehension' and 'punishment.' Testing is related to apprehension and apprehension is integral to punishment. This is where future strategies for drug driving can develop and become more refined. Within this deterrence domain of the punishment, there is potential for development in the area of 'swiftness' of punishment. Within many jurisdictions the process of detecting the drug driver on the roadside and moving to the final conviction, can take months. Key milestones in this process are, (a) the laboratory confirmation process, (b) the subsequent issuing of a charge, and (c) the court process of conviction.

Again, Australia has a strong history in drink driving to model drug driving program development in this area. Each year, unfortunately, across jurisdictions, over one hundred thousand drink drivers are convicted. The majority of these cases are managed effectively on the roadside, immediately following detection. This has produced large savings to our court systems and at the same time increased the potential deterrent impact associated with swiftness. In other words, punishment for the offence commences almost immediately upon detection. For reasons of effectiveness and efficiency, the Working Group would recommend the development across jurisdictions of a roadside charging process for drug driving that is similar to drink driving. This was identified as one of the high priority needs in the 2017 Roadside Drug Testing Scoping Study (Davey and Armstrong et al., 2017). Importantly, the Working Group also recognises that similar to drink driving, this process may not be the desired approach for repeat and other high-risk type offenders.

Such a strategy would involve a number of key issues. The first, as discussed above, is the development and implementation of a roadside evidentiary confirmatory device. Again, this highlights the importance of strategically pursuing this need as a significant milestone for the future. Secondly, it requires processes and legislation for a 'ticketed or infringement type-of-offence' to be issued on the roadside to some offenders. Some jurisdictions are already working towards this goal with proposals for and the development of legislation to allow drivers to plead guilty to an offence on the roadside, without the oral fluid sample having to be sent to the laboratory for confirmation. A move towards roadside confirmation and charging is becoming increasingly essential, as Australia moves towards and beyond 500,000 roadside drug screening tests per year.

Additionally, it has also been recognised within the Working Group and in the 2017 Roadside Scoping Drug Testing Study report (Davey and Armstrong et al.), that the increasing number of roadside drug screening tests and subsequent number of people charged have resource implications for procedural, administrative and data management systems, involved in managing the offender process. Jurisdictions and stakeholders need to be aware that ever-increasing numbers of tests require ever-increasing efficient and effective 'back-end' data processing systems.

Another sign of program maturity is that some jurisdictions are currently examining the levels of penalties associated with various charges related to drug driving. It has been noted that in some jurisdictions levels of penalties were originally set at the comparative level of a lower-end drink driving offence. Stakeholders who were present at the time of these original discussions in jurisdictions, report that a reason for this was to make the introduction of the legislation more palatable to the community at the time. There has been discussion with the Working Group, and identified in previous work, that some stakeholders perceive current offences may not necessarily carry an appropriate penalty. Significantly, it was also noted that there is great range in what penalty is actually received from a court sentencing and what are the possible legislative options for penalties associated with a nominated offence. One recommendation is that a comprehensive education program be developed for courts detailing, not just penalties, but importantly program rationale, including the importance of deterrence theory and how it is incorporated into an overall approach to drug driving.

An example of the need for appropriate education of court officials, key stakeholders and commentators, is the frequent referencing of the February 2016, Lismore Magistrate Court Case,

as evidence that oral fluid roadside drug testing is identifying substances, particularly THC, in drivers' samples, several days after ceasing use. In this case (*Police vs Carrall: Lismore Local Court, 1 Feb 2016*) the magistrate "dismissed a charge of 'drug (cannabis) driving' where the accused gave evidence that he had consumed cannabis nine days before the time at which he was subjected to a roadside test" (Quilter and McNamara, 2016:57). Reporting of this case highlighted inaccurate understanding about the performance of roadside fluid testing devices.

Recommendation 9: Support the development of an education program for courts, health workers, policy makers and other stakeholders, which details not just the offence but importantly, the program rationale including the central notion of deterrence theory and how it is incorporated into an overall approach to drug driving.

Another area of legislative development that has occurred in some jurisdictions has been the notion of a combined drink and drug driving charge, which would be a higher-order type offence. There is research to support this approach both in terms of the potential influence and impact of the combined substance on the individual, and the development of separate charges. Where overseas jurisdictions do operate such specific legislation, it is interesting to note that the cut-off-limits for both alcohol and the nominated drug/s, is usually much lower when compared to an offence where only alcohol or a drug is present. It was also noted that this combined alcohol and drug related driving issue could also be managed through some jurisdictions' existing 'driving-under-the-influence/impaired type legislation.' Regardless of current processes, the Working Group felt this was an issue that does require further investigation within each jurisdiction, as to the adequacy of current legislation.

