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IMPAIRED DRIVING RISK ASSESSMENT: A PRIMER FOR PRACTITIONERS

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Traffic Injury Research Foundation
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EXECUTIVE SUMMARY

Background

Drinking and driving has been widely recognized as a major social problem in Canada for more than three decades. Although a general decreasing trend in the number of persons killed in a traffic crash involving a drinking driver\(^1\) occurred in Canada between 1995 and 2008, the progress achieved since the late 1990s has been nominal and the number of persons killed and injured in crashes involving drinking drivers remains high. In 2010, (the most recent year for which data are available), 33.6% of fatally injured drivers in Canada had a blood alcohol concentration (BAC) in excess of the legal limit of .08 (Brown et al. 2013). In addition, in 2010, 744 people were killed in Canada in road crashes that involved a driver who had been drinking and approximately 2,733 drivers (excluding Newfoundland and Labrador) were involved in alcohol-related serious injury crashes in Canada (Brown et al. 2013).

Similar patterns of nominal or limited declines in drinking and driving are also evident in the United States (U.S.) and Europe as revealed by an examination of crash data. In the U.S., after holding steady between 13,000-14,000 impaired driving fatalities annually for several years, new decreases have been recorded, and fatalities have since dropped to a new low of 10,136 in 2010 and 9,878 in 2011 (NHTSA 2012). It is estimated that there were 31,000 road deaths in 2010 in the European Union (E.U.) and the European Commission estimates 25% of all road deaths in the EU are alcohol-related. It is important to note that comparisons of drink driving crashes and fatalities across countries should be made with caution in light of significant differences in data collection and reporting (ETSC 2011).

In light of these trends, increased knowledge and understanding of the profile and characteristics of impaired drivers, the factors that put them at risk for recidivism, available

\(^1\) Reported Canadian national data on alcohol-related crashes resulting in fatalities and serious injuries include all drivers that test positive for any amount of alcohol. This means that drivers that are below the legal limit for impairment as well as those above the legal limit are included in these counts. Hence the term drinking driver is used as opposed to impaired driver.
risk assessment instruments and relevant treatment options can inform the activities of transportation, criminal justice, and health practitioners to better identify, manage, and address this high-risk population in the future.

Introduction

There is increasing recognition of the importance and benefits of tools such as risk assessment and treatment as alternatives to complement punitive measures. Research shows that properly designed strategies and tools developed to match offenders’ risks and needs with appropriate programs and interventions have beneficial effects (Bonta 2002; NIDA 2006; Oglaff and Davis 2004), including reductions in recidivism as well as reductions in substance misuse that translate into long-term risk reduction and higher levels of public safety. The use of evidence-informed risk assessment tools and practices is linchpin to making the best use of available resources to achieve greater declines in the magnitude of the problem.

The use of risk assessment instruments has become commonplace to help practitioners in the criminal justice and remedial driver licensing systems to differentiate among various types of impaired drivers, especially those more prone to recidivism. However, to use these tools effectively, it is important that practitioners possess a clear understanding about the most effective ways to apply risk assessment instruments to better manage impaired drivers and to direct them towards appropriate treatment interventions that are built upon best practices.

Purpose and objectives

The purpose of this report is to summarize available knowledge about the profile and characteristics of impaired drivers, relevant risk factors, risk assessment instruments and treatment interventions to treat impaired drivers as well as best practices in this field. It provides an overview of available research regarding the profile of male and female first offenders in relation to repeat offenders and highlights the inability of existing theories of behaviour to adequately disentangle the heterogeneous nature of the impaired driving offender population. It also provides a summary of relevant risk factors that have been linked to repeat impaired driving offences, while acknowledging some of the key limitations of the research in this field. In addition, the report briefly reviews some of the available tools used to assess risk, available treatment interventions that are applicable to impaired drivers, the research relating to their effectiveness, and current best practices for the treatment and rehabilitation of impaired driving offenders in remedial driver licensing programs.

The intent of this report is to provide a high level review of available knowledge that can benefit frontline practitioners working both in the remedial driver licensing system and the criminal justice system. For this reason, additional resources are provided at the end of some

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2 There are a broad range of other policies, programs, and interventions for impaired drivers that have been developed, implemented, and evaluated in the past three decades which are beyond the scope of this report.
sections in the full report in order to afford practitioners an opportunity to review relevant research in more depth.

Profile and characteristics of impaired drivers

This section briefly summarizes what is known about the profiles and characteristics of adult impaired drivers and draws from the research in criminology, psychology, transportation, health, addiction medicine, and neuroscience. It first examines what is known about male offenders followed by what is known about female offenders. Key dimensions that are considered include: demographic factors, personality and psychosocial factors, substance misuse including engagement in treatment, mental health, cognitive impairment, and driver and criminal history. In all of these sub-sections, distinctions are drawn between first versus repeat offenders.

Male impaired drivers

Age and sex. Most impaired drivers are between the ages of 20 and 45 years old with almost half of them being between the ages of 20 and 30 years old (Simpson and Mayhew 1991; Jonah and Wilson 1986; Jones and Lacey 2001; Wanberg et al. 2005). Generally speaking, drinking and driving behaviour begins to decrease substantially after the age of 45 years (Hingson and Winter 2003), though this behaviour persists in some drivers into their 60s. Research shows that between 70% and 80% of impaired drivers are male.

Ethnicity. Research spanning 30 years suggests that a majority of impaired drivers are Caucasian, although there has been less research on ethnicity relative to other demographic factors such as age and sex. However, while ethnicity is one of the factors that is linked to impaired driving (Ferguson et al. 2002; Jones and Lacey 2001), differences between populations studied and the ways in which questions have been posed have resulted in inconsistent evidence in relation to this factor (Caetano and McGrath 2005).

Employment and income. Contrary to popular belief, the majority of impaired drivers are employed, although they are more likely to be unemployed relative to the general population (Wanberg et al. 2005). However, it is important to note that these offenders are more often in the lower-to-middle income range (Ambtman 1990; Wilson and Jonah 1985; Nochajski et al. 1993), and they are more apt to experience occupational instability.

Marital status. Research on the marital status of impaired drivers is fairly consistent with some variations. Some studies suggest that more than two-thirds (65-75%) of impaired drivers are single, separated or divorced (Simpson et al. 1996; Wilson 1991; Nochajski et al. 1993). Thus, while approximately half of impaired drivers are in fact married (but perhaps separated), the other half are comprised of those who are currently unmarried or who have never been married. It is important to underscore that many of these studies were conducted
two decades ago at a time when being married was more often equated with having a stable relationship, whereas today this may be less often the case. As such, it may be more useful and practical to consider the level of stability of any co-habiting relationship as opposed to focusing on the specific marital status of this population.

**Blood alcohol concentration (BAC).** Many impaired drivers possess BACs that are quite high relative to the legal limit in North America of .08 (Simpson et al. 2004; NHTSA 2003). In Canada, the mean BAC among fatally injured drinking drivers is .17 (Mayhew et al. 2011). In the U.S., the average BAC among drivers in fatal crashes is .18 (NHTSA 2010). There is evidence to suggest that while BAC is a good measure of level of alcohol use, it is not a reliable indicator of alcohol-related problems, involvement in impaired driving or risk of recidivism (Wieczorek et al. 1992).

**Personality and psychosocial factors.** A wide range of personality and psychosocial factors have been examined in relation to impaired drivers including sensation-seeking, hostility, aggression, psychopathic deviance, assertiveness, antisocial personality, impulse control, risk perception, narcissistic personality, intermittent explosive disorder, external locus of control (i.e., blaming others for problems), and emotional adjustment. In particular, a comprehensive review by Wanberg et al. (2005) reported that the “most salient personality variables associated with [DWI] behaviour include: agitation, irritability, resentment, aggression, overt and covert hostility; thrill and sensation-seeking; low levels of assertiveness, low self-esteem, feelings of inadequacy, and sensitivity to criticism and rejection; helplessness, depression, and emotional stress; impulsiveness, external locus of control (blame others for problems); social deviance and non-conformity, anti-authoritarian attitudes” (p.23).

**Alcohol misuse.** The role of alcohol misuse in relation to impaired driving behaviour has been studied more than almost any other factor. However, while older research has suggested that substance-related problems were a critical factor in impaired driving offending, more recent research has determined that, although substance use is strongly correlated with impaired driving behaviour, it is not a causal factor.

- It has been well-established over the past 35 years that early onset of alcohol and other drug use are predictive of substance use and abuse in adulthood (Hingson et al. 2002; 2003; Grant and Dawson 1997; Wanberg et al. 2005). Generally speaking, those individuals who begin drinking at an early age (under the age of 14) often consume more alcohol as compared to those who begin drinking in their late teens or at the age of 21 (the U.S. legal drinking age).

- Research shows that there are two characteristics related to family history that are the most strongly associated with number of impaired driving offences as an adult. These include: having a father with a drinking problem (Schuckit 1999; 2009); and
having a relative who was arrested for impaired driving (McMillen et al. 1992a; Wieczorek and Nochajski 2005).

Research investigating the drinking patterns of impaired driving offenders reveals that these individuals generally consumed greater amounts of alcohol per occasion and also consumed alcohol more often than the general population of drinkers (Beirness et al. 1997). There is also research to indicate that a majority of impaired drivers are, in fact, binge drinkers (Caetano and McGrath 2005; Chou et al. 2006). These findings challenge a popular belief that alcoholism is at the root of impaired driving behaviour.

Some research suggests that a diagnosis of alcohol abuse (as opposed to alcohol dependence) is more common among first offenders than repeat offenders, suggesting that this group may generally have lower levels of problem severity relative to repeat offenders (Wieczorek and Nochajski 2005).

Many offenders, regardless of their number of prior offences, are assessed as being in the pre-contemplative stage in relation to the stages of change with regard to their drinking and driving behaviour\(^3\). There is also research demonstrating that impaired driving offenders may be more defensive of their drinking behaviour, and more resistant to self-disclose the extent of their alcohol consumption (BHRCS 2007) than the average patient who engages in alcohol treatment.

A comparison between impaired driving offenders who completed mandated remedial programs versus those who were non-compliant indicated that the latter group possessed the following characteristics: older, lower income in last 30 days, less likely to be married or with a partner, unemployment, similar drinking patterns, more cocaine dependence, higher proportion of positives on axis 1 disorders (e.g., anxiety, depression), and higher proportion of antisocial personality features. Logistic regression further revealed that unemployment was the main predictor of non-compliance (Nadeau 2010), suggesting that cost may be a major obstacle to increased participation among poorer offenders.

**Mental health.** A broad range of mental health and psychiatric conditions have also been linked to impaired driving offenders including antisocial personality disorder, anxiety, conduct disorder, impulse control disorder, narcissism, depression, post-traumatic stress disorder (PTSD), and bipolar disorder. Recognition of and interest in these factors has grown in the past decade, and even more recently as a result of the large number of soldiers and veterans

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\(^3\) The transtheoretical stages of change model posits that individuals with behaviour problems, such as substance dependence, experience several conditions and differ in their willingness to acknowledge that they have a problem and work towards change (Alexander 2000). Interventions or treatment strategies are most likely to be successful when geared toward the stage of change that the individual client is in. Adapted from Prochaska et al.’s (1992) readiness for change process stages, the various stages include: 1) Pre-contemplation (lack of awareness of a problem; no contemplation of change); 2) Contemplation (recognition of a problem; contemplation of change); 3) Preparation (consideration of behaviour change); 4) Action (taking steps to change behaviour such as participation in treatment); and, 5) Maintenance (relapse prevention).
that are involved in impaired driving events either overseas or upon their return to North America.

A number of research studies suggest that psychiatric disorders are higher among impaired drivers (Shaffer et al. 2007; Lapham et al. 2001; McMillen et al. 1992a; Wieczorek and Nochajski 2005). Stress is also considered an important factor in relation to impaired driving behaviour (Wanberg et al. 2005). Research examining the effects of anxiety disorder in relation to substance use has also produced significant findings that may have important implications for impaired drivers (Kushner et al. 2011). Many impaired drivers have substantial histories of drug use (Beirness and Davis 2008). Rates of drug use among first and repeat offenders are not only important but also are not limited to “soft” drugs like marijuana.

**Cognitive impairment.** Executive cognitive function “involves the set of abilities that allows one to select behaviour appropriate to a situation, including the ability to inhibit inappropriate behaviours and to focus on a specific task in spite of distraction” (Brown et al. 2008, p. 115). Deficits are linked to impulse control and self-regulation, capacity to learn and retain intervention content, problem solving, abstracting, and the speed of information processing, among other abilities. Preliminary studies of neurocognitive characteristics of first-time offenders indicate that they are more likely to suffer deficits related to executive cognitive function compared to normal drivers (Brown et al. 2010a; Couture et al. 2010, August).

**Driver and criminal history.** Research has demonstrated that a significant proportion of impaired driving offenders may also have a history of other driving violations as well as other criminal history. In particular, the propensity for other driving and criminal offences appears to be more pronounced among repeat offenders (Simpson et al. 1996; Jones and Lacey 2001; Syrcle and White 2006; Wieczorek and Nochajski 2005). Impaired driving is likely not an isolated high-risk driving behaviour in some offenders, meaning that some individuals who drive while impaired may also have a history of other unsafe and/or high-risk driving behaviours (Beirness et al. 1997). Moreover, reliance solely on driving records to identify these drivers is problematic in light of gaps in reporting and record systems (Simpson and Robertson 2001; Nochajski and Stasiewicz 2006). Studies investigating criminal history of these offenders also illustrate that at least a portion of convicted impaired drivers have a history of other criminal offences and suggest that strengthening linkages between the criminal justice system and impaired driver treatment programs may be beneficial.

