

## **Best Practice in Alcohol Ignition Interlock Schemes**

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### **Abstract**

Australia's *National Road Safety Strategy 2011-2020* proposes greater use of alcohol ignition interlocks. To inform a potential expansion of interlock use, an international literature review examined the influence of mandatory versus voluntary alcohol ignition interlock schemes (AIS) in offenders' subsequent driving and broader rehabilitation, and interlocks as preventative measures in occupational driving contexts. Additionally, the review documented AIS operational effectiveness in relation to first offenders versus repeat offenders, timing of program admittance and exit, program monitoring, participant support programs and problems experienced in AIS implementation. Evaluations of road safety effectiveness for AIS in Canada, USA, Sweden and Australia were also studied. The literature review yielded a substantial list of considered best practice components of effective AIS, ranging from the various broad contexts where interlock use can be usefully encouraged or mandated, down to specific operational considerations. Identifying best practice components affords assistance to any efforts to progress the National Strategy's vision for the future deployment of interlocks.

### **Keywords**

interlocks, alcohol, drink drive, best practice

### **Background**

Australia's *National Road Safety Strategy 2011-2020* envisions *greater* use of vehicle technologies, such as alcohol ignition interlocks, in addressing illegal behaviours including drink driving, as an important opportunity for road safety improvement. To inform a potential expansion of interlock usage, it was deemed helpful to review AIS literature to identify considered best practice components. Since the first AIS began, a great deal has been researched about how AISs have evolved, their implementation and road safety benefits to contribute to a best practice view.

### **Methodology**

Relevant literature was searched using the Australian Transport Index, TRANSPORT, TRID, CINCH, Australian Federal Police Library, AGIS Plus Text (all via Informit Online), Science Direct and PubMed databases under the search terms: “ignition interlock, drink driving and repeat offender, drink driving and offence, drink driving and penalty”. From this broad sweep, literature relating to AIS outcome and operational effectiveness plus operational issues was selected if it could usefully contribute to building a best practice view. Although significant studies from the 1990s were included, there was a search emphasis on literature since 2000, as both interlock devices and programs have evolved considerably since they first began.

### **Evolution of AISs**

The original AIS in 1986 began as a mandatory scheme in which Californian law compelled judges sentencing drink driving offenders to require an interlock on any vehicle they owned or operated. That AIS soon took on a discretionary component in which repeat offenders were

encouraged to install an interlock after halfway through a term of suspension if they also obtained a restricted licence allowing them to drive with the interlock fitted (DeYoung, 2002).

Jurisdictions that have subsequently adopted an AIS tend to have a mandatory component as the core but many also have a complementary discretionary or voluntary AIS provision. However, mandating an interlock term for offenders as a pre-condition for reinstatement of full licensure does not necessarily increase overall AIS participation rates (Voas, Tippetts, Fisher & Grosz 2010). As long as increased participation and acceptance of interlocks is an AIS objective, then this can be better achieved through adopting both mandatory and voluntary forms rather than either one on its own.

Smith (2004) and Mathijssen (2006) noted that American judges did not always require interlocks to be fitted, despite the legislated requirement for them to do so. These two researchers considered that the judges preferred the opportunity to exercise discretion when they believed a case warranted it, while DeYoung (2002) reported some judges believed interlocks were ineffective. Furthermore, in many instances even if an interlock was ordered by a judge, this order was not necessarily followed through by court officials or the offender, usually because the offender claimed they no longer had a vehicle to drive, that the financial cost was too great (despite the availability of subsidy schemes), or that monitoring the offender's behaviour and enforcing compliance was too problematic.

To overcome judge and court official aversion to sentencing a required interlock term, some jurisdictions instigated AISs through an automatic administrative sanction imposed by a driver licensing or other government authority. According to Voas, Blackman, Tippetts and Marques (2002), a key advantage for administrative over court imposed sanctions is that motor vehicle departments usually have greater resources for managing the programs. However, the authorities must rely on participants complying with the administrative sanction merely because this accords them the privilege of driving legally. Voas et al (2002) cite the experience in California, where only 16% of drink drive offenders chose to regain that privilege, even when an interlock was not a requirement for licence re-instatement (although they did not say if this meant the remainder drove illegally or not at all). By contrast, courts are able to force greater persuasion on offenders to install interlocks by their ability to apply severe sanctions, even gaol for non-compliance.