Media and education programs

Although not necessarily a major topic of discussion, the Working Group acknowledges the importance of media education programs and the place for offender rehabilitation/education programs. The Working Group noted that these issues were also raised previously (Davey and Armstrong et al., 2017) and in the recent NTC report (2018). The Working Group agrees that these are essential elements in an overall approach to drug driving, and encourages individual jurisdictions to continue to pursue and develop appropriate responses in these areas. Particularly, the group cited the importance of general media programs working in support of overall deterrence strategy approaches.

Summary

In conclusion, there is a clearly identified path for roadside drug testing in Australia. As opposed to focusing on a single piece of technology, a testing device, numbers of tests, where and when to test, who to test, what type of offences and punishments; the actual mechanisms, logistics, process, legislation and operations around roadside drug testing should be conceptualised within the overarching theory and construct of deterrence. A deterrence approach gives sense, reason and purpose to what we do on the roadside.

Australia is already the world leader in drug driving enforcement. Our 'first generational' response to drug driving was to establish and develop a roadside testing ability and ongoing capability. Australia has historically had a harmonised approach to drug driving built on the notion of deterrence. As we move into developing our 'second generational' approach to drug driving, it is important at this juncture, to reaffirm and clearly articulate this theoretical and philosophical underpinning. It is this clearly defined and strategic deterrence approach which will underlie and guide jurisdictions' individual future responses, and maintain our international leadership in this area of reducing the impact of death and injury on our roads.

Recommendation 10: The National Drug Driving Working Group continue working towards a national best practice model of roadside drug testing and deterring the drug driver with the group meeting at a minimum every six months to update the group on operational and policy developments.

Recommendation 11: That Transport Ministers share the report with Attorney Generals, Police Ministers, and other relevant agencies and departments in their respective jurisdiction.

Appendix I

National Drug Driving Working Group terms of reference

Background

The National Road Safety Strategy (NRSS) 2011–2020 represents the commitment of federal, state and territory governments to an agreed set of national goals, objectives and action priorities. It is guided by the vision that no person should be killed or seriously injured on Australia's roads and has a key objective to reduce annual numbers of both deaths and serious injuries on Australian roads by at least 30 per cent.

The NRSS is overseen by the Transport and Infrastructure Council (the Council), established by the Council of Australian Governments (COAG). The Council brings together Commonwealth, state, territory and New Zealand ministers with responsibility for transport and infrastructure issues, as well as the Australian Local Government Association.

Drug-impaired driving has been identified by Council, with significant input from senior police, as a priority area to address. The Centre for Accident Research and Road Safety – Queensland (CARRS-Q) conducted a scoping study on drug-impaired driving and cost-effective approaches to roadside drug testing in 2017 (refer www.roadsafety.gov.au) and following consideration of the research results, the Council agreed to the formation of a National Drug Driving Working Group to develop options to address the problem.

Purpose

The purpose of the National Drug Driving Working Group is to bring together the knowledge, experience and resources of governments and other parties to work towards a national best practice model of roadside drug testing as well as to provide advice to the Transport and Infrastructure Council on more efficient and cost effective options for road side drug testing, through coordinating national research effort and liaising with industry.

Key issues and tasks

1. Establish a better understanding of modes of operation for deterrence from drug-impaired driving in Australian jurisdictions through research and trials, and work towards development of a best-practice deterrence model.
2. Explore the scope to save on the cost of drug testing through national bulk purchasing and other arrangements.
3. Liaise with industry and develop research proposals to encourage development of testing products which would reduce the time taken at the roadside to conduct tests.
4. Liaise with industry and develop research proposals to encourage development of testing products that could in time be accepted as confirmatory (evidentiary) with no additional laboratory testing required for a conviction.

Appendix II

National Drug Driving Working Group member agencies

Co-Chair – Representative from the Department of Infrastructure, Regional Development and Cities

Co-Chair – Representative from the Australian and New Zealand Policing Advisory Agency Road Policing Network

AFP/Australian Capital Territory Police

Queensland Police

New South Wales Police

Northern Territory Police

South Australia Police

Tasmania Police

Victoria Police

Western Australia Police

Commonwealth Department of Health

Commonwealth Department of Infrastructure, Regional Development and Cities

Australian Capital Territory Justice and Community Safety Directorate

Transport Canberra and City Services

Transport for New South Wales

Northern Territory Department of Infrastructure, Planning and Logistics

Queensland Department of Transport and Main Roads

South Australia Department of Planning, Transport and Infrastructure

Transport for Victoria

VicRoads

Western Australia Department of Transport

Main Roads Western Australia

Austroads

The National Transport Commission

Appendix III

[The National Transport Commission Australia - Towards a national approach to drug driving
Information paper May 2018](#)