**Repeat and/or hard core impaired drivers.** This segment of the impaired driver population generally has many similar characteristics to first impaired drivers, however these characteristics are often more pronounced (Wieczorek and Nochajski 2005).

> Research shows that some 90% of recidivists are male and between the ages of 23 and 45 years.

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4 Hard core impaired drivers, also known as hard core drunk drivers are defined as drivers who drink and drive repeatedly, often at high blood alcohol concentrations, and have a history of prior convictions for impaired driving and/or substance abuse problems.
While a majority of repeat offenders can be classified as Anglo-white (Jones and Lacey 2001; Wanberg et al. 2005), it has also been suggested that ethnicity is related to repeat impaired driver status, however this varies according to region.

Repeat offenders are more often single, separated, or divorced, have less education, lower levels of income, and have higher levels of unemployment in comparison to first offenders.

Finally, among repeat offenders, arrests at higher BACs of .18 or over .20 are more common compared to first-time offenders (Wanberg et al. 2005), as is test refusal at the roadside (Robertson and Simpson 2002).

Findings from the literature exploring personality differences between first and repeat offenders are mixed. Some studies report that repeat offenders demonstrated higher levels of hostility, sensation-seeking, psychopathic deviance, mania and depression, and antisocial tendencies, as well as lower levels of assertiveness and emotional adjustment, self-esteem, locus of control, social desirability (McMillan et al. 1992a; Wieczorek and Nochajski 2005; Cavaiola et al. 2007). Other studies have failed to identify significant differences between these two groups (Cavaiola and Wuth 2002; Wanberg et al. 2005). These apparently contradictory conclusions reveal the fact that the research to date has failed to adequately disentangle the significant heterogeneity observed in the impaired driver offender population. Socially desirable responding among impaired drivers in self-report studies may also bias our understanding of personality and behavioural factors (Schell et al. 2006).

Similar to first offenders, age of onset, family history, and alcohol misuse issues play an important role in relation to repeat impaired driving offenders. A comprehensive review of the literature by Wanberg et al. (2005) similarly reported that repeat offenders have higher levels of disruptive alcohol use symptoms.

Repeat offenders have significantly higher levels of psychiatric symptoms (Wieczorek and Nochajski 2005; Wanberg et al. 2005; Jones and Lacey 2001; Simpson et al. 1996). It has been reported that there are significant differences in drug use by the number of prior offences and persistent offenders have higher levels of use than first offenders (Wieczorek and Nochajski 2005; Wanberg et al. 2005; White and Gasperin 2006). Mental health issues among impaired drivers are an important consideration given that treatment is more difficult when individuals possess emotional and psychiatric problems in conjunction with substance-related problems (Lapham et al. 2001). Hence, not only can co-occurring disorders decrease the effectiveness of treatment, but they are also considered a predictor of poorer treatment outcomes (Lapham et al. 2001; Laplante et al. 2008; Shaffer et al. 2007).
Research reveals that repeat offenders are more likely to possess cognitive impairments. The most intervention-resistant offenders have a decreased ability for self-regulation, for learning and retaining intervention content, and for exercising good decision-making even when sober. Not all of these problems are attributable to alcohol abuse severity. This suggests that new strategies in the design of remedial programs and interventions directed at some offenders with the highest risk of recidivism may be needed (Ouimet et al. 2007; Maldonado-Bouchard et al. 2012; Brown et al. 2008).

Repeat offenders are also more likely to have more traffic offences and to have been involved in crashes more frequently than drivers that are convicted of a first impaired driving offence (McMillen et al. 1992a; Nochajski and Wieczorek 2000; Wieczorek and Nochajski 2005) according to official records and/or self-report.

**Female impaired drivers**

For several decades, road safety research has demonstrated that fatalities and injuries related to road crashes (due to alcohol or other unsafe driving behaviours) have predominantly involved males (Mayhew et al. 1981; Beirness and Simpson 1988; Mayhew and Simpson 1990; Mayhew et al. 1990; Kelley-Baker and Romano 2010).

In Canada, since 2002, females have accounted for 13-16% of fatally injured impaired drivers, reaching a high of 16.4% in 2006 (TIRF 2012). However, this percentage seems to have stabilized in the past four years, and, overall, females continue to account for a minority of this population. An examination of alcohol crash data from the U.S. Fatality Analysis Reporting System (FARS) indicates that the involvement of female drivers in alcohol-impaired road crashes has remained fairly stable with incremental increases from 12% in the 1980s to 14% in the 2000s. Since 2006, the percentage of women drivers who tested positive for any amount of alcohol in fatal crashes has averaged 16% annually, while in 2008 1,837 fatalities in crashes involved an alcohol-impaired female driver (NHTSA 2009).

Conversely, impaired driving incident and arrest data reveal a different picture. In Canada, the impaired driving rate for females generally declined up to 1997 and remained stable through to 2005. It has for the most part increased since 2005 and in 2011, females accounted for one in every six impaired drivers, compared to 1 in 13 in 1986 (Perreault 2013). In the United States, the number of female impaired driving arrests in the U.S. rose nationally by 28.8% between 1998 and 2007 (Lapham et al. 2000; Schwartz and Rookey 2008). Thus, while in the 1990s it was estimated that about 10% of impaired drivers were female, as of the 2000s it has been estimated that women account for closer to 20% (Wanberg et al. 2005; Schwartz and Rookey 2008).
There are three main hypotheses that explain these increases. Female roles in society have changed considerably (Popkin 1991; Bergdahl 1999; Mayhew et al. 2003; Robertson et al. 2011a; Tsai et al. 2008), there have been changes in social norms (Gudrais 2011; Popkin 1991), and also changes in social control mechanisms (Farrow and Brissing 1990; Robertson et al. 2011a; Schwartz and Rookey 2008; Schwartz and Steffensmeier 2007).

Although much of the research investigating female impaired drivers is dated (Robertson et al. 2011b), in 2013 a series of case studies were conducted with more than 150 convicted female impaired driving offenders who participated in interview focus groups in four U.S. states (California, Michigan, Missouri and New York) (Robertson et al. 2013). In particular, three distinct profiles of female impaired drivers also emerged from this study, and it is estimated that more than three-quarters of the study participants matched one of these profiles:

1. Young women who drink in order to ‘fit in’ and consume alcohol and/or binge drink at house parties and bars;
2. Recently married women with spouses who drink or who have children and drink following the birth of their children as a means for coping with loneliness; and,
3. Divorced older women and/or “empty nesters” who begin to drink later in life (after age 40) following a catalyst such as the death of a parent, end of a marriage, or children leaving home.

**Age and sex.** Robertson et al. (2013) found that female impaired driving offenders ranged in age from late teens to mid-60s, suggesting that women of all ages drink and drive. However a majority of participants were an estimated 20 to 40 years of age. Generally, rates of involvement in alcohol-impaired motor vehicle crashes decrease with age, and the population of greatest concern is often young females (Peck et al. 2008). In particular, the increasing involvement of young women with alcohol, in combination with their inexperience driving and their growing propensity for risky driving (Lynskey et al. 2007; Tsai et al. 2010) warrants attention and further research.

**Education and employment.** The literature regarding levels of education and employment among female impaired drivers is inconsistent. Female impaired drivers are generally older than men and have higher levels of education (Peck et al. 2008) but lower paying jobs (Chalmers et al. 1993; Shore and McCoy 1987). Low academic achievement in young females represents a risk factor for impaired driving comparable to that observed in males (McMurran et al. 2011).

**Marital status.** A significant proportion of female impaired drivers are single, divorced, or separated, or are more likely to be living with a partner with an alcohol problem compared to women with no past impaired driving offences (McMurran et al. 2011; Chang et al. 1996;
Shore and McCoy 1987; Argeriou et al. 1986). In fact, when compared to male impaired drivers, females are even more likely to be divorced or single (McMurran et al. 2011; Chang et al. 1996; Shore and McCoy 1987; Argeriou et al. 1986). Generally speaking, female impaired drivers are more likely to be the primary caretaker of children at the time of arrest, are more likely to have experienced abuse, and are more likely to have physical and mental health needs compared to their male counterparts (Bloom et al. 2003).

**Personality and psychosocial factors.** In contrast to the availability of research examining this issue among male impaired drivers, there have been fewer studies examining the prevalence of personality and psychosocial factors among female impaired drivers. A review of these studies suggests that psychosocial problems among female impaired drivers may not be uncommon and that, at least a portion of these women may experience depression, boredom, and problems at home and school that are related to their drinking (McMurran et al. 2011).

**Alcohol misuse.** Alcohol use among women is a very important factor to consider in relation to impaired driving for several reasons. Research shows that women metabolize alcohol differently than men (Gudrais 2011; Greenfield 2002). In addition, females generally have less water in the body and a lower body mass. Physiological differences also contribute in part to the more rapid progression of alcohol dependence such that women often require medical intervention an average of four years earlier than males who are problem drinkers (Gudrais 2011). It is also important to note that a study by Elliott et al. (2006) found that women are more vulnerable to all types of traffic incidents following alcohol consumption.

- Most recently, Robertson et al. (2013) reported that the extent of substance use varied substantially across study participants. It is estimated that almost one-half of women reported early onset of drinking with many experimenting with alcohol and/or drugs in their early or mid-teen years; the lowest reported age of onset drinking was nine years old. Conversely, it was estimated that between one-quarter and one-third of women did not begin to regularly use or develop a problem with alcohol or drugs, or begin to drive after using these substances, until they were in their 30s or 40s.

- A constellation of family history factors, including a history of alcoholism within the family, experience with abuse, anxiety and depression, and family and personal relationships that encouraged heavy drinking (White and Hennessey 2006), are associated with female impaired driving offending to varying extents, however the specific influence of each factor is unclear.

- Estimates of alcohol diagnoses among female impaired drivers vary but are significant and comparable to or greater than males (Lapham et al. 2000; Maxwell and Freeman 2007; Maxwell 2011). In a study by Robertson et al. (2013) a universal
theme that emerged in interview focus groups with more than 150 convicted female impaired drivers was reports that they drank for emotional reasons, or that alcohol consumption was a coping mechanism to help them manage their emotions and stress.

**Mental health.** Findings indicate that there is a need to treat some female impaired drivers not only for alcohol misuse problems but mental health problems as well (McMurran et al. 2011). Female impaired driving offenders have significantly higher psychiatric co-morbidity relative to their male counterparts (Laplante et al. 2008). Diagnoses of anxiety, depression, and post-traumatic stress disorder (PTSD) are common among female impaired driving offenders. Histories of trauma are also not uncommon among female impaired drivers (Robertson et al. 2013).

> The use of illicit and licit substances among female impaired drivers is prevalent. Some studies suggest that involvement in drug use may be more comparable among males and females (Lapham et al. 2000). However, Maxwell and Freeman (2007) reported that the use of illicit drugs was higher among females as compared to males, noting that females most likely to be diagnosed with a primary problem with sedatives or opiates, whereas males were most likely to be diagnosed with a primary problem with alcohol and cannabis (Maxwell 2011). More recently, Robertson et al. (2013) reported that, although prescription drug use was common, less than one-third of female impaired drivers reported use of illicit substances. Given that the use of drugs appears to be somewhat common among female impaired drivers, it is important that female offenders are appropriately screened, identified, and treated for all drug use disorders.

**Cognitive impairment.** While there has been limited research into the prevalence of cognitive impairments among female impaired drivers, Brown et al. (2013) reported that executive control appears to be a feature of female first impaired driving offending and that their ability to identify goals, plan, execute, inhibit old behaviour patterns, and learn from experience is reduced. These impairments worsened with alcohol intake. As such, alcohol appeared to contribute to female first impaired driving offending through acute and chronic disruption of executive control functioning.

**Driver and criminal history.** There are limited data to suggest that a smaller number of female impaired driving offenders relative to males have a history of other traffic offences or criminal offences, although more research into this topic is needed. Common criminal offences in females may include drug offences, theft offences, and assault (Caldwell-Aden et al. 2009).

**Repeat female impaired drivers.** Female repeat impaired driving offenders often share similar characteristics to their male counterparts.
Older research suggests that repeat female offenders are approximately 30 years old but more current research on this issue is needed.

Similar to males, there is also evidence that this population has lower levels of education, employment, and income, and is much more likely to be single, separated, or divorced than first offenders.

Like their male counterparts, repeat female impaired driving offenders are more likely to drink more frequently and exhibit higher levels of impairment, more often abuse drugs, and utilize treatment services (Argeriou et al. 1986).

However, there are some differences between female and male repeat offenders. For example, repeat female impaired driving offenders have higher levels of psychiatric co-morbidity than male repeat offenders and are more likely to also use drugs (Laplante et al. 2008; Maxwell 2011).

Recidivism rates among male and female impaired drivers show some consistent patterns, depending on the studies consulted. Available data suggest recidivism risk may be higher for young males than females (Argeriou et al. 1986; Jones and Lacey 2001; McMurran et al. 2011; Webster et al. 2009; Wells-Parker et al. 1991), but it appears that risk of recidivism may converge as adults of both sexes age (Lapham et al. 2000). However, a comparison of rates among older offenders revealed few differences between sexes (Laplante et al. 2008; Rauch et al. 2010). As relatively few studies have specifically examined this issue, more research is needed.

**Summary of similarities and differences between males and females**

On average, impaired drivers of both sexes are generally aged 20 to 40, with many offenders being in their 30s. Relative to the general population, impaired drivers of both sexes also are more likely to have less education and lower levels of employment and income; this finding is more pronounced among repeat offenders. Similarly, impaired drivers of both sexes are more likely to be single, separated, or divorced. Again, this finding is more pronounced among repeat offenders.