AIS success in America and Canada contributed to Sweden in 1999 being the first European country to adopt an AIS. In 2004-2005, France, Norway, Germany, Belgium, Spain and the United Kingdom ran small-scale experimental programs and France and Finland established national AISs in 2009 (SWOV, 2011). The Netherlands followed suit in 2011. An inventory of AISs as reported by licensing authorities in Australia, Europe and North America is available at <http://iiip.tirf.ca/>

Following trials in South Australia, that state, in 2001, became the first Australian jurisdiction to establish an AIS for offenders statewide. This scheme was initially voluntary in nature, but was accompanied by a mandatory scheme introduced in 2009. AIS trials began in Queensland in 2001 and Victoria in the 1990s. Tasmania and the Australian Capital Territory aim to introduce an AIS later in 2013. New Zealand's mandatory AIS began in 2012.

Until recently, AISs have been primarily viewed by governments as offender sanctions aimed at reducing the incidence of drink driving offences and crashes, at least while the interlock is fitted. However, it is increasingly apparent for interlocks to be also viewed as aids to alcohol rehabilitation in the broader context of an offender's lifestyle (Vanlaar, Robertson & Schaap, 2010). In addition, interlocks are being viewed as preventative or quality assurance measures in occupational health and safety contexts whereby some companies and authorities require drivers of buses (including school buses), taxis and trucks, to use their vehicle's fitted

interlock before they begin a work shift (Robertson, Holmes & Vanlaar, 2011). Such drivers and companies tend to view the requirement as promoting an image of a safe and responsible driver and company (Vehmas, Sirkiä, Kinnunen & Oy, 2012). Volvo now has its integrated Alcolgard interlock as a standard manufacturing feature for new cars (*Volvo News*, 2012), and likewise Saab (Magnusson, Jakobsson & Hultman, 2011). An Australian cost benefit analysis (Lahausse & Fildes, 2009) suggests that requiring all new vehicles to be fitted with interlocks could reduce national road fatalities by 24% and serious injuries by 11%.

This evolving wider cultural change concerning the use of interlocks is an influential broader contextual issue, because one of the keys to the success of an AIS for offenders is the degree to which interlocks become viewed and used in a universal and more positive context (Marques, 2009). In America, at least, the majority of the population is receptive to the notion of all vehicles having alcohol detection devices in order to prevent drink driving (McCartt, Wells & Teoh, 2010). In fact, as Marques (2009) pointed out, it would be helpful if AISs were more generally accepted as public protection measures against high risk drivers rather than as forms of criminal retribution or as rewards for contrite offenders.

### **AIS Outcome Effectiveness**

In researching best practice, there is a need to focus on AIS evaluations performed since 2002 because interlock devices have evolved considerably from the very first models requiring the driver to perform a perceptual or motor task designed to detect driver impairment. These were largely incapable of discriminating between low and moderate intoxication levels (Vanlaar et al, 2010). However, they have evolved to sophisticated second and third generation devices requiring the driver to, for example, hum and blow into the interlock so that opportunities for circumvention are minimised (Elder et al, 2011). In turn, this results in improved effectiveness in reducing drink driving among offenders (Clayton & Beirness, 2008). Another rationale for the research selectivity is that the early evaluation studies often suffered from weak research designs, small sample sizes among voluntary participants and relatively shorter participation durations for collection of usage data (Schonfeld & Sheehan, 2004). This is notwithstanding that the early results nevertheless tended to recommend AIS continuation and expansion on the basis of recidivism reductions found. A critical mass of AIS participants is also needed, not only to afford sufficient statistical power in evaluation studies, but to make a substantial impact on drink drive recidivism generally within a jurisdiction.

With regards to participant self-referral in AIS evaluations, whether offender participation is voluntary or mandatory can render making comparisons between study samples problematic. This difficulty is compounded when voluntary AIS participation becomes mandatory in effect because an alternative sanction (such as longer licence suspension periods, jail terms or vehicle impoundment) makes it an attractive option to prefer the AIS (Voas et al, 2002). At the other extreme, AIS participants, whether voluntary or mandatory, might claim they are not subject to the program because they have sold their vehicle or otherwise have no vehicle available for interlock installation (Voas et al, 2002; Elder et al, 2011). Such drivers may also make no attempt to regain their licence, perhaps driving unlicensed instead (Smith, 2004). These possibilities can likewise bias a study sample, as well as reduce the sample size.

A common characteristic found in the literature is that any positive effects in reducing drink driving among the participants tend to last only while the offender is required to have an interlock fitted. This trend has been apparent in both early and more recent evaluations. Despite this major limitation in long term effectiveness, major evaluation studies have reported reductions in recidivism ranging between 35% and 90%, with an average reduction of 64% while the interlock is fitted (Willis, Lybrand & Bellamy, 2004). An evaluation of Sweden's AIS reported a 60% reduction in drink drive recidivism compared to before (this is

while the interlock was fitted and with regular medical assessments). There were also 80% fewer crashes up to 4.6 years (average 2.3 years) after the program, (Bjerre and Thorsson, 2008). Other important AIS findings include<sup>1</sup>:

- mandatory participation can be as effective as voluntary in reducing drink driving when offenders are matched on key variables (DeYoung, Tashima and Masten, 2004)
- Sweden’s AIS has led to less recidivism, reduced crashes, reduced hospital treatment, reduced sick days, and reduced alcohol consumption (Magnusson et al, 2011)
- The positive effects of Queensland’s AIS in reducing recidivism were not due just to legal sanctions, such as suspension and use of the interlock, but through combining the effects of these with educational and counselling interventions (Robertson et al, 2010).