Reference list

- Armstrong, K., Watling, C., & Davey, J. (2014). Deterrence of Drug Driving: The impact of the ACT Drug Driving legislation and detection techniques. Report to the NRMA-ACT Road Safety Trust.
- Compton, R. (2017, July). Marijuana-Impaired Driving – A Report to Congress. (DOT HS 812 440). Washington, DC: National Highway Traffic Safety Administration.
- Davey, J., & Freeman, J. (2011). Improving road safety through deterrence-based initiatives: a review of research. *Sultan Qaboos University Medical Journal*, 11(1), pp.312–320.
- Davey, J., Armstrong, K., Freeman, J., Sheldrake, M. (2017) Roadside drug testing scoping study: Final report for the Department of Infrastructure, Regional Development and Cities. (Canberra ACT)
- Freeman, J., Armstrong, K., Truelove, V. & Szogi, Elizabeth (2015) Left on the side of the road? A review of deterrence-based theoretical developments in road safety. In Australasian Road Safety Conference 2015, 14–16 October 2015, Gold Coast Convention and Exhibition Centre, Queensland, Australia
- Freeman, J., Watling, C., Davey, J., & Palk, G. (2010). Perceptual deterrence versus current behaviours: a study into factors influencing drug driving in Queensland. *Road & Transport Research: A Journal of Australian and New Zealand Research and Practice*, 19(3), 3.
- Freeman, J., & Watson, B. (2006). An application of Stafford and Warr's reconceptualisation of deterrence to a group of recidivist drink drivers. *Accident Analysis & Prevention*, 38(3), 462–471
- Grasmick H, Jacobs D, McCollom CB. (1983) Social class and social control: an application of deterrence theory. *Social Forces*, 62, 359–74.
- Henstridge J, Homel R, Mackay, P (1997). The long-term effects of random breath testing in four Australian states: A time series analysis (CR 162). Canberra, Australia: Federal Office of Road Safety.
- Howe, E., & Loftus, T. (1996). Integration of certainty, severity, and celerity information in judged deterrence value: further evidence and methodological equivalence. *Journal of Applied Social Psychology*, 26, 226–242
- Homel, R. (1988). Policing and punishing the drinking driver: A study of general and specific deterrence. New York, NY: Springer-Verlag.
- Johnston, A; Wolff, K; Agombar, R; Clatworthy, A; Cowan, D; Forrest, R; Osselton, D; Scott Ham, M (2016). Expert Panel Review of alternative biological matrices for use as an evidential sample for drug driving. Queen Mary University of London <http://qmro.qmul.ac.uk/xmlui/handle/123456789/27903>
- The National Transport Commission (2018) Towards a national approach to drug driving Information paper May 2018
- Nagin, S, Pogarsky G. (2001). Integrating celerity, impulsivity, and extralegal sanction threats into a model of general deterrence: theory and evidence. *Criminology*, 39, 865– 89.

- Parliament of Victoria Law Reform, Road and Community Safety Committee, 2018, Inquiry into drug law reform, https://www.parliament.vic.gov.au/images/stories/committees/lrrcsc/Drugs_/Report/LRR_CSC_58-03_Full_Report_Text.pdf 8/6/2018
- Piquero, A., R., & Paternoster, R. (1998). An application of Stafford and Warr's reconceptualization of deterrence to drinking and driving. *Journal of Research in Crime and Delinquency*, 35, 3–39.
- Piquero, A., R., Pogarsky, G. (2002). Beyond Stafford and Warr's reconceptualization of deterrence: personal and vicarious experiences, impulsivity, and offending behaviour. *Journal of Research in Crime and Delinquency*, 39, 153–186.
- Piquero, A., Paternoster, R., Pogarsky, G., Loughran, T. (2011). Elaborating the individual difference component in deterrence theory. *Annual Review of Law and Social Science*, 7, 335-360.
- Quilter, J., McNamara, L. (2016) 'Zero Tolerance' Drug Driving Laws in Australia: A gap between rationale and form. *International Journal for Crime, Justice and Social Democracy*, 6 (3) 47–71
- Stafford MC, & Warr M. (1993). A reconceptualisation of general and specific deterrence. *Journal of Research in Crime and Delinquency*, 30, 123–35.
- Von Hirsch A, Bottoms A, Burney E, Wikstrom P. (1991). *Criminal deterrence and sentence severity: an analysis of recent research*. Oregon: Hart Publishing.
- Watson, B. & Freeman, J. (2007) Perceptions and experiences of random breath testing in Queensland and the self-reported deterrent impact on drink driving. *Traffic Injury Prevention*, 8(1), pp. 11–19.
- Wolff, K., 2013, *Driving under the influence of drugs – Report from the expert panel on drug driving*: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/167971/drug-driving-expert-panel-report.pdf 8/6/2018