Alcohol-related diagnoses are very common among impaired drivers of both sexes. In particular, the age of onset of drinking and family history warrant attention. To reiterate, while such diagnoses are highly correlated with impaired driving offending, they are not necessarily a causal factor. Both male and female impaired drivers have higher levels of psychiatric symptoms relative to the general population so co-occurring disorders should not be overlooked during screening and assessment of this population. Moreover, recidivism rates for impaired driving among men and women of adult age appear similar following a first alcohol-related conviction.
There are also some important differences between male and female impaired drivers. Men appear to exhibit a higher degree of antisocial attitudes and behaviours relative to women, although research comparing these populations on this dimension is sparse. Conversely, women experience more severe psychological and mental health symptoms as well as report greater involvement in drugs. Men may be more defensive about alcohol problems and, in particular, repeat male impaired drivers may demonstrate a greater readiness for change. In addition, younger males appear to have higher recidivism rates relative to females in this age category. Male impaired drivers also have more extensive histories of driving offences and other criminal offences as well as more prior experience with impaired driving interventions.

**Impaired driving risk factors**

Risk factors are characteristics that are identified (according to sufficient research evidence) to be indicators of the potential for a group of individuals with shared characteristics to engage in a specific behaviour in the future. It cannot be underscored enough that “understanding the factors associated with recidivism is critical to our capacity for better detection of high-risk offenders and our ability to orchestrate effective countermeasures” (Ouimet et al. 2007, p. 743).

Generally speaking, risk factors are organized in two distinct categories: 1) static factors (e.g., number of prior offences) that cannot be changed; and, 2) dynamic factors (e.g., substance abuse) which may change over time (Gendreau et al. 1996; DeMichele and Lowe 2011). Again, risk factors are relative to a group and not an individual and, subsequently, these measures are not very robust (Nadeau 2010).

Risk assessment is a process that utilizes identified risk factors (usually in relation to multiple domains) to predict future behaviour. Risk assessment is not an exact science and risk factors only provide insight into the probability or likelihood of recidivism of offenders based upon existing research that is available. In this regard, much of the research around risk prediction has focused on criminal offenders and, in particular, those who have committed violent and/or sexual offences.

More recently, the quality of instruments used with offenders has greatly improved (to Andrews and Dowden 2006) as our understanding of risk factors has grown. Risk assessment instruments that possess a higher degree of accuracy in prediction generally account for multiple risk factors to reach a determination as to the probability of recidivism, and place a greater emphasis on objective measures as opposed to just the reliance on professional judgment which is more often subjective.

A broad range of risk factors have been noted in the literature regarding impaired drivers including: sex, age, marital status, socio-economic status, history of prior treatment, impaired driving history, criminal history of violent aggression, prior traffic offences, test refusal or

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5 It is equally important that risk assessment instruments demonstrate proven reliability and are scientifically validated and standardized on an appropriate population.
high-BAC, and drinking patterns to name a few (Syrcle and White 2006). Yet, these studies vary dramatically in terms of the population studied, sample size, variables and measures utilized, data sources, analyses conducted, comparison groups employed, the time period used to measure recidivism, and the interpretation of results. Moreover, the number of studies that have examined the reliability of each individual risk factor is relatively small, which makes the drawing of conclusions a challenge.

In light of the limitations associated with research investigating risk factors associated with impaired driving, what is currently known about impaired driving risk factors should be interpreted cautiously. At best, no single impaired driving risk factor provides a clear indication regarding the potential for future impaired driving recidivism. Collectively, however, these risk factors may provide some insight that enable practitioners to gauge the need to further explore individual cases and the need for more intensive interventions.

In brief, there is some limited evidence to support the use of the following factors as predictors of impaired driving recidivism among males:

- younger age;
- male sex;
- life history including family members or spouses with alcohol problems or impaired driving arrests;
- early onset alcohol and drug use and abuse, frequency of drinking, amount of alcohol consumed;
- BAC is often cited as a reliable predictor of recidivism but research findings are mixed and more recent research suggests that BAC alone is not useful and should be interpreted cautiously or in combination with other predictive variables (Caviola et al. 2007; Dugosh et al. 2013);
- Instruments with some strength in predicting recidivism include the MAST, the MAC scale of the MMPI, and the subtle items of alcoholism on the RIASI. Of importance, different jurisdictions or offender samples will have higher or lower rates of failing, and agencies need to make decisions about how to balance the positive and negative predictions. That is, assessment is an exercise in prediction, and prediction has error. It is a bit of an art to balance these issues, but also a matter of agency capacity. The bottom line is that because of decisions regarding instrument precision, practitioners should be careful about comparing different assessments and even the same assessment across different populations;
- Biomarkers can detect the presence of alcohol disorders fairly accurately and a number of studies have investigated the extent to which biomarkers are predictive
of impaired driving recidivism. More recently, there is research to suggest that biomarkers are not a good predictor of recidivism, individually or as a group. The primary reason for this is that biomarkers may not capture the drinking patterns that are most common among impaired driving offenders – e.g., binge drinking (Couture et al. 2010);

➢ A poor driving record that includes offences both prior to and following the initial impaired driving offence is predictive of recidivism (Peck et al. 1994; Rauch et al. 2002; Wieczorek and Nochajski 2005; Cavaiola et al. 2007). However, some have noted that prior impaired driving arrests may not be a good predictor as the presence of prior arrests is influenced to a large extent by the level of impaired driving enforcement as well as the length of the “look-back” period for counting prior arrests (Nochajski and Stasiewicz 2006);

➢ Research investigating risk factors associated with criminal re-offending has identified a number of objective and verifiable risk indicators that are useful to distinguish between first and repeat impaired drivers. These variables are associated with an offender’s criminal history and include: “age at time of first arrest for any criminal act, age at time of first impaired driving conviction, having a prior summary of alcohol- or drug-related offence, having a prior misdemeanor offence, having a misdemeanor offence for a crime against persons, or having five or more prior moving violations” (Dugosh et al. 2013, p.8);

➢ Research suggests that a high rate or pattern of BAC fail readings from the alcohol interlock, particularly in excess of .02, is predictive of the likelihood of impaired driving recidivism (Marques et al. 2003; Beirness and Marques 2004). Researchers have also determined that the presence of elevated BAC tests during early morning hours can also assist in predicting future impaired driving offences (Beirness and Marques 2004); and,

➢ A number of recent studies have identified risk factors among repeat offenders in comparison to first offenders (Nadeau 2010). Low levels of participation or involvement in treatment and treatment interventions is considered predictive of recidivism (Aharonovich et al. 2003; Crews et al. 2005; Syrclle and White 2006; Wanberg et al. 2005). Neurocognitive deficits have also been reported as predictive of recidivism among repeat offenders. More specifically, these deficits can contribute to variation in affect, impulsivity, problem solving, perception and memory (Glass et al. 2000; Ouimet et al. 2007). Finally, a reduced ability to change is also predictive among repeat offenders of future impaired driving offences (Buntain-Ricklefs et al. 1995; Glass et al. 2000; Ouimet et al. 2007).
With regard to female impaired drivers, there is one key study that examined differences in risk factors among men and women. For the most part, few differences were found in terms of predictive variables with the exception that women were more likely to report a history of aggressive behaviour towards a partner than were males, and this indicator was associated with increased recidivism (Lapham et al. 2000).

While it is clear that a wide range of risk factors have been examined in relation to the prediction of repeat impaired driving offences in the past two decades, the findings from this research are inconsistent in many cases and far from conclusive. There are only a small handful of common factors that have been investigated across several studies, however with regard to criminological research, more is known about risk factors among repeat drunk drivers. For these reasons, practitioners in the field are encouraged to take a broader view of and approach to the use of these factors, and focus on the presence of a number of risk factors collectively as a basis to inform decisions, as opposed to the presence or absence of individual factors. Much more research on this issue is needed before definitive conclusions can be reached.

**Risk assessment instruments**

The effective management of the many different types of impaired drivers is based upon the identification and development of a range of supervision strategies and interventions specifically geared towards those offenders who are more or less amenable to behaviour change. This is a fundamental principle of evidence-based practices. Of considerable importance, the use of valid and reliable risk assessment instruments is essential to accurately differentiate between the different types of impaired drivers that exist and ensure that they are streamed into appropriate interventions designed to address their specific risks and needs. These assessment tools are designed to identify as many potential cases as possible, while at the same time minimizing the number of false-positives (i.e., identifying someone as “high-risk” for re-offending when they are not). Some of these instruments are not as strong and have demonstrated limited validity and reliability in relation to the accurate prediction of future impaired driving events, including the following:

- Mortimer Filkins (MF) (Chang et al. 2002; Wendling and Kolody 1982); and,
- Driver Risk Inventory (DRI) (Chang et al. 2002).

In light of the strengths and weaknesses associated with many of the available instruments, many jurisdictions rely on the outcomes of several instruments during the assessment process in order to produce a more complete picture of impaired driving offenders.

The full report briefly describes some of the instruments that are most commonly used across Canada and the United States. Each instrument is described in terms of type
of administration, who it can be administered by, number of items, time required for administration, training required for administration, scoring, summary of psychometrics, limitations, cost, and source. In addition, a few key references are identified in relation to each instrument in order to provide additional information to practitioners seeking more knowledge about the risk assessment instrument.

The following is a list of the instruments described in the full report:

- ADS (Alcohol Dependence Scale);
- ASUDS-R (Adult Substance Use and Driving Survey – Revised);
- ASI (Alcohol Severity Index);
- AUDIT (Alcohol Use Disorders Identification Test);
- IDTS (Inventory Drug-Taking Situations);
- DAST (Drug Abuse Screening Test);
- LSI-R (Level of Service Inventory-Revised);
- MAST (Michigan Alcoholism Screening Test);
- SASSI (Substance Abuse Subtle Screening Inventory);
- RIASI (Research Institute on Addiction Self Inventory); and,
- Biomarkers.

There are no clear indications of the superiority of any one screening instrument or set of instruments and procedures. To summarize, there are many impaired driver assessment instruments that are available and utilized across North America. Yet not all of these instruments have been validated on an impaired driver population and few have undergone rigorous or independent evaluation efforts. It is for this reason that many jurisdictions rely upon a combination of these instruments to guide the assessment process.

It is essential to underscore that problem substance use behaviour in and of itself is not the source or cause of persistent impaired driving behaviour, but instead merely a correlate of it. Therefore while assessment instruments designed to identify the likelihood of relapse among substance using and even impaired driving populations provide valuable information, these tools frequently overlook the role of criminogenic and socio-psychological factors that are important contributors to chronic offending.

Of the available risk assessment instruments to date, both the LSI-R and ASUS instruments appear to be the most well-grounded in theory and based upon a solid theoretical

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6 The Adult Substance Use Survey (ASUS) is a self-report survey that consists of 64 items designed to assess an individual’s perceived alcohol and drug use. The survey also provides a brief mental health screen. It can either be self-administered (paper-and-pencil) or administered orally by a practitioner. Unlike the ASUDS-R, this screening instrument is not specific to an impaired driving offender population although both tools were developed by the Center for Addiction Research and Evaluation (CARE).
foundation. These instruments incorporate a range of recognized concepts stemming from several relevant disciplines including criminology, psychology, sociology, and addictions, and these concepts have been repeatedly tested and validated through extensive research. Such a comprehensive approach is essential in light of the well-documented complexity associated with impaired driving behaviour and the diversity of underlying processes that have been used to explain persistent offending by this population. It should be underscored that assessment approaches that are multi-trait and multi-method provide more accurate results (Campbell and Fiske 1959).

Looking forward, there is some clear direction as to ways to strengthen research that can guide the development of empirically-based risk assessment instruments. First, with regard to the evaluation of risk assessment instruments, Brown and Ouimet (2013) underscore that “Longer duration perspective evaluations of assessment protocols for prediction of recidivism are urgently needed” (p.311). Second, the research undertaken by Dugosh et al. (2013) provides a basis to begin to integrate criminological theories and empirically-based risk factors to enhance risk assessment tools for impaired drivers. The inclusion of these factors in risk assessment tools can help to strengthen the internal validity of them.

**Treatment interventions**

Alcohol education programs for impaired drivers show an average reduction in recidivism of approximately 10% (NHTSA 1986; Wells-Parker et al. 1995). Among offenders who suffered from some degree of substance misuse problems, those programs that utilized a therapeutic approach are considered to have a greater effect, illustrating the value of treatment as an intervention to encourage rehabilitation and behaviour change (Wanberg et al. 2005).

The results of a risk assessment in conjunction with resources that are available are two critical components of any intervention strategy. There is growing evidence to suggest that combining appropriate sanctions and supervision with treatment interventions can be more effective than either strategy alone. The partnering of these different strategies can expand opportunities to achieve long-term risk reduction and to reduce and/or prevent repeat offending. In order to maximize the effectiveness of this approach it must be assessment driven and combine appropriate levels of supervision with appropriate treatment interventions.

The full report briefly describes a variety of common approaches to treatment including:

- screening and brief interventions (SBI);
- motivational interviewing (MI);
- cognitive behavioural therapy (CBT);
- pharmacological interventions; and,
Each intervention is described in terms of purpose and objectives, general effectiveness, staff training requirements, mechanism of delivery, and strengths and weaknesses. Note that some of these interventions have been specifically evaluated on an impaired driving population whereas others are merely a source of emerging interest and more research is needed to gauge effectiveness with impaired drivers. In addition, a few key references are identified in relation to each intervention in order to provide additional information to practitioners seeking more knowledge about specific strategies.

In summary, there is a range of treatment interventions that have been shown to be promising or effective in reducing recidivism among impaired driving offenders. However, each of these strategies rely upon different levels of resources, staff with different backgrounds and qualifications, different amounts of time, and have varying levels of cost. In addition, some interventions are more easily implemented and delivered than others. Perhaps what is most important is that efforts are made to best match interventions to the individual risks and needs of each offender.