Many evaluation studies reveal AISs are effective only for as long as the interlock is installed, with the researchers often concluding that the interlocks should remain installed until substantial periods of alcohol-free driving can be demonstrated (e.g. Raub, Lucke and Wark, 2003). In fact, for the deep seated minority of repeat offenders (often those with high BACs) who appear immune to modifying their behaviour during their AIS term, an indefinite compulsory interlock fitting may be the only way they should maintain driving privileges.

Marques (2009) noted that this recalcitrant minority is not really indicative of any inherent ineffectiveness of AISs. Rather, it is indicative of the difficulty in long term behaviour change for this group, who essentially comprise the alcohol dependent. Marques advises that broader based (holistic) treatment for alcohol dependence will improve AIS success if those treatment plans are integrated with the interlock data record to promptly detect and deal with lapses in alcohol control or abstinence. This insightful comment is a useful example of the interrelationship that can exist between a drinking problem per se and use of an interlock for a drink driving problem. While use of an interlock can be a valuable tool to assist a drink drive offender control a broader alcohol problem, equally, a broad-based focus on a drinking problem can be supportive of efforts to prevent drink driving through use of an interlock.

### **AIS Operational Effectiveness**

Robertson et al’s (2010) recent overview of operational issues in Australian AISs includes overcoming concerns about interlock tampering and circumvention and whether Australian AISs should include a treatment program<sup>2</sup>. Concerns about ease of tampering have been overcome through field trial demonstrations in South Australia and Victoria. The value of a treatment component in helping AISs achieve their objectives is well accepted. However, treatment is often difficult to achieve operationally due to issues such as ensuring participant compliance with the treatment regime (which is commonly due to impaired thinking stemming from an individual’s alcohol problem), as well as problems of access by rural/remote offenders. The following are some key operational issues especially relevant to mandatory AISs.

### **Timing of an Offender’s Admission to an AIS**

Clayton and Beirness (2008) note the experience of New Mexico, where offenders are allowed to enter the AIS as soon as they are first arrested rather than serving a term of disqualification first. Evaluations showed that the recidivism reductions experienced were similar to those found in comparable studies (Marques, Voas, Roth & Tippetts, 2010).

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<sup>1</sup> A more detailed summary of AIS outcome research findings can be found at: <http://aic.tirf.ca>

<sup>2</sup> Robertson et al (2010) discuss several other operational issues, including interstate mobility for interlock participants, improving inter-agency communication how to improve AIS participation rates.

As repeat drink driving offence rates are lower among AIS participants than those who simply serve a disqualification period, there is now a trend in many US states to replace most if not all licence disqualification by participation in an AIS, beginning as soon as possible. This is premised on reducing the hardship imposed on personal transport by a licence disqualification, by the need to reduce the likelihood of the offender subsequently driving while suspended, and to minimise their drinking of alcohol as well as drink driving.

Robertson and Vanlaar (2009) note that jurisdictions contemplating establishing an AIS may be reluctant to dispense with existing requirements for a minimum term of licence disqualification to be first served by offenders, compared with installation of an interlock as soon as practicable. Such existing provisions are usually long standing and are traditionally viewed as sending a strong deterrent message. In fact, longer suspension terms are often sought as a response to increased drink driving incidence (Marques, 2009). While disqualification remains an effective sanction for drink drivers, research has repeatedly demonstrated that AIS participation can be considerably more effective than disqualification alone (ibid). This is over and above the benefit of early use of interlocks in minimising the incentive to drive while disqualified.

### **First Offenders and Repeat Offenders**

Recently, McCartt, Leaf, Farmer and Eichelberger (2013) found that Washington State’s mandating interlocks for all first time drink drive offenders from 2009 was associated with reductions in both drink drive recidivism and crashes. American research has found that drivers in some cases drink and drive more than 200 times before being detected and apprehended (Beck, Rauch, Baker & Williams, 1999), so from that perspective alone, it makes sense to also target first offenders with an AIS. Also, many first offenders frequently drive with high BACs that are more than twice the legal limit and have a significant risk of crashing (Rauch 2005 in Robertson, Holmes & Vanlaar, 2009).

However, Robertson et al (2009) note that inclusion of first offenders in an AIS can be contentious. First offenders can contribute to low participation rates and debate has centred on focussing most attention on hard core offenders, who have a much greater risk of crashing.

### **Cost Subsidies for AIS Participants**

Robertson and Vanlaar (2009) discuss various forms of subsidy schemes. For example, offenders might be asked to pay higher AIS participation fees and costs in order to subsidise financially challenged applicants (although this would likely be considered inequitable by participants). Other jurisdictions, such as New Mexico, have established support funding schemes, subsidised by the government and interlock vendors (ibid). Florida Courts are entitled to waive or reduce fines to help the offender pay interlock costs. However, Hands (2003) cautions that fines should not be waived (or reduced) for AIS participants until successful completion of the interlock program, in order to maximise compliance with it. Even without a subsidy scheme, many AIS programs point out to participants that the average daily cost of the scheme is very low, comparable to the cost of a standard drink of alcohol or two (Marques, 2009), (although of course the cost is higher if the person drives more than one vehicle fitted with an interlock).

### **Ongoing Monitoring While on an AIS**

Close monitoring of AIS participants substantially enhances compliance with AIS conditions over time, when compared with less stringent AIS monitoring programs (Zador, Ahlin, Rauch, Howard & Duncan, 2011). AIS participants generally need to know their behaviour is being tracked via the interlock device. Periodic servicing allows participants to ask questions and discuss any issues experienced with the agent. Authorities are often replacing fixed-term

AISs with open-end date schemes for offenders who show a “clean record” for several months before being allowed to apply for an unrestricted licence (Clayton & Beirness, 2008).

AIS participants should come to expect that a record of interlock violations will likely lead to an extension in their interlock term or additional sanctions if warranted. Some leniency is often exerted initially, to allow the participant to become acquainted with the interlock and some unintentional violations (such as not providing timely repeat breath samples when driving — the ‘rolling retest’) are to be expected in the early phase. These serve as an illustration for the offender that the vehicle cannot be driven by someone who has been drinking alcohol. Equally, though, such early violations may also be due to deliberate attempts to “test” the system to see if violations will incur any consequences (Vanlaar et al, 2010). Nonetheless, a record of high BAC violations (particularly early morning violations) is associated with increased chances of recidivism and should be handled by increased monitoring and/or referral to a support program (Marques, 2009; Vanlaar et al, 2010).

Marques et al (2010) stress the importance of diligent monitoring of downloaded data from interlocks to evaluate ongoing drink driving incidence from the breath test records. In a similar vein, Vanlaar et al (2010) point out the need for AISs to employ sufficient staff to analyse and act on the downloaded monitoring data because the success of an AIS is predicated on an offender knowing that their behaviour is being monitored constantly and that violations will be swiftly followed up. If this intensive monitoring does not occur, an offender may be prematurely removed from the AIS for non-compliance before they have had a chance to learn the consequences of violations and modify their behaviour accordingly. Similarly, towards the end of the interlock term, there should be a substantial period of no violations prior to regaining a full licence and if not a decision can be made about extending the interlock term or removal from the program if necessary. Experience with AISs has shown that there will typically be a small group of recalcitrant re-offenders, regardless of how long they participate in the program (ibid). Consequently, adequate staff resources are needed to identify these cases and to ensure mandatory consequences are applied (for example, permanent interlock licence conditions).

In some AISs, regular monitoring of interlock data is combined with a more holistic assessment of the offender, including medical assessment that can involve various biomarkers (Mercier-Guyon, 2012). In Sweden’s AIS, blood sampling is required on a regular basis for over 2 years, to determine the extent of alcohol dependency (Marques, 2009). The advantages of such mandatory assessment include (Robertson et al, 2011):

- The ability to discriminate between high and low risk offenders and hence tailor interlock terms and conditions to suit the individual
- Use of a standardised assessment protocol affords quality control jurisdiction-wide
- A multi-dimensional form of assessment draws on several sources of objective data to enable an informed risk profile of the offender.

However, the disadvantages should also be borne in mind:

- The potential for false positives and false negatives in assessment results
- Standardised assessments can be influenced by training of the assessor, accuracy when interpreting the results and honesty of the offender (e.g. in relation to impaired driving episodes (ibid))
- Mandatory assessment requirements may deter some offenders from participating in a [voluntary] AIS (Robertson & Vanlaar, 2009).

Roberston and Vanlaar (2009) also suggest there is value in using a formal assessment process in determining when an interlock should be removed in order to regain a driver’s licence. In Victoria, for example, such drivers must appear before a magistrate who considers all the evidence from the assessment(s) and ongoing monitoring from the interlock device.