**Best practices for treatment and rehabilitation of impaired driving offenders**

Health Canada produced a Best Practices report (2004) that was based upon a thorough literature review, consultation with experts, and interviews with key informants. The aim of the report was to compile current knowledge on driving while impaired remedial programs across Canada.

Specifically, the report addresses the planning and delivery of education programs and treatment and rehabilitation programs. The report in its entirety can be found online: [http://www.hc-sc.gc.ca/hc-ps/alt_formats/hecs-sesc/pdf/pubs/adp-apd/bp_treatment-mp_traitement/treatment_rehab_driving_impaired_practices.pdf](http://www.hc-sc.gc.ca/hc-ps/alt_formats/hecs-sesc/pdf/pubs/adp-apd/bp_treatment-mp_traitement/treatment_rehab_driving_impaired_practices.pdf)

**Research gaps and future needs**

Much has been learned about the profile and characteristics of impaired drivers over the course of the past three decades. To a lesser extent, knowledge has also grown with regard to the factors that put them at risk, the types of assessment instruments that are appropriate for this population, and the types of treatment interventions that can begin to address their risks and needs.

Still, continued efforts are needed to increase understanding of these topics and to inform approaches that can best prevent impaired driving behaviour, as well as manage, supervise and treat those that are detected and processed through the criminal justice system.
number of topics that reflect gaps in offender research, gaps in intervention research, and gaps in implementation and practice warrant future attention.

> Perhaps most pressing in the field of research is the need to integrate existing knowledge stemming from diverse disciplines as a basis to explore and develop more holistic, robust and complex models of impaired driving behaviour that acknowledge the heterogeneity of this population. A core feature of this initiative should be to increase understanding of the interactions and effects of different characteristics of offenders.

> Greater knowledge and understanding of relevant risk factors that influence future offending is also a critical need.

> The development of valid, reliable and practical screening and risk assessment instruments that can accurately distinguish between offenders not only with regard to risk related to substance use but also risk of re-offending and individual-specific trajectories to impaired driving behaviour are essential to inform decision-making and the allocation of resources.

> Future efforts to investigate the effectiveness of interventions must account for not only the increasingly complex environment in which such interventions are delivered, but also the web of factors that play an important role.

> A range of research questions remain that must be addressed. These include:

  » Is it possible to achieve an optimal balance between sanctions/supervision and rehabilitation/treatment for offenders with different levels of risk?

  » What interventions or combination of interventions provide the best outcomes for different subpopulations of offenders?

  » Are there commonalities and differences across interventions that can provide insight into the essential ingredients of effective interventions? This may include an examination of content, delivery mechanisms, training, duration, key features, and the emphasis that is placed on sanctioning, rehabilitation or both.

  » Is there an optimal duration for the various interventions that are available, including educational programs, treatment, probation, and alcohol monitoring technologies?

  » Is it possible to achieve the outcomes associated with longer-term and more intensive treatment interventions using well-designed programs that are more cost-effective and shorter in duration?
What characteristics of offenders are most useful to appropriately match them to effective interventions?

With regard to the implementation of interventions, the following issues should be addressed:

- Increases in female involvement in impaired driving arrests and crashes warrant close monitoring and may have important implications for the delivery of interventions in order to account for differences across sexes and ages.

- There is growing awareness that additional and complementary services may be required for specific sub-populations of offenders such as those who possess deficits in executive cognitive functioning, those who suffer from co-occurring disorders, and those offenders identified with polysubstance (i.e., alcohol and drugs) use.

- While much has been learned with regard to effective interventions, less work has been focused on the implementation of such programs to ensure that they are delivered in ways that demonstrate fidelity to the model.
Drinking and driving has been widely recognized as a major social problem in Canada for more than three decades. Due to the significant number of fatalities and serious injuries caused by impaired drivers each year, and the growing concern associated with the problem (Simpson and Mayhew 1991), jurisdictions have worked to develop a comprehensive approach to address it. Since the 1980s, education and awareness programs have expanded, enhancements have strengthened criminal and administrative laws, and enforcement activities have become prominent and commonplace.

Heightened attention along with a myriad of efforts to combat the problem have resulted in significant declines, with the proportion of fatally injured drivers with BACs in excess of the legal limit dropping 27% between 1981 and 1988 (Mayhew et al. 1996). In the 1990s, progress continued, but declines were less pronounced as the proportion of fatally injured drivers with a BAC over the legal limit dropped just 13.9% between 1990 and 1998 (Mayhew et al. 2011).

These shrinking declines were attributed to the fact that the characteristics of the problem had changed (Simpson et al. 1996). It was suggested that the deterrent effect associated with available countermeasures was less pronounced among heavier drinkers who persisted in driving after drinking, often with high BACs (Simpson et al. 1996) and who were responsible for a very significant portion of the problem (Beirness et al. 1997; Simpson et al. 1996). Hence, major decreases in the magnitude of the problem have been more difficult to achieve.

Although a general decreasing trend in the number of persons killed in a traffic crash involving a drinking driver continued in Canada between 1995 and 2008, the progress achieved since the late 1990s has been nominal and the number of persons killed and injured in crashes involving drinking drivers remains high. In 2010, (the most recent year for which data are available), 33.6% of fatally injured drivers in Canada had a BAC in excess of the legal limit of .08 (Brown et al. 2013). In addition, in 2010, 744 people were killed in Canada.

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1 Reported Canadian national data on alcohol-related crashes resulting in fatalities and serious injuries include all drivers that test positive for any amount of alcohol. This means that drivers that are below the legal limit for impairment as well as those above the legal limit are included in these counts. Hence the term drinking driver is used as opposed to impaired driver.
in road crashes that involved a driver who had been drinking and approximately 2,733 drivers (excluding Newfoundland and Labrador) were involved in alcohol-related serious injury crashes in Canada (Brown et al. 2013).

Public opinion polls demonstrate the high level of concern associated with impaired driving among young drivers in particular, and data indicate that concern about this population is warranted. A national survey revealed that a majority (82.1%) of young Canadian drivers (aged 16-24) agreed that young drinking drivers are a very or extremely serious problem; almost the same percentage of adult drivers (aged 25+) (83%) equally agreed that young drinking drivers were a problem (Marcoux et al. 2011). In 2010, drivers aged 25 and under accounted for 22.7% of all fatally injured drivers (312 of 1,372). Among fatally injured drivers who had positive BACs, 28.4% (123 out of 433) were aged 25 and under. Among drivers aged 25 and under, 45.4% of those tested (123 out of 271) had positive BACs (Brown et al. 2013).

This is a concern because, while young drivers make up a small proportion of the drinking and driving problem relative to other drivers, some research has shown that when young drivers do drink and drive, they are more likely than adults to experience an alcohol-related crash (Bingham et al. 2009). To illustrate, among drivers under the age of 21, positive BACs are associated with higher relative crash risks compared to drivers over the age of 21 (Peck et al. 2008). Further, among young drivers, the likelihood of being involved in a crash has been shown to be higher at all BAC levels compared to older drivers (Peck et al. 2008).

To summarize, according to Vanlaar et al. (2012) who reviewed recent trends in drinking and driving in Canada, “There has been a continued and consistent decrease in the number of fatalities involving a drinking driver in Canada. This remains true when looking at the number of fatalities involving a drinking driver per 100,000 population, and per 100,000 licensed drivers. This decreasing trend is also still apparent when considering the percentage of persons killed in a traffic crash in Canada involving a drinking driver, although less pronounced. Data from [TIRF’s] Road Safety Monitor further show that the percentage of those who reported driving after they thought they were over the illegal limit has also declined. However, regardless of the apparent decreasing trend in drinking driving fatalities and behaviour, reductions have been relatively modest, and fatalities in crashes involving drivers who have consumed alcohol remain high at unacceptable levels” (p.297). Of equal concern, from 2010-2011 there were 40,144 criminal convictions for impaired driving2 in Canada (Dauvergne 2012), placing a significant burden on the criminal justice system.

In the United States, progress in reducing alcohol-impaired deaths and injuries has been very comparable to Canada in that progress was more pronounced in the late 1980s and early 1990s, with little headway being achieved between the mid-1990s and mid-2000s. Only

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2 The term “impaired driving” is used throughout this report to refer to the drivers who are considered to be legally impaired or have a blood alcohol concentration in excess of the legal limit of .08.
more recently has renewed progress emerged. After holding steady between 13,000-14,000 impaired driving fatalities annually for several years, new decreases have been recorded, and fatalities have since dropped to a new low of 10,136 in 2010 and 9,878 in 2011 (NHTSA 2012). In addition, convicted impaired driving offenders represent approximately 15% of the four million adults on probation. To better manage and intervene with this population, probation agencies are seeking guidance to help identify better ways to supervise these individuals (DeMichele and Payne 2013).

Progress in the European Union (EU) has been more difficult to gauge in light of inconsistencies in reporting across member states. However, it has been estimated that 2% of all vehicle kilometers travelled (VKTs) driven in the EU are with an illegal BAC, keeping in mind that the average legal BAC limit is more likely to be .05 or lower. It is estimated that there were 31,000 road deaths in 2010 in the EU and the European Commission estimates 25% of all road deaths in the EU are alcohol-related. It is important to note that comparisons of drink driving crashes and fatalities across countries should be made with caution in light of significant differences in data collection and reporting (ETSC 2011).

In light of these trends, increased knowledge and understanding of the profile and characteristics of impaired drivers, the factors that put them at risk for recidivism, available risk assessment instruments and relevant treatment options can inform the activities of transportation, criminal justice, and health practitioners to better identify, manage, and address this high-risk population in the future.
2. INTRODUCTION

In light of the shrinking declines in the drinking and driving problem in the past decade, renewed efforts are needed to better target those Canadians who continue to drive after drinking and place themselves and others at high risk for death and injury. To this end, there is growing awareness among researchers and practitioners of the limitations of a solely punitive approach to the problem. Although there is less awareness of these limitations at a political or public level – the “get tough” philosophy still dominates much of the application of justice. In particular, persistent impaired drivers are more often viewed by researchers and practitioners as offenders who may suffer from a treatable problem with substance misuse3 (and who may or may not have other issues as well), as opposed to being viewed merely as persistent offenders who are unlikely and/or not able to change their behaviour.

The good news is that there is increasing recognition of the importance and benefits of tools such as risk assessment and treatment as alternatives to complement punitive measures. Research shows that properly-designed strategies and tools developed to match offenders’ risks and needs with appropriate programs and interventions have beneficial effects (Bonta 2002; NIDA 2006; Oglaff and Davis 2004), including reductions in recidivism as well as reductions in substance misuse that translate into long-term risk reduction and higher levels of public safety.

At the same time, growing economic challenges mean that jurisdictions are seeking ways to use resources more effectively and efficiently to best manage drinking and impaired drivers and protect the public. The use of evidence-informed risk assessment tools and practices is one means to attain this goal and a linchpin to making the best use of available resources to achieve greater declines in the magnitude of the problem.

The use of risk assessment instruments has become increasingly commonplace to help practitioners differentiate among distinct types of impaired drivers, especially those more prone to recidivism. However, to use these tools effectively, it is important that practitioners possess a clear understanding of the research pertaining to the characteristics and profile of

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3 Substance misuse is defined by the World Health Organization as the “use of a substance for a purpose not consistent with legal or medical guidelines, as in the non-medical use of prescription medications. The term is preferred by some to abuse in the belief that it is less judgmental.” (WHO 2013)
impaired drivers about the appropriate ways to apply risk assessment instruments to better manage impaired drivers. As such, it is imperative that research findings which provide insight into the profile and characteristics of impaired drivers, the factors that place them at risk for re-offending, and the reliability and validity of instruments to assess risk are translated to practitioners in the criminal justice, transportation and health systems to strengthen practice in the field. Moreover, knowledge about treatment interventions and best practices must be shared with practitioners to inform decision-making and to ensure that offenders are appropriately managed and treated to reduce long-term risk.
3. PURPOSE AND OBJECTIVES

Research to inform the risk assessment of impaired drivers has grown in the past decade. In conjunction with this, demand for knowledge has increased as agencies seek to better utilize limited resources to effectively manage this population. Thus, it is timely to take stock of available research and knowledge about impaired drivers and their offending behaviour in an effort to inform practices that are currently applied to characterize, assess, and manage these drivers post-conviction in a way that promotes long-term risk reduction.

The purpose of this report is to summarize available knowledge about the profile and characteristics of impaired drivers, relevant risk factors, risk assessment instruments and effective treatment interventions to treat impaired drivers as well as best practices in this field. It provides an overview of available research regarding the profile of male and female first offenders in relation to repeat offenders and highlights the inability of existing theories of behaviour to adequately disentangle the heterogeneous nature of the impaired driving offender population. It also provides a summary of relevant risk factors that have been linked to repeat impaired driving offences, while acknowledging some of the key limitations of the research in this field, and briefly reviews some of the available tools used to assess risk. Finally, it offers an overview of available treatment interventions that are applicable to impaired drivers, the research relating to their effectiveness, and current best practices for the treatment and rehabilitation of impaired driving offenders in remedial driver licensing programs.

This report provides answers to the following questions:

- What characteristics are associated with impaired driving?
- Are there important differences between first and repeat impaired drivers?
- Are there important differences between male and female impaired drivers?
- What is known about risk factors associated with impaired driving?

4 There are a broad range of other policies, programs, and interventions for impaired drivers that have been developed, implemented, and evaluated in the past three decades which are beyond the scope of this report.
What instruments are available to assess risk?

What treatment interventions are available for impaired drivers and how effective are they?

What is known about factors that are related to better treatment outcomes?

What best practices exist for the treatment and rehabilitation of impaired driving offenders?