### **Education/Treatment Support Programs**

There is some evidence in favour of education or treatment programs in combination with AIS participation. Clayton and Beirness (2008) note the experience of the AIS in Texas in trialling a 12 hour motivational support program involving individual and group sessions over a 4-month period. Comparisons with a non-support program offender group showed that the program participants had fewer elevated breath tests on the interlock record, which was predictive of a lower likelihood of recidivism once the interlock is removed. Ongoing rather than one-off or occasional counselling, as well as rehabilitation, is strongly advised by Beirness et al (2008). In the same vein, Robertson and Vanlaar (2009) note that follow-up training on interlock use should be available to offenders in addition to the initial training.

One of the main benefits of support programs is that, in combination with (or as part of) an AIS, they afford a more holistic approach to tackling not just an offender’s drink driving problem but beyond, covering the broader context of their lifestyle alcohol management. Voas (2010), for example, has advocated consideration of home-based self-monitoring and recording of BAC levels, to provide definitive feedback to individuals, though home-based monitoring could equally be a mandatory component of a judicial or administrative sanction.

However, if participants are required to pay highly for such support programs, the cost can be a major disincentive to enrolment (Marques, 2009), which suggests there may be a role for governments in paying for, or at least subsidising, the support programs. There may also be an accompanying belief that the risk of detection is low if participants drive while disqualified rather than participate in the AIS (ibid). Further, there may be a fear that other dependencies (e.g. illicit drugs) might become disclosed during such a program (Tippetts & Voas, 1998).

### **<sup>3</sup>Driving While Suspended/Disqualified/Never Licensed**

Many AIS evaluations acknowledge the problem of AIS participants sidestepping the restriction by illegally driving a non-interlock vehicle and some of these studies go on to recommend interlock installation as soon as possible after conviction in an effort to minimise this tendency. However, Rauch et al (2002) note that AIS drivers who drive non-interlock vehicles may drive shorter overall distances and drive more conservatively to avoid drawing enforcement attention. Although not often mentioned in the literature, the level of police enforcement of drink driving laws can strongly influence participation rates in mandatory AISs (Mathijssen, 2006). Implicit in this is that high levels of enforcement are desirable in order to deter AIS participants from driving without a valid licence, as well as from driving while disqualified or suspended. Where mandatory carriage of licence laws are in place (and/or police are technologically equipped to undertake roadside licence checks), it is thus possible to quickly tell if a driver required to have an interlock fitted is driving a vehicle without one, and hence in contravention of the AIS requirements.

A related issue, as flagged by Sheehan et al (2006), is how interlocks should be managed as a sentencing option for offenders who were unlicensed (never held a licence) at the time of apprehension and sentencing. While Sheehan et al did not discuss this point further,

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<sup>3</sup> Comprehensive online training support for personnel involved in administering or delivering AISs, as well as interlock service providers, is available at <http://aic.tirf.ca>

Chamberlain and Solomon (2012) suggested that the threat of vehicle impoundment and/or full-time alcohol monitoring could motivate unlicensed drink drivers to participate in an AIS.

Voas and Marques (2006) noted that a significant majority of drink drive offenders were not applying to regain their licence due to greatly increased insurance costs, the costs of re-licensing and completion of any treatment programs, and a belief that the risk of detection of driving unlicensed is low (see also Hands, 2003; Marques, 2009), all of which serve to increase the chances of the offender driving while unlicensed.

### **Components of an Effective AIS**

The preceding discussion on AIS evolution and outcome and operational effectiveness informs consideration of the various components that would comprise an effective AIS. An early attempt at defining best practice for AISs involved two workshops in Canada attended by international researchers, interlock manufacturers, policy makers and program specialists (Beirness & Robertson, 2002). The best practice components identified included:

- Viewing AISs, not just in terms of the interlock itself, but more broadly as coordinated activities also involving monitoring, communication and rehabilitation, and also as a restriction allowing offenders to still drive rather than as a form of punishment.
- Legislation that clearly specifies the AIS administering authority, eligibility criteria, conditions of participation and prohibitions on circumvention.
- Service providers who understand AIS clientele and are committed to their needs.
- Eligibility criteria that allow as many drink drive offenders as possible into the AIS, and as soon as possible, to minimise the temptation to drive while unlicensed.
- Using mandatory and voluntary forms of AIS in a complementary manner such that offenders who are not compelled to participate may elect to participate in exchange for a reduced period of licence suspension, as this would boost participation rates.
- The authority for AIS administration residing with the licensing agency, but still allowing courts to impose AIS participation.
- Regular monitoring of AIS participants, especially through downloaded interlock data.
- Integrating an AIS with other drink drive and alcohol management programs.
- Duration of interlock term should depend on the participant’s success in the program (based on a variety of measures) rather than a fixed interlock term.