In addition, the report also summarizes priority gaps in offender research, gaps in intervention research, and gaps associated with the implementation of interventions in order to provide guidance for the field and to encourage ongoing collaboration between researchers and practitioners to begin to fill these gaps.

The intent of this report is to provide a high level review of available knowledge that can benefit frontline practitioners working both in the remedial driver licensing system and the criminal justice system. For this reason, additional resources are provided at the end of some sections in order to afford practitioners an opportunity to review relevant research in more depth.
A wealth of research has been conducted in the past three decades that examines the profile and characteristics of impaired driving offenders. While much of this research focuses on males and attempts to identify differences in the profile and characteristics of first versus repeat impaired drivers, some research has also included female offenders, as well as focused exclusively on female impaired drivers.

This section briefly summarizes what is known about the profiles and characteristics of adult impaired drivers and draws from the research in criminology, psychology, transportation, health, addiction medicine, and neuroscience. It first examines what is known about male offenders followed by what is known about female offenders. Key dimensions that are considered include: demographic factors, personality and psychosocial factors, substance misuse including engagement in treatment, mental health, cognitive impairment, and driver and criminal history. In all of these sub-sections, distinctions are drawn between first versus repeat offenders.

While there is also a wealth of research specific to young impaired drivers, this is beyond the scope of this report. However, individuals interested in more information on this topic should refer to “Driving with Care Education and Treatment of the Underage Impaired Driving Offender: An Adjunct Provider’s Guide” by Wanberg, K.W., Milkman, H.B. and Timken, D.S. (2010) published by Sage, Thousand Oaks, CA.

To help place these findings in context, it is worthwhile to highlight some of the limitations of this research, aptly described in Bud Perrine’s theory of “the Quick, the Caught, and the Dead” (1990) and noted by Wanberg et al. (2005) in their book entitled Driving With Care: Education and Treatment of the Impaired Driving Offender (The Provider’s Guide). There are three main sources of information that can inform our understanding of impaired drivers. Much of what is currently known has been drawn from observations of samples of offenders who have been “caught” by the criminal justice system. These so-called convenience samples of offenders are more easily studied, but are not necessarily representative of the entire
offender population. Some of what is known has been learned from studies of the “dead,” that is, those impaired drivers who have been killed in road crashes. Fatal road crashes are relatively rare events and arise from a confluence of factors (e.g., poor road design), so these drivers also are not necessarily representative of the entire offender population either. In sharp contrast, little is known about “the Quick,” or those impaired drivers who drink and drive, sometimes repeatedly, but are not detected. At this time, it is not known if these impaired drivers share common characteristics with their counterparts who are arrested or who die in road crashes. This is a recognized gap in the field; more information about this latter group of offenders is needed to increase our understanding of impaired driver behaviour and ways it can be prevented or reduced.

4.1 Male Impaired Drivers

4.1.1 Demographic factors

Several key demographic factors of male impaired drivers have been studied by a broad cross-section of researchers from different disciplines. Factors that have been examined include age, ethnicity, education, employment, marital status, BAC, life history, and environmental factors. There are a number of comprehensive resources that provide summaries of these factors that practitioners are encouraged to review, including Simpson and Mayhew (1991), Jones and Lacey (2001), Wanberg et al. (2005), and White and Gasperin (2006). What is known about each of these factors is described briefly below.

Age. Most impaired drivers are between the ages of 20 and 45 years old with almost half of them being between the ages of 20 and 30 years old (Simpson and Mayhew 1991; Jonah and Wilson 1986; Jones and Lacey 2001; Wanberg et al. 2005). Generally speaking, drinking and driving behaviour begins to decrease substantially after the age of 45 years (Hingson and Winter 2003), though this behaviour persists in some drivers into their 60s. This “aging out” phenomenon is very consistent with patterns of behaviour exhibited by other criminal offenders (Nagin et al. 2008; PEW 2012). Hence, similar to other types of offences, a significant portion of the impaired driving problem is perpetrated by a subgroup of the population.

Sex. Research shows that between 70% and 80% of impaired drivers are male. Studies in Canada and the United States have used several approaches including studies of arrested and/or convicted impaired drivers, studies of those in remedial program or treatment settings, and studies of fatally injured drivers in alcohol-impaired crashes (Waller 1997; Simpson and Mayhew 1991; Jones and Lacey 2001).

For comparison purposes, an examination of arrest rates for all types of offences revealed similar numbers. Females accounted for only 23% of arrests for all offences in the United
States in 2004 (Schwartz and Steffensmeier 2007). Furthermore, the female share of arrests for most offences is less than 20% and is smallest for serious offences.

An examination of incarceration rates in Canada reveals a different picture. The rate of crime among females is about one-quarter the rate among males and women account for only 6% of offenders in provincial/territorial corrections and 4% of offenders in federal corrections (Kong and AuCoin 2008). Similarly, in the U.S., the male imprisonment rate is 14 times higher than that of females and males account for 93.2% of incarcerated offenders (BJS 2012).

**Ethnicity.** Research spanning 30 years suggests that a majority of impaired drivers are Caucasian, although there has been less research on ethnicity relative to other demographic factors such as age and sex. For example, Weisheit and Klofas (1992) compared the characteristics of impaired drivers in jail with a representative national survey of more than 5,000 jail inmates. It revealed that traffic offenders and impaired drivers were more likely to be Caucasian compared to other jail inmates.

However, while ethnicity is one of the factors that is linked to impaired driving (Ferguson et al. 2002; Jones and Lacey 2001), differences between populations studied and the ways in which questions have been posed have resulted in inconsistent evidence in relation to this factor (Caetano and McGrath 2005). There is some evidence that non-white and non-Asian subgroups are overrepresented compared to their presence in the general population (Jones and Lacey 1998; Wolf and Lund 1991). Most recently, an analysis in Minnesota prison populations revealed that approximately 15% of incarcerated felony driving while intoxicated (DWI) offenders (those who have had at least four prior driving while intoxicated offences in the past ten years) are American Indian, however American Indians comprise about one percent of the state’s population, indicating that this population is substantially overrepresented among felony DWI offenders (T. Roy, personal communication 2012).

**Education.** Most impaired drivers have completed elementary school and at least some high school, but the majority have no college or post-secondary education. Some studies suggest that as many as one-third of convicted offenders have at least some post-secondary education (Nochajski et al. 1993; Wilson 1991). A Manitoba study by Ambtman (1990) of participants in a remedial impaired driver program indicated that a minority of participants (less than one-fifth) had attained some level of post-secondary education. A 1996 TIRF study (Simpson et al.) concluded that impaired drivers have varying degrees of education, with the large majority having completed high school and a handful of them having some post-secondary education.

To put these findings in context, in comparison to the general population in the U.S., correctional inmates report lower levels of educational attainment. An estimated 40% of state prison inmates, 27% of Federal inmates, 47% of inmates in local jails, and 31% of

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5 In the United States, criminal offences are categorized as misdemeanor and felony offences. In Canada, offences are categorized as summary conviction and indictable offences respectively.
those serving probation sentences had not completed high school or its equivalent while 18% of the general population failed to attain high school graduation (Harlow 2003).

**Employment and income.** Contrary to popular belief, the majority of impaired drivers are employed, although they are more likely to be unemployed relative to the general population (Wanberg et al. 2005). However, it is important to note that these offenders are more often in the lower-to-middle income range (Ambtman 1990; Wilson and Jonah 1985; Nochajski et al. 1993), and they are more apt to experience occupational instability.

To place these findings in context, the income of impaired drivers is infrequently reported in studies. Moreover, when such information is reported, different income categories and time periods are used. Collectively, these differences make comparison of the findings across studies challenging. Of interest, self-report studies involving non-convicted drinking drivers suggest there are differences in income relative to convicted impaired driving offenders in that more self-reported drinking drivers declare income in excess of $60,000. While some have hypothesized that this discrepancy indicates that drinking drivers with higher incomes are better able to avoid detection by driving newer vehicles and having more disposable income to afford a private attorney, others have argued that drinking drivers with higher incomes may drive at lower BACs (Beirness et al. 1997). More research is needed to increase understanding of this issue.

**Marital status.** Research on the marital status of impaired drivers is fairly consistent with some variations. Some studies suggest that more than two-thirds (65-75%) of impaired drivers are single, separated or divorced (Simpson et al. 1996; Wilson 1991; Nochajski et al. 1993). Thus, while approximately half of impaired drivers are in fact married (but perhaps separated), the other half are comprised of those who are currently unmarried or who have never been married. To some degree, the extent to which impaired drivers are single may also be a function of their young age, although this hypothesis has not been tested. To summarize, drivers who are either divorced or separated are overrepresented in the offender population relative to the general population.

Interestingly, while in male offenders being married or in a stable relationship represents a protective factor against future impaired driving offences, among female offenders the marital or relationship status is not a protective factor but rather an aggravating one. This may arise in part because women are more often in relationships with spouses who also have alcohol problems (Brown et al. 1995).

It is important to underscore that many of these studies were conducted two decades ago at a time when being married was more often equated with having a stable relationship, whereas today this may be less often the case. As such, it may be more useful and practical to consider the level of stability of any co-habiting relationship as opposed to focusing on the specific marital status of this population.
Blood alcohol concentration (BAC). Many impaired drivers possess BACs that are quite high relative to the legal limit in Canada of .08 (Simpson et al. 2004; NHTSA 2003). In Canada, between 1993 and 1997, the mean BAC among fatally injured drinking drivers was .17 (Mayhew et al. 1995; 1996; 1997; 1998; 1999); a more recent estimate derived from TIRF’s National Fatality Database for 2005-2009 revealed a mean BAC of .174, so there has been little change in this measure. In the U.S., the average BAC among drivers in fatal crashes is .18 (NHTSA 2010). There is evidence to suggest that while BAC is a good measure of level of alcohol use, it is not a reliable indicator of alcohol-related problems, involvement in impaired driving or risk of recidivism (Wieczorek et al. 1992).

Repeat and/or hard core impaired drivers. This segment of the impaired driver population generally has many similar characteristics to first impaired drivers, however these characteristics are often more pronounced.

Sex and age. Research shows that some 90% of recidivists are male. Repeat offenders are mostly male and between the ages of 23 and 45 years. More than half of them (70%) are under the age of 40. Similar to other criminal offenders, repeat impaired drivers appear to age out of this offending behaviour beginning at age 35 with sharp declines between 40 and 50 years of age (Simpson et al. 1996).

Ethnicity. While a majority of repeat offenders can be classified as Anglo-white (Jones and Lacey 2001; Wanberg et al. 2005), it has also been suggested that ethnicity is related to repeat impaired driver status, however this varies according to region. For example, more repeat offenders in northern parts of the U.S. are Caucasian whereas in the southwest the majority of offenders are Hispanic or Native American (Nochajski and Stasiewicz 2006). More research into ethnicity is needed to further validate these results.

Education. Studies show that repeat offenders generally have less education than non-offenders as well as first offenders (Simpson et al. 1996; Jones and Lacey 2001; Nochajski and Stasiewicz 2006).

Employment and income. Similarly, research reveals that repeat offenders represent a cross-section of income levels, however most have moderate family incomes and lower personal incomes than first offenders, and are more likely to be unemployed (Nochajski and Stasiewicz 2006; Beirness 1997).

Marital status. Repeat offenders are also more likely than first offenders to be never married, divorced, separated, or widowed (Wieczorek and Nochajski 2005; Simpson and Mayhew 1991). Also of interest, it has been reported that almost two-thirds (60%) of repeat impaired drivers have children (White and Gasperin 2006).

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6 Since its inception by TIRF, the following agencies have provided funding for the Fatality Database: Health Canada (1973 to 1982); Transport Canada (1983); Transport Canada and Canadian Council of Motor Transport Administrators (1984 to 2010; their funding for the Fatality Database has been in support of the Strategy to Reduce Impaired Driving - STRID - for several years).

7 Hard core impaired drivers, also known as hard core drunk drivers are defined as drivers who drink and drive repeatedly, often at high blood alcohol concentrations, and have a history of prior convictions for impaired driving and or substance abuse problems.
Finally, among repeat offenders, arrests at higher BACs of .18 or over .20 are more common compared to first-time offenders (Wanberg et al. 2005) as is test refusal at the roadside (Robertson and Simpson 2002).

**Summary.** An examination of several demographic characteristics suggests that many of these characteristics are more pronounced among repeat offenders in comparison to first offenders (Wieczorek and Nochajski 2005). That is, repeat offenders are more often single, separated, or divorced, have less education, lower levels of income, and higher levels of unemployment in comparison to first offenders.

**4.1.2 Personality and psychosocial factors**

A wide range of personality and psychosocial factors have been examined in relation to impaired drivers including sensation-seeking, hostility, aggression, psychopathic deviance, assertiveness, antisocial personality, impulse control, risk perception, narcissistic personality, intermittent explosive disorder, external locus of control (i.e., blaming others for problems), and emotional adjustment. To illustrate, since the early 1960s, numerous studies have sought to differentiate between impaired drivers and other drivers on the basis of social, psychological, attitudinal, and behavioural characteristics including Donovan et al. (1983), Jonah and Wilson (1986), MacDonald (1989), Selzer et al. (1963), Cosper and Mozersky (1968), Yoder and Moore (1973), Meck and Baither (1980), Fine and Scoles (1974), MacDonald and Pederson (1990), Perrine (1975), and Steer and Fine (1978). These studies were reviewed and summarized in a Health Canada study (1997). The results of this review suggested that impaired drivers demonstrate higher degrees of hostility, aggression, and sensation-seeking among other factors in comparison to other groups of drivers (Beirness et al. 1997).

Similarly, since 2000, there have been a number of studies that serve to reinforce these findings (Vingilis 2000; Jones and Lacey 2001; Cavaiola et al. 2003). In particular, a comprehensive review by Wanberg et al. in 2005 reported that the “most salient personality variables associated with [DWI] behaviour include: agitation, irritability, resentment, aggression, overt and covert hostility; thrill and sensation-seeking; low levels of assertiveness, low self-esteem, feelings of inadequacy, and sensitivity to criticism and rejection; helplessness, depression, and emotional stress; impulsiveness, external locus of control (blame others for problems); social deviance and non-conformity, anti-authoritarian attitudes” (p.23).

**Repeat and/or hard core impaired drivers.** Studies from the early 1990s suggest there are personality differences between first and repeat offenders. For example, in a study comparing first and repeat impaired driving offenders, McMillan et al. (1992a). reported that repeat offenders demonstrated higher levels of hostility, sensation-seeking, psychopathic deviance, mania and depression as well as lower levels of assertiveness and emotional adjustment. More recently in 2005, a study by Wieczorek and Nochajski reported that repeat offenders
have lower levels of self-esteem, locus of control, social desirability, and higher levels of psychiatric symptoms and antisocial tendencies. A 2007 study by Cavaiola et al. based upon data derived from more indirect questions about behaviour revealed that sensation-seeking, hostility, depression, and psychopathic deviance are correlated with repeat impaired driving offences.

Conversely, a 2002 study by Cavaiola and Wuth (2002), cited in a comprehensive review of the literature by Wanberg et al. (2005), noted that a majority of studies have not identified significant personality differences between first and repeat impaired drivers. Cavaiola and Wuth (2002) further suggested that this may reflect the fact that many first offenders are, in fact, repeat offenders who just have not yet been brought to the attention of the criminal justice system. While plausible, these apparently contradictory conclusions also reveal the fact the research to date has failed to adequately disentangle the significant heterogeneity observed in the impaired driver offender population.

Some research (Schell et al. 2006) suggests that socially desirable responding among impaired drivers in self-report studies biases our understanding of personality and behavioural factors. Individuals who are high in socially desirability are less likely to admit to relevant behaviours including driving after drinking, drinking alcohol, aggressive driving, hostility, impulsivity, and sensation-seeking. Schell et al. concluded that the “fact that personality factors are very difficult to modify in conjunction with evidence that their effects on driving after drinking are small and indirect suggests that personality factors may not be a promising point of intervention” (p.39). At the same time, if reliable trait-like markers are uncovered in the future, they could serve to assist in the prediction of impaired driving recidivism and to trigger targeted selective prevention procedures.

### 4.1.3 Alcohol misuse

The role of alcohol misuse in relation to impaired driving behaviour has been studied more than almost any other factor. However, while older research has suggested that substance-related problems were a critical factor in impaired driving offending, more recent research has determined that, although substance use is strongly correlated with impaired driving behaviour, it is not a causal factor. This section summarizes what is known of this multi-faceted issue including: age of onset of drinking, family history, drinking patterns, substance-related diagnoses, treatment history, and failure to enroll in or complete treatment.

Age of onset of drinking. It has been well-established over the past 35 years that early onset of alcohol and other drug use are predictive of substance use and abuse in adulthood.
Generally speaking, those individuals who begin drinking at an early age (under the age of 14) often consume more alcohol as compared to those who begin drinking in their late teens or at the age of 21 (the U.S. legal drinking age). While these individuals may or may not eventually become dependent, they are at higher risk for impaired driving. Equally concerning, these same individuals are more likely to believe that driving after drinking is only risky if individuals are obviously impaired, and may be less likely to believe that driving after drinking increases the risk for injury or crashes. In addition, persons who begin drinking before age 14 are more than seven times more likely to be in an alcohol-related crash than those who begin at age 21 (Hingson et al. 2002). Of concern, impaired drivers often report heavier drinking behaviour and involvement in binge drinking at a young age (Wechsler et al. 2003; Hingson et al. 2002; 2003).

Family history. Research shows that there are two characteristics related to family history that are the most strongly associated with number of impaired driving offences as an adult. These include: having a father with a drinking problem (Schuckit 1999; 2009); and having a relative who was arrested for impaired driving (McMillen et al. 1992a; Wieczorek and Nochajski 2005). The “modeling” of drinking and driving behaviour within the family appears common (Elliott et al. 2006; Gulliver and Begg 2004). What family history represents in the impaired driving literature is often vague. Both genetic predisposition to alcohol abuse (e.g., tolerance for heavy drinking, euphoria vs. sedation, externalizing personality) and the social genetics of being brought up in an alcoholic environment (e.g., greater likelihood of exposure to alcohol at an earlier, neurodevelopmentally vulnerable age) are likely involved.

Drinking patterns. Research investigating the drinking patterns of impaired driving offenders reveals that these individuals generally consumed greater amounts of alcohol per occasion and also consumed alcohol more often than the general population of drinkers (Beirness et al. 1997). Their drinking behaviours are also more likely to result in more alcohol-related problems and they may consume alcohol to cope with personal or emotional issues (Wanberg et al. 2005). There is also research to indicate that a majority of impaired drivers are, in fact, binge drinkers (Caetano and McGrath 2005; Chou et al. 2006). A study by Flowers et al. (2008) indicated that 84% of alcohol-impaired drivers were binge drinkers while 88% of impaired driving episodes involved binge drinkers. These findings challenge a popular belief that alcoholism is at the root of impaired driving behaviour.

Alcohol-related diagnoses. There are considerable discrepancies with regard to estimates of problem drinking and substance abuse problems across studies (Simpson et al. 1996; Wanberg et al. 2005; Vingilis 1983; Beirness et al. 1997; Baker et al. 2002; Kramer 1986; Maruschak 1999; Brinkmann et al. 2002). This may be a result of different procedures that studies have used to reach such estimates including:
definitions of alcohol problems;

- data reporting practices;
- the populations sampled and sampling methods; and,
- instruments to diagnose problem drinking and substance abuse, some of which may not have items related to impaired driving behaviour.

The DSM-IV-TR identifies the criteria for two alcohol use disorders: alcohol abuse and alcohol dependence. It defines alcohol abuse as a “maladaptive pattern of alcohol use leading to clinically significant impairment or distress, as manifested by one or more criteria (including recurrent alcohol use resulting in a failure to fulfill major role obligations; recurrent alcohol use in situations in which it is physically hazardous; recurrent alcohol-related legal problems; and continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol) occurring within a 12-month period that does not meet the criteria for alcohol dependence.” Alcohol abuse is most common among youth aged 15 to 24 while 17.8% of Americans meet the criteria for this disorder at some point in their lifetime (Hasin et al. 2007).

Alcohol dependence, previously referred to as alcoholism, has different symptoms than alcohol abuse, most notably tolerance and withdrawal. According to the DSM-IV-TR, it is defined as a “maladaptive pattern of alcohol use, leading to clinically significant impairment or distress as manifested by three or more of the following, occurring at any point in a 12-month period: tolerance; withdrawal; alcohol is often used in larger amounts or over a longer period than was intended; there is a persistent desire or unsuccessful efforts to cut down or control alcohol use; a great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects; important social, occupational, or recreational activities are given up or reduced because of alcohol use; and, alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol.” During their lifetime, 12.5% of American adults meet the criteria for alcohol dependence (Hasin et al. 2007).

Nevertheless, some research suggests that a diagnosis of alcohol abuse is more common among first offenders than repeat offenders, suggesting that this group may generally have lower levels of problem severity relative to repeat offenders (Wieczorek and Nochajski 2005).

**Attitudes about change and treatment.** Research indicates that approximately only one-third of first offenders have a history of varying degrees of involvement in treatment (Wieczorek and Nochajski 2005). Moreover, many offenders, regardless of their number of prior offences, are assessed as being in the pre-contemplative stage in relation to the stages

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8 Tolerance is defined by either 1) a need for markedly increased amounts of alcohol to achieve intoxication or desired effect, or 2) markedly diminished effect with continued use of the same amount of alcohol.

9 Withdrawal is manifested by either 1) the characteristic withdrawal syndrome for alcohol, or 2) alcohol (or a closely related drug such as valium) is used to relieve or avoid withdrawal symptoms.
of change with regard to their drinking and driving behaviour\textsuperscript{10}. This suggests that, despite the consequences of prior impaired driving convictions, a majority of offenders still fail to recognize the need to change their behaviour, or do not begin to think about changing their behaviour, much less develop the motivation to do so (Nochajski and Stasiewicz 2006; Wieczorek and Nochajski 2005).

There is also research that demonstrates that impaired driving offenders may be more defensive of their drinking behaviour, and more resistant to self-disclose the extent of their alcohol consumption (BHRCS 2007) than the average patient that engages in alcohol treatment. Generally speaking, higher levels of resistance are most often observed during an initial screening and assessment level (Vingilis 1983; Wanberg et al. 2005, p.25; Chang et al. 2002; Owens 2001).

As a practical consequence of their repeated experiences with offenders who fail to be forthcoming about their drinking behaviour, practitioners who conduct screening and assessment of these offenders more often tend to doubt or distrust reports of alcohol consumption disclosed by impaired drivers. However, it has been argued that clinicians should not underestimate or overlook the value of self-reported drinking by offenders. In fact, self-reports provide a good indication of an offender's perceptions of their drinking behaviour. Therefore, this information may be interpreted as an indication of the offender's self-appraisal of their impaired driving behaviour as opposed to their presumed denial or resistance. In sharp contrast, impaired drivers appear to be much less defensive to disclosing use of drugs than they are to disclosing alcohol use and associated disruptive symptoms (Wanberg et al. 2005), although the reason for this is not known.

**Failure to enroll in or complete remedial programs.** A study by Boudreault et al. (2002) that examined 126 hard core recidivists in prison revealed that 62% had never complied with mandated remedial programs. Similarly, a Montreal study by Brown et al. (2002) reported data from Quebec that showed that just 50% of convicted impaired driving offenders had pursued participation in intervention programs that were mandated within the first year of relicensing eligibility.

A more detailed examination of those offenders who delay participation conducted in 2008 by Brown et al. further revealed that more than 50% of offenders identified key reasons for this delay as being due to having made other transportation arrangements, the cost of remedial program participation, no access to a vehicle, and no interest in driving. One-third identified no interest in and/or ability to change their alcohol usage as an obstacle.

\textsuperscript{10}The transtheoretical stages of change model posits that individuals with behaviour problems, such as substance dependence, experience several conditions and differ in their willingness to acknowledge that they have a problem and work towards change (Alexander 2000). Interventions or treatment strategies are most likely to be successful when geared toward the stage of change that the individual client is in. Adapted from Prochaska et al.’s (1992) readiness for change process stages, the various stages include: 1) Pre-contemplation (lack of awareness of a problem; no contemplation of change); 2) Contemplation (recognition of a problem; contemplation of change); 3) Preparation (consideration of behaviour change); 4) Action (taking steps to change behaviour such as participation in treatment); and, 5) Maintenance (relapse prevention).
This study further revealed that some important characteristics of non-participants in mandated remedial programs include poorer socio-economic status and disrupted neurocognitive performance in terms of memory, behavioural inhibition, and delayed reward discounting (i.e., they have lower motivation for delayed gratification and heightened attraction to immediate gratification), possibly manifested in their propensity for unlicensed driving, and reluctance to pay fines and other costs associated with relicensing and to commit to long-term behavioural change. The study further reported that the reluctance of offenders to engage in remedial impaired driving programs, was due, in part, to the fact that their personal objectives for change were inconsistent with the goal of the intervention which was to significantly reduce drinking.

A comparison between impaired driving offenders who completed mandated remedial programs versus those who were non-compliant indicated that the latter group possessed the following characteristics: older, lower income in last 30 days, less likely to be married or without a partner, unemployment, similar drinking patterns, more cocaine dependence, higher proportion of positives on axis 1 disorders (e.g., anxiety, depression), and higher proportion of antisocial personality features. Logistic regression further revealed that unemployment was the main predictor of non-compliance (Nadeau 2010), suggesting that cost may be a major obstacle to increased participation among poorer offenders.

Voas et al. (2010) also examined the propensity of first and repeat impaired drivers to delay licence reinstatement and the implications of this delay on their driving behaviours in seven U.S. states. In particular, this study revealed that:

- Fewer first offenders (42%) delayed licence reinstatement for at least one year (from the time they became eligible) in comparison to 55% of repeat offenders. At three years post-eligibility, the proportion of offenders who reinstated were 70% and 58% respectively. It was also reported that no record of reinstatement could be located for 25% of first offenders and more than one-third (35%) of repeat offenders.

- In the first year of eligibility, those offenders with prior offences were significantly less likely to reinstate their licence than first offenders. However, in the subsequent years, the length of the delay did not appear to differ between first and repeat impaired driving offenders.

- Higher recidivism rates were reported during the suspension period in relation to offenders who delayed licence reinstatement for more than one year as well as offenders who failed to reinstate at any time. Similarly, post-reinstatement, offenders who delayed reinstatement also have higher rates of recidivism.
It appears that recidivism rates are somewhat lower post-reinstatement among those offenders who do reinstate. In addition, recidivism rates are higher among offenders who do not reinstate in comparison to those who do.

**Repeat and hard core impaired drivers.** Similar to first offenders, age of onset, family history, and alcohol misuse issues plays an important role in relation to repeat impaired driving offenders. It has been noted that there is a strong direct linear relationship between the total number of dependence criteria that repeat offenders present and the number of prior offences (Weiczorek and Nochajski 2005). A comprehensive review of the literature by Wanberg et al. (2005) similarly reported that repeat offenders have higher levels of disruptive alcohol use symptoms. Other studies have concluded that the incidence of problem drinking increases with the number of prior convictions (Perrine 1990; Nochajski and Stasiewicz 2006; McMillen et al. 1992a).