To that last best practice component, it could be added that consideration should be given to whether the fixed interlock term ought to comprise a minimum period. In relation to ongoing monitoring of interlock data in particular, Vanlaar et al (2010) note that certain interlock usage patterns are predictive of future recidivism and should therefore command attention in the monitoring process, for example two or more elevated BAC readings in the early hours of the morning and high numbers of interlock warnings and failed attempts during the first five months on an interlock. Such patterns, if detected, should be followed up with the offender and appropriate actions taken as may be warranted (ibid).

Some researchers have suggested additional components for effective AISs, such as removing or reducing disincentives to AIS participation (Voas et al, 2002), for example by improving the rolling retest procedure, or by subsidising participant costs, including insurance costs.

Marques and Voas (2010) developed a more recent best practice analysis and their key points, along with those of other researchers, add to the list of best practice components, for example:



- The AIS (including the technical qualities of the interlock devices employed) should be compliant with an agreed set of operating standards (Robertson et al, 2011.)
- Increased AIS participation rates should be the aim so that overall drink drive recidivism rates are improved and costs of alcohol related crashes reduced (Elder et al, 2011); increased participation can come from including ongoing alcohol-dependent drivers who show they can comply with an AIS (Robertson & Vanlaar, 2013).
- Offender admittance to an AIS should occur as soon as possible after conviction (Mathijssen, 2006; Robertson & Vanlaar, 2009; Elder et al, 2011).
- First offenders should be admissible to an AIS (Robertson et al, 2009; Elder et al, 2011), even for low to moderate BACs (McCartt et al, 2013).
- AIS participation should not be adversely affected by user costs (Mathijssen, 2006; Robertson & Vanlaar, 2009; Elder et al, 2011); although any waiving or reductions in fines should not be allowed until the offender’s AIS term is complete (Hands, 2003).
- AIS administration should not be too complex for participants and voluntary participants should have an opportunity to trial the device (Woolley, Edwards & Versteegh, 2003.)
- Interlock terms should be tailored to an offender’s record of compliance with AIS conditions and related performance-based criteria (Clayton & Beirness, 2008; Robertson & Vanlaar, 2009; Elder et al, 2011).
- All AIS participants should be notified of every violation recorded by the interlock device throughout the term of the program (Zador et al, 2011).
- The full licence suspension term should not be more attractive than the full term assigned on the AIS (Woolley et al, 2003; Mathijssen, 2006; Elder et al, 2011).
- Treatment, holistic monitoring, counselling and other forms of support should, as far as possible, be integrated with the AIS (Robertson et al, 2010; Elder et al, 2011).
- Participant transferability between interstate AIS should be facilitated (Robertson et al, 2010, 2011), along with greater communication between AIS jurisdictions, licensing authorities and judicial systems (Fieldler, Brittle & Stafford, 2012).
- Remote area access to interlock servicing and advice should be facilitated through the use of mobile units to allay rural area concerns (Clayton & Beirness, 2008).
- It should be ensured that interlock devices are almost impossible to circumvent (aside from driving a non-interlock vehicle) (Mathijssen, 2006; Elder et al, 2011).
- Exchange of monitored data and information about interlock research and AIS evaluations should occur between all agencies involved in administering the AIS (Woolley et al, 2003; Elder et al, 2011; Robertson et al, 2011).
- Sufficient staff should be allocated to administering the AIS, especially for usage monitoring of data in terms of both monitoring effectiveness for individual offenders as well as in terms of the AIS as a whole (Vanlaar et al, 2010, Robertson et al, 2011).
- There should be adequate police enforcement of drink driving laws, not only to boost AIS participation but to also deter driving while suspended or disqualified (Mathijssen, 2006; Robertson et al, 2011; Robertson & Vanlaar, 2013).

Finally, there should be compliance with standards for evaluating AISs. As noted earlier, there is a paucity of evaluation studies of Australian AISs, despite some early pioneering work that established national guidelines for evaluating interlock programs (Soames Job Associates, 1998). Planning the structure and processes of an AIS should as far as possible reflect such evaluation standards to enable a sound evaluation to be conducted. This includes ensuring that the monitoring processes, especially the interlock data content downloaded, is consistent with the required evaluation standards.