A study by MacDonald and Pederson (1990) that examined impaired driving arrests among male, hospitalized alcoholics showed that multiple offenders were more likely to report a higher number of “most drinks ever consumed in a day” but less frequent drinking, a pattern indicative of binge drinking.

It is estimated that more than two-thirds of second offenders and almost 90% of multiple offenders have some history of alcohol treatment involvement (i.e., alcohol education, outpatient, inpatient, or other recognized forms of treatment) (Weiczorek and Nochajski 2005). Of interest, repeat offenders appear to have a higher level of motivation for change and treatment and may be less defensive and more self-disclosing than first offenders.

### 4.1.4 Mental health

A broad range of mental health and psychiatric conditions have also been linked to impaired driving offenders including antisocial personality disorder, anxiety, conduct disorder, impulse control disorder, narcissism, depression, post-traumatic stress disorder (PTSD), and bipolar disorder. Recognition of and interest in these factors has grown in the past decade, and even more recently as a result of the large number of soldiers and veterans that are involved in impaired driving events either overseas or upon their return to North America.

A number of research studies suggest that psychiatric disorders are higher among impaired drivers (Shaffer et al. 2007; Lapham et al. 2001; McMillen et al. 1992a; Wieczorek and Nochajski 2005). In a study of offenders in New Mexico by Lapham et al. (2001), among offenders with alcohol use disorders, 33% of men had a least one additional psychiatric disorder, other than drug abuse or dependence. The most common conditions were major depression and post-traumatic stress disorder. This study also reported that 13% of men had a lifetime major depressive disorder (7% of men in the 12 months prior to the interview). A higher proportion of men (relative to women) in this study met criteria for
antisocial personality disorder, whereas a smaller proportion of men (relative to women) had experienced lifetime and 12-month dysthymic disorder, generalized anxiety disorder, and PTSD.

Stress is also considered an important factor in relation to impaired driving behaviour. It frequently occurs in situations that exceed an individual’s ability to cope with events and/or the demands made on them. It should be underscored that stress and its resulting emotional conditions (i.e., guilt, anger, depression) can significantly influence substance use given that people often rely upon alcohol and other drugs to either cope with or relieve stress and associated unpleasant emotions. Of greater concern, these emotions are closely tied to relapse and connected to negative outcomes, including impaired driving (Wanberg et al. 2005). For example, impaired drivers may experience stress due to relationship problems, financial problems, job or employment-related problems that may contribute to their alcohol and drug use and arrests, which may further compound stress.

Research examining the effects of anxiety disorder in relation to substance use has also produced significant findings that may have important implications for impaired drivers. A study by Kushner et al. (2011) reported that the presence of an anxiety disorder affects the brain such that the transition from regular drunkenness to alcohol dependence is accelerated. An important factor in this process is the age of onset of anxiety disorder in relation to important drinking milestones. Men may experience shorter transition times relative to women, as women may not experience such “telescoping” of the development of alcohol dependence. Moreover, the study reported that the age of onset of drinking in this sample of alcohol dependent patients in a chemical dependency program was earlier for women than for men; in sharp contrast to findings from other studies of alcoholism.

**Drug use (other than alcohol).** Many impaired drivers have substantial histories of drug use (Beirness and Davis 2008). Rates of drug use among first and repeat offenders are not only important but also are not limited to “soft” drugs like marijuana. One study reported that more than 40% of all impaired driving offenders in the study sample had used cocaine, hallucinogens, and amphetamines (Weiczorek and Nochajski 2005). A comprehensive review of the literature by Wanberg et al. (2005) revealed that about 11-12% of impaired drivers are multiple drug users who report significant involvement in drugs other than alcohol and marijuana; close to 50% report a history of marijuana use.

A substantial percentage of impaired driving offenders reports involvement with other drugs. In a New Mexico study of these offenders, 32% of women and 38% of men had a drug use disorder (Lapham et al. 2001). Other studies of impaired driving offenders in treatment in Texas by Maxwell (2011) and Freeman et al. (2011) similarly demonstrate that a history of drug use among impaired drivers in not uncommon. To illustrate, Maxwell (2011) found that cannabis was identified as a primary problem among the youngest arrested impaired drivers.
whereas alcohol and crack cocaine were more prevalent among older drivers. In addition, Caucasian arrestees more often had problems with other opiates, methamphetamines, and sedatives in contrast to Hispanics who more often had problems with powder cocaine and cannabis. The most recent U.S. roadside survey results showed that 31.8% of drivers at or over the legal BAC limit of .08 were positive for a drug. This result was twice as high as sober drivers (Lacey et al. 2009).

To place these numbers in context, the National Survey on Drug Use and Health for 2009-2010 revealed that, nationally, 7.3% of the population aged 12 or older was classified with alcohol dependence or abuse nationwide in the past year while individuals between the ages of 18 and 25 had the highest rate of alcohol dependence or abuse (15.9%). It also revealed that, 2.8% of persons aged 12 or older had past year illicit drug dependence or abuse which was unchanged from 2008-2009. Again, the highest rates for illicit drug dependence or abuse in the past year were among the 18 to 25 year age group (7.8% nationally) (SAMHSA 2012).

Repeat and/or hard core impaired drivers. Repeat offenders have significantly higher levels of psychiatric symptoms (Wieczorek and Nochajski 2005; Wanberg et al. 2005; Jones and Lacey 2001; Simpson et al. 1996). To illustrate, in a sample of 729 patients in a two-week inpatient treatment facility for court-sentenced repeat impaired driving offenders (i.e., offenders electing to participate in treatment in place of prison time), Shaffer et al. (2007) found that the offenders had higher lifetime and past-year co-morbidity rates than the general population with regards to alcohol use and drug use disorders, conduct disorder, post-traumatic stress disorder, generalized anxiety disorder, and bipolar disorder. Almost half qualified for lifetime diagnoses of both addiction (i.e., alcohol, drug, nicotine, and/or gambling) and a psychiatric disorder.

A recent Harvard Medical School study (Nelson et al. 2012) compared lifetime prevalence of substance use disorder diagnosis and lifetime prevalence of mental health disorder diagnosis among a sample of drivers enrolled in a two-week inpatient facility for repeat impaired drivers in Middlesex to results from a replication of the National Comorbidity Survey. A majority of repeat offenders in this study were male (81%) and more than half (62%) had two prior impaired driving offences; 24% had three priors. More than 30% of the sample was between the ages of 40 and 50 years. This study revealed that repeat offenders had a higher lifetime prevalence of drug dependence (16%), drug abuse (26%), alcohol dependence (42%), and alcohol abuse (56%) in comparison to the results of the replication of the National Comorbidity Survey which were 3%, 8%, 5%, and 13% respectively. Similarly, the repeat impaired driver sample had a much higher prevalence of conduct disorder (19%), bipolar disorder (8%), PTSD (14%), and generalized anxiety disorder (9%) in comparison to the replication of the National Comorbidity Survey which were 10%, 4%, 7%, and 6%
respectively. However, the repeat impaired driver sample also had a lower prevalence of major depressive disorder (12%) than reported in the survey results (17%) (Nelson et al. 2012).

To date, there have been no published studies identifying the prevalence or co-morbidity of psychiatric disorders among repeat impaired drivers (Labrie et al. 2007). It has been reported that there are significant differences in drug use by the number of prior offences and persistent offenders have higher levels of use than first offenders (Wieczorek and Nochajski 2005; Wanberg et al. 2005; White and Gasperin 2006).

<table>
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<th>Summary. Mental health issues among impaired drivers are an important consideration given that treatment is more difficult when individuals possess emotional and psychiatric problems in conjunction with substance-related problems (Lapham et al. 2001). Hence, not only can co-occurring disorders decrease the effectiveness of treatment, but they are also considered a predictor of poorer treatment outcomes (Lapham et al. 2001; Laplante et al. 2008; Shaffer et al. 2007).</th>
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### 4.1.5 Cognitive impairment

Executive cognitive function “involves the set of abilities that allows one to select behaviour appropriate to a situation, including the ability to inhibit inappropriate behaviours and to focus on a specific task in spite of distraction” (Brown et al. 2008, p.115). Deficits are linked to impulse control and self-regulation, capacity to learn and retain intervention content, problem solving, abstracting, and the speed of information processing, among other abilities.

Research shows that a continuum of alcohol users ranging from both social drinkers to alcoholics may possess neurocognitive deficits (Parsons 1998). It has further been shown that persons who possess varying degrees of cognitive deficits are overrepresented in substance abuse programs (Teichner et al. 2002). Preliminary studies of neurocognitive characteristics of first offenders indicate that they are more likely to suffer deficits related to executive cognitive function compared to normal drivers (Brown et al. 2010; Couture et al. 2010, August).

Generally, it is estimated that it may take a minimum of six months for individuals to begin to recover from reversible deficits in executive function due to alcohol (Zinn et al. 2004). In cases involving much heavier drinking for extended periods, it may take two to four years, and some individuals may never fully recover from all deficits (Parsons 1998).

**Repeat and/or hard core impaired drivers.** Research reveals that repeat offenders are more likely to possess cognitive impairments. In a study by Glass and Chan (2000) involving 134 volunteer participants that attended one of two residential alcohol education programs in Massachusetts following a repeat impaired driving conviction, 73% were reported to possess one or more clinically significant cognitive deficits; an additional 12% were identified as borderline. The tests utilized in this study measured abilities in relation to comprehending instructions, learning, sustaining attention, and completing tasks. Scores below the 50th
percentile in relation to tests of word fluency, vocabulary, sustained attention, memory, executive functioning, and impulse control were common among a majority of participants. The most prevalent impairments related to planning, foresight, and impulse control.

A study of sober recidivists by Ouimet et al. (2007) revealed that more than half (66%) of participants showed impaired performance on at least one test of a battery of tests of executive control functioning. In particular, deficits were identified in visuospatial constructional abilities, visual memory, and inhibition capacities. The study further noted that the neurocognitive functioning of impaired driving recidivists was disproportionately lower to that of the general population and that the number of past convictions was related to severity of memory difficulties. More recent investigations have revealed more disadvantageous decision-making in sober recidivists compared to normal drivers. One study (Maldonado-Bouchard et al. 2012) indicated that intractable impaired driving behaviour, as measured by frequency of past offending, was strongly associated with the propensity to exercise more disadvantageous decision-making. This involved repeatedly choosing smaller but immediate gains despite the greater risk of suffering larger, long-term losses (e.g., the decision to choose the convenience of driving to a drinking venue despite increasing the probability of having an impaired driving-related crash or citation). This relationship was independent of the severity of alcohol misuse. Another study (Brown et al. 2008) revealed that poorer executive control functioning in impaired drivers was associated to a greater tendency to delay or avoid participation in remedial relicensing programs.

Overall, these findings indicate that the most intervention-resistant offenders have a decreased ability for self-regulation, for learning and retaining intervention content, and for exercising good decision-making even when sober. Not all of these problems are attributable to alcohol abuse severity. This suggests that new strategies in the design of remedial programs and interventions directed at some offenders with the highest risk of recidivism may be needed. Effective interventions for these individuals may need to target not only a reduction in their substance misuse, but also alteration in the decisions they make prior to drinking and driving (e.g., the decision to take their car to a drinking venue).

4.1.6 Driver and criminal history

Research has demonstrated that a significant proportion of impaired driving offenders may also have a history of other driving violations as well as other criminal history. In particular, the propensity for other driving and criminal offences appears to be more pronounced among repeat offenders (Simpson et al. 1996; Jones and Lacey 2001; Syrcle and White 2006; Wieczorek and Nochajski 2005). The relevant research is described in more detail below.
Driver history. Impaired drivers are less likely to use seatbelts, have more traffic violations, more involvement in crashes, and have often been compared to high risk drivers\(^\text{11}\) (Wilson and Jonah 1985; Wilson 1992; McMillen et al. 1992a; Gebers and Peck 2003). Impaired driving offenders demonstrate a range of poor driving behaviours and/or involvement in road crashes (Beirness et al. 1997; Jones and Lacey 2001; Labrie et al. 2007; Taxman and Piquero 1998; McMillen et al. 1992b), which may also bring them into contact more frequently with police and increase the potential for an impaired driving arrest (Nochajski and Stasiewicz 2006).

To summarize, impaired driving is likely not an isolated high-risk driving behaviour in some offenders, meaning that some individuals who drive while impaired may also have a history of other unsafe and/or high-risk driving behaviours (Beirness et al. 1997). Nevertheless, reliance solely on driving records to identify these drivers is problematic. To illustrate, information contained in official criminal or driving records has not permitted accurate prediction of prior impaired driving offences (Simpson and Robertson 2001; Nochajski and Stasiewicz 2006).

Criminal history. The higher prevalence of criminal arrests for other offences among impaired driving offenders was first identified by Waller (1967). Later, in a study by Gould (1989) it was suggested that impaired driving is not an isolated incident of bad behaviour, but instead part of a continuing pattern of criminal activity. The research was based on an archival review of the prior criminal histories for people arrested for impaired driving in Louisiana and revealed that there is a substantial difference in the number of arrests for the group of individuals with an impaired driving arrest as compared to a random sample of all male licensed drivers in Louisiana. A 1992 study by Weisheit and Klofas examined the criminal history of impaired drivers in comparison to a large sample of other jail inmates. It revealed that impaired drivers are as likely to have prior arrests as other jail inmates, and many have substantial histories of property and violent offences.

More recently, a study was conducted to analyze the past criminal histories of first impaired driving offenders in California (CA), Florida (FL), and New York (NY) in order to gauge whether there were common prior offences. Analyses of these data consistently revealed that between 26% and 44% had been engaged in criminal activities prior to their impaired driving arrest. Two of these states (CA and FL) included traffic offences and reported that more than one in three people had a prior arrest history for other offences at the time of their first impaired driving arrest (Caldwell-Aden et al. 2009). Results of this study also revealed that drug offences, assault, and theft offences were the most common reasons for arrest prior to the impaired driving offence among those with criminal histories in these states; and between 45% and 85% of those with a prior arrest had also been arrested for at least one of these three offences (Caldwell-Aden et al. 2009).