## References

- Australian Transport Council. (2011). *National Road Safety Strategy 2011-2020*. Canberra: Department of Infrastructure and Transport.
- Beck, K. H., Rauch, W. J., Baker, E. A. & Williams, A. F. (1999). Effects of ignition interlock license restrictions on drivers with multiple alcohol offences: A randomized trial In Maryland, *American Journal of Public Health* 89(11), 1696-1700.
- Beirness, D. J., Clayton, A., & Vanlaar, W. (2008). *An Investigation of the Usefulness, the Acceptability and Impact on Lifestyle of Alcohol Ignition Interlocks in Drink-Driving Offenders* (Road Safety Research Report No. 88). London, UK: Department for Transport.
- Beirness, D. J. & Robertson, R. (2002). Best practices for alcohol ignition interlock programs: Findings from two workshops, *Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety ICADTS-2002*, Canada.
- Beirness, D. J., Marques, P. R., Voas, R. B. & Tippetts, A. S. (2003). The impact of mandatory versus voluntary participation in the Alberta ignition interlock program, *Traffic Injury Prevention*, 4, 195-198.
- Bjerre, B. & Thorsson, U. (2008). Is an alcohol ignition interlock programme a useful tool for changing the alcohol and driving habits of drink-drivers? *Accident Analysis and Prevention* 40, 267-273.
- Chamberlain, E. & Solomon, R. M. (2012). The challenges of implementing interlock best practices in a federal state: The Canadian experience, *Injury Prevention* 18, 347-352.
- Clayton, A. & Beirness, D. (2008). *A Review of International Evidence on the Use of Alcohol Ignition Interlocks in Drink-Drive Offences*, Department for Transport Road Safety Research Report 89, Department for Transport, London, U.K.
- DeYoung, D. J. (2002). *An Evaluation of the Implementation of Ignition Interlock in California*, California: California Department of Motor Vehicles.
- DeYoung, D. J., Tashima, H. N. & Masten, S. V. (2004). *An Evaluation of the Effectiveness of Ignition Interlock in California*, California: California Department of Motor Vehicles.
- Elder, R. W., Voas, R., Beirness, D., Shults, R. A., Sleet, D. A., Nichols, J. L. & Compton, R. (2011). Effectiveness of ignition interlocks for preventing alcohol-impaired driving and alcohol-related crashes: A community guide systematic review', *American Journal of Preventive Medicine*, 40(3), 362-376.
- Fieldler, K., Brittle C. & Stafford, S. (2012). *Case Studies of Ignition Interlock Programs*, Report No. DOT HS 811 594. Washington DC: National Highway Traffic Administration.
- Hands, M. (2003). Working with the benefit of hindsight: A perspective on alcohol ignition interlocks, *Proceedings of the Road Safety Research, Policing and Education Conference*, Sydney.

- Lahaussé, J. A. & Fildes, B. N. (2009). Cost-benefit analysis of an alcohol ignition interlock for installation in all newly registered vehicles, *Traffic Injury Prevention*, 10, 528-537.
- Magnusson, B. A., Jakobsson, L. & Hultman, S. (2011) Alcohol interlock systems in Sweden: 10 years of systematic work?, *American Journal of Preventive Medicine*, 40 (3), pp. 378-379.
- Marques, P. R. (2009). The alcohol ignition interlock and other technologies for the prediction and control of impaired drivers, in Verster, J. C.; Pandi-Perumal, S. R.; Ramaekers, J. G. & de Vler, J. J (eds). Switzerland: *Drugs, Driving and Traffic Safety*, Birkhäuser Verlag.
- Marques, P. R. & Voas, R. B. (2010). *Key Features For Ignition Interlock Programs*. Washington DC: National Highway Traffic Safety Administration.
- Marques, P. R., Voas, R. B., Roth, R. & Tippetts, S. S. (2010). *Evaluation of the New Mexico Ignition Interlock Program*, Department of Transportation, Report DOTHS 811 410. Washington DC: National Highway Traffic Administration.
- Mathijssen, R. (2006). *Alcolocks: factors influencing implementation, participation and compliance*, Institute for Road Safety Research, Report R-2006-7. The Netherlands: SWOV.
- McCartt, A. T., Wells, J. K. & Teoh, E. R. (2010). Attitudes toward in-vehicle advanced alcohol detection technology. *Traffic Injury Prevention* 11, 156-164.
- McCartt, A. T., Leaf, W. A., Farmer, C. M. & Eichelberger, A. H. (2013). Washington State's alcohol ignition interlock law: Effects on recidivism among first time DUI offenders. *Traffic Injury Prevention* 14, 215-229.
- Mercier-Guyon, C. (2012). Alcohol ignition interlocks and biomarkers, *EU Drink Driving Forum Summary of Proceedings*. Ottawa, Canada: Traffic Injury Research Foundation.
- Raub, R. A., Lucke, R. E. & Wark, R. I. (2003). Breath alcohol ignition interlock devices: Controlling the recidivist, *Traffic Injury Prevention*, 4 (1S), 28-34.
- Rauch, W. J., Zador, L., Ahlin, E. M., Baum, H. M., Duncan, D., Beck, K. H., Raleigh, R., Joyce, J. & Gretsinger, N. (2002). A longitudinal survival analysis of drivers with multiple alcohol-related traffic offences: Fifth year follow-up of a randomized ignition interlock license restriction trial in Maryland, *Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety T2002*, Ottawa.
- Robertson, R. D., Holmes, E. & Vanlaar, W. (2009). Alcohol Interlocks: Planning for Success, *Proceedings of the 9<sup>th</sup> International Alcohol Interlock Symposium*, August 2008. Ottawa, Canada: Traffic Injury Research Foundation.
- Robertson, R. D. & Vanlaar, W. (2009). *Alcohol Interlocks: Planning for Success, Proceedings of the 9<sup>th</sup> International Alcohol Interlock Symposium* 2008. Ottawa, Canada: Traffic Injury Research Foundation.
- Robertson, R. D., Holmes, E. & Vanlaar, W. (2010). Alcohol Interlocks: Taking Research to Practice. *Proceedings of the 10<sup>th</sup> International Alcohol Interlock Symposium*, October 2009. Ottawa, Canada: Traffic Injury Research Foundation.
- Robertson, R. D., Holmes, E. & Vanlaar, W. (2011). Alcohol Interlocks: Harmonizing Policies and Practices, *Proceedings of the 11<sup>th</sup> International Alcohol Interlock Symposium*, October 2010. Ottawa, Canada: Traffic Injury Research Foundation.
- Robertson, R. D. & Vanlaar, W. (2013). Canada's Impaired Driving Framework: The Way Forward, *Proceedings of the Drinking and Driving Symposium*, May 2012. Ottawa, Canada: Traffic Injury Research Foundation.

- Soames Job Associates. (1998). *National Guidelines for the Evaluation of Alcohol Ignition Interlock Programs*. Austroads Report AP-132/98. Sydney: Austroads.
- Schonfeld, C. & Sheehan, M. (2004). Critical overview of alcohol ignition interlock programs in Australia, *Proceedings of 17<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety T2004*, Glasgow.
- Sheehan, M. C., Schonfeld, C. C., Watson, B. C., King M. J., Siskind, V. & Freeman, J. E. (2006). *Implementation of a trial of alcohol ignition interlocks in Queensland*. Brisbane: Centre for Accident Research and Road Safety – Queensland University of Technology.
- Smith, K. P. (2004). *Improving Australia's Responses to Recidivist Drink Driving*, Canberra: The Winston Churchill Memorial Trust of Australia.
- SWOV. (2011). *Alcolock*, SWOV Factsheet. The Netherlands: SWOV Institute for Road Safety Research.
- Tippetts, A. S. & Voas, R. B. (1998). The effectiveness of the West Virginian interlock program. *Journal of Traffic Medicine*, 26(1-2), 19-24.
- Vanlaar, W., Robertson, R. & Schaap, D. (2010). *Understanding Behavioural Patterns of Interlocked Offenders to Inform the Efficient and Effective Implementation of Interlock Programs: How Offenders on an Interlock Program Learn to Comply*. Ottawa, Canada: Traffic Injury Research Foundation.
- Vehmas, A., Sirkiä, A., Kinnunen, T. & Oy, R. F. (2012). *Adoption of the Alcohol Interlock and Its Effects in Professional Transport*. Report 5/2012. Finnish Transport Safety Agency.
- Voas, R. B. (2010). Monitoring Drinking — Alternative to license suspension to control impaired drivers? *Transportation Research Record*, No. 2182, 1-7.
- Voas, R. B. & Marques, P. R. (2006). Barriers to interlock implementation. *Traffic Injury Prevention* 4:S1, 12-16.
- Voas, R. B.; Blackman, K. O.; Tippetts, A. S. & Marques, P. R. (2002). Evaluation of a program to motivate impaired driving offenders install ignition interlocks, *Accident Analysis and Prevention* 34, 449-455.
- Voas, R. B., Tippetts, S. S., Fisher, D. & Grosz, M. (2010). Requiring suspended drunk drivers to install alcohol interlocks to reinstate their licenses: effective? *Addiction* 105(8), 1422-1428.
- Volvo Cars launches new Alcotest to help reduce the number of alcohol-related road accidents, *Volvo News*. [www.volvocars.com/intl/top/about/news-events/pages/default.aspx?itemid=49](http://www.volvocars.com/intl/top/about/news-events/pages/default.aspx?itemid=49) [viewed 14 Feb 2012].
- Willis C., Lybrand, S. & Bellamy, N. (2004). Alcohol ignition interlock programs for reducing drink drive recidivism. *Cochrane Database of Systematic Reviews* 2004, Issue 3, Art. No. CD004168.
- Woolley, J. E., Edwards, S. Versteegh, S. (2003). *Evaluation of the South Australian Alcohol Interlock Scheme*, Adelaide: Centre for Automotive Safety Research, University of Adelaide.
- Zador, P. L., Ahlin, E. M., Rauch, W. J., Howard, J. M. & Duncan, G. D. (2011). The effects of closer monitoring on driver compliance with interlock restrictions. *Accident Analysis and Prevention* 43, 1960-1967.