\(^{11}\) High risk drivers refer to a small population of drivers who repeatedly engage in a variety of hazardous or dangerous driving behaviours such as speeding, red light running, drinking and driving and non-use of seatbelts, and who are more resistant to traditional interventions and sanctions.
Similarly, a study by Syrcle and White (2006) reported that there were also differences between first and repeat offenders in relation to previous charges for controlled substances; however, these differences were less pronounced (11% vs. 19%).

These studies illustrate that at least a portion of convicted impaired drivers have a history of other criminal offences and suggest that strengthening linkages between the criminal justice system and impaired driver treatment programs may be beneficial. As evidence of this, the past decade has seen a clear emergence of interventions that are working to bridge this gap, including specialty problem-solving courts12 in which the results of alcohol and/or drug screens are made available to justice practitioners. Similarly, alcohol monitoring technologies delivered through either the criminal justice system and/or the administrative driver licensing system are also increasingly linked (albeit to varying degrees) with alcohol education programs and treatment services. This permits data from alcohol monitoring devices to be shared with both criminal justice and treatment professionals.

A comprehensive review of the literature by Wanberg et al. 2005 reported that antisocial and criminal conduct was more prevalent among impaired driving offenders compared to normal drivers. In particular, they tend to have greater involvement in the justice system for other offences than impaired driving and engage in socially acceptable behaviours less often. They further “report more psychosocial disturbed problems, reluctance to comply with court mandates and frequent under-reporting of criminal conduct, and higher rates of traffic violations than the general population” (Wanberg et al. 2005, p. 25).

**Repeat and/or hard core impaired drivers.** Repeat offenders are also more likely to have more traffic offences and to have been involved in crashes more frequently than drivers that are convicted of a first impaired driving offence (McMillen et al. 1992a; Nochajski and Wieczorek 2000; Wieczorek and Nochajski 2005) according to official records and/or self-report. In addition to having more driving violations and problems, repeat offenders also have a more pronounced history of involvement in road crashes, injuries, and fatalities (Simpson et al. 1996; Wanberg et al. 2005; Nochajski and Stasiewicz 2006). With regard to criminal history, involvement of repeat impaired drivers in a wide range of other criminal offences (including both property and personal injury offences that are prosecuted by both summary conviction and indictment) is also more frequent (Argeriou et al. 1986; Nochajski and Stasiewicz 2006; Syrcle and White 2006; Wanberg et al. 2005).

A study by McMillen et al. (1992a) reported that non-traffic arrests for both misdemeanours and felonies (i.e., summary conviction and indictable offences) were substantially higher among repeat offenders, with the frequency of non-traffic arrests being three times greater. Similarly, Applegate et al. (1997) found that repeat offenders are more likely to be re-arrested for other crimes, a new alcohol-related offence, or a new impaired driving offence compared

12 Specialty problem-solving courts such as DWI courts and drug courts are more widespread in the United States than in Canada. For more information about these courts please see the National Association of Drug Court Professionals and the National Center for DWI Courts at www.nadpc.org and www.dwicourts.org
to those with only one prior impaired driving conviction. A review by White and Gasperin (2006) reported that approximately 20-25% of prior convictions among repeat impaired drivers involved crimes against persons. Syrcle and White (2006) reported that a larger percentage of repeat offenders had prior sentences that involved a period of incarceration relative to first offenders, suggesting the more serious nature of their offending history.

Finally, a Massachusetts study by Labrie et al. (2007) examined 1,281 repeat offenders that opted to participate in a treatment program in lieu of a period of incarceration. It revealed that more than half (61%) of participants had criminal histories that involved substance-related crimes only and more than one-third had a more extensive criminal history. Among this one-third, almost half (45%) had committed only property crimes, one-fifth (22%) had committed only crimes against persons, and one-third had histories that involved property and person-related crimes. It further noted that more severe criminality (moving from substance-related to property crimes to crimes against persons) was related to higher levels of recidivism. Results showed that participants involved in property crime were 1.4 times more likely to be re-arrested for impaired driving, and participants involved in crimes against persons were twice as likely to recidivate relative to those participants with a history of impaired driving only. The study also found that participants with less prior involvement in crime responded better to treatment whereas those with more criminal involvement did not respond as well.

4.2 Female Impaired Drivers

For several decades, road safety research has demonstrated that fatalities and injuries related to road crashes (due to alcohol or other unsafe driving behaviours) have predominantly involved males (Mayhew et al. 1981; Beirness and Simpson 1988; Mayhew and Simpson 1990; Mayhew et al. 1990; Kelley-Baker and Romano 2010). Similarly, impaired driving has also predominantly been considered a male-based problem (Waller 1997; Simpson and Mayhew 1991; Jones and Lacey 2001). To illustrate, men and young adults are more likely than women or older age groups of drivers to self-report drinking and driving behaviour, to be arrested for impaired driving, or to be fatally injured or to fatally injure others while driving impaired (Mayhew et al. 2003; Zador et al. 2000).

In Canada, females accounted for less than 10% of fatally injured impaired drivers prior to the 1990s. This increased slightly between 1991 and 2001 and ranged from 10-12%. Since 2002, females have accounted for 13-16% of fatally injured impaired drivers, reaching a high of 16.4% in 2006 (TIRF 2012). However, this percentage seems to have stabilized in the
past four years, and, overall, females continue to account for a minority of this population. By contrast, in Canada, the impaired driving rate for females generally declined up to 1997 and remained stable through to 2005. It has increased since 2005 and in 2011, females accounted for one in every six impaired drivers, compared to 1 in 13 in 1986 (Perreault 2013).

A similar picture emerges using U.S. data. An examination of alcohol crash data from the U.S. Fatality Analysis Reporting System (FARS) indicates that the involvement of female drivers in alcohol-impaired road crashes has remained fairly stable with incremental increases. Females accounted for 12% of alcohol-impaired drivers in the 1980s, 13% in the 1990s, and 14% in the 2000s. Since 2006, the percentage of women drivers who tested positive for any amount of alcohol in fatal crashes has averaged 16% annually, while in 2008 1,837 fatalities in crashes involved an alcohol-impaired female driver (NHTSA 2009). By contrast, there is mounting evidence to suggest that impaired driving arrests for women in the U.S. have risen in the past three decades (NHTSA 2009; Schwartz and Steffensmeier 2007). To illustrate, in 1980, just 9% of those arrested for impaired driving were female; this percentage rose to nearly 15% by 1996 and 20% by 2004. The number of female impaired driving arrests in the U.S. rose nationally by 28.8% between 1998 and 2007 (Lapham et al. 2000; Schwartz and Rookey 2008). Thus, while in the 1990s it was estimated that about 10% of impaired drivers were female, as of the 2000s it has been estimated that women account for closer to 20% (Wanberg et al. 2005; Schwartz and Rookey 2008).

Since the increase in female impaired driving behaviour first garnered attention in the late 1980s (Underhill 1986; Argeriou 1986), there have been three main hypotheses regarding contributing factors. These explanations have centred on changes in female roles in society (Popkin 1991; Bergdahl 1999; Mayhew et al. 2003; Robertson et al. 2011a; Tsai et al. 2008), changes in social norms (Gudrais 2011; Popkin 1991), and changes in social control mechanisms (Farrow and Brissing 1990; Robertson et al. 2011a; Schwartz and Rookey 2008; Schwartz and Steffensmeier 2007).

One of the historical challenges associated with better understanding the characteristics of female impaired drivers has been the smaller number of them who are detected, arrested, and convicted for impaired driving, as well as the smaller number of female offenders who re-offend or recidivate (although their rate of recidivism following a first conviction is equivalent to males). Generally speaking, this has resulted in making it more difficult to conduct research on this sub-group of the impaired driver population (Moore 1994). While data on the characteristics of female impaired drivers has increased in recent years, much more research has been conducted on populations of females who consume alcohol generally, and not all of this research is specific to impaired driving offenders.

Most recently, in 2013 a series of case studies were conducted with more than 150 convicted female impaired driving offenders who participated in interview focus groups in four U.S.
states (California, Michigan, Missouri and New York) (Robertson et al. 2013). In particular, three distinct profiles of female impaired drivers emerged, and it is estimated that more than three-quarters of the study participants matched one of these three profiles which are described in more detail below.

**Young women.** It is estimated that at least one-quarter of the study participants were women under the age of 25, some of whom had accumulated multiple impaired driving offences in a rather short period of time. In fact, one participant had served one year in prison following her fourth offence at the age of 24.

These young women reported that they did most of their drinking in bars or at house parties and that they had attempted to drive home from those locations when they were arrested. They often reported drinking to relax, to feel comfortable, or to “fit in” in social settings. Moreover, many of them reported that they felt pressure to “keep up” with male friends or boyfriends in terms of the amount of alcohol that they consumed. Young women who had grown up in a stable home environment also reported drinking in order to cope with the high expectations of family members and what they perceived as “the pressure to succeed.”

Daily alcohol consumption and binge drinking was not uncommon among this subgroup and this is consistent with research findings identifying binge drinking among college-age women as a phenomenon of growing concern (CDC 2013). These women tended to be single or had a partner who also drank heavily and facilitated and/or encouraged their use of alcohol.

**Recently married women with children.** This group of female impaired driving offenders reported that their drinking did not become a problem or ‘take off’ until after their children were born. In some instances, these women suffered symptoms of postpartum depression and drank as a coping mechanism or as a result of feelings of isolation and loneliness. Much of the alcohol consumption occurred with family or friends at home (e.g., they would drink while they did household chores, while on the phone, or with friends or their partner). If a spouse was present, more often than not, they would also drink heavily which in some cases led to incidences of domestic violence. Of note, most of the women who fit into this profile stated that they did not have a drinking problem prior to entering into the relationship with the partner who abused alcohol and/or prior to the birth of their children. The circumstances that led up to the arrest of these women were often characterized by running errands close to the home such as picking up their children from school, buying groceries, or going to get gas. Many of these women were convicted of felony impaired driving offences on account of their children being passengers in the vehicle at the time of their arrest (this was especially common in New York due to the passage of Leandra’s Law\(^\text{13}\)). While a majority of the women acknowledged that they were aware that they should not be driving after drinking with their

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\(^{13}\) Leandra’s Law was passed in 2009. This law made any DWI conviction where a child 16 years of age or under was present in the vehicle at the time of the arrest a felony. This law also provided for mandatory ignition interlocks for a minimum period of six months for all misdemeanor and felony DWI convictions.
children in the vehicle, it was often perceived as the only or the safest option (e.g., they were the more sober partner or childcare was not available).

**Divorced older women and/or empty nesters.** Women who were not convicted of impaired driving until later in life typically reported that they developed a drinking problem in their late 30s or early 40s. Catalysts for their drinking included divorce or failed long-term relationships, shared custody arrangements or grown children leaving home, or parental illness/death. These women most often drank at home when they were alone and reported depression or feelings of isolation. Some of these women also reported drinking to feel comfortable in social settings, such as bars, because it had been a very long time since they had engaged in social activities of this nature. In particular, the women who fit this profile reported that they had more intense feelings of embarrassment and shame as their children were old enough to appreciate the stigma associated with their offending behavior, and in some cases, were also called to bail them out of jail following the arrest.

While it is estimated that a small minority of participants did not fit into one of these three profiles, a majority of them possessed many of the characteristics frequently reported in the scientific literature including failed relationships, mental health problems, history of alcohol misuse within the family, multiple impaired driving arrests, history of trauma, and feelings of shame, guilt, and embarrassment.

This section summarizes what is known about female impaired drivers. Key characteristics that are considered include: demographic factors, substance misuse, mental health, and driver and criminal history. Given that there has been much less research on females as compared to males, what is known about female offenders generally is summarized first, and what is known specifically about female repeat offenders is summarized at the end of this section.

**4.2.1. Demographic factors**

**Age.** The average age of female first impaired driving offenders is 31 and the average age of recidivists is 30, although this fact is drawn from older research (Shore and McCoy 1987). Most recently, U.S. data from the Federal Bureau of Investigation (FBI) Uniform Crime Reports (UCR) in 2009 reveal that there were 860,689 men were arrested for impaired driving, compared to 251,695 women. Of the total impaired driving arrests for females, almost 28% were aged 18-24 and almost 18% were aged 25-29. In addition, women aged 30-34 accounted for 12% of arrests; ages 35-39 were 11%; and, ages 40-44 and 45-49 were 10% each. Finally, women aged 50 and older accounted for 11% of impaired driving arrests (FBI 2010).

Robertson et al. (2013) also found that female impaired driving offenders ranged in age from late teens to mid-60s, suggesting that women of all ages drink and drive. However a majority
of participants were an estimated 20 to 40 years of age. The authors also noted that the number of college-aged women present in each of the interview focus groups was higher than expected and accounted for perhaps one-quarter of participants. Generally, rates of involvement in alcohol-impaired motor vehicle crashes decrease with age, and the population of greatest concern is often young females (Peck et al. 2008). In particular, the increasing involvement of young women with alcohol, in combination with their inexperience driving and their growing propensity for risky driving (Lynskey et al. 2007; Tsai et al. 2010) warrants our attention and further research.

**Education and employment.** The literature regarding levels of education and employment among female impaired drivers is inconsistent. Some studies from the 1980s and 1990s indicate little difference in the levels of education between male and female impaired driving offenders (Chalmers et al. 1993). Conversely, a study of 274 women and 3,151 men convicted of impaired driving offences and ordered to attend a safety action program in Mississippi between 1976 and 1979 revealed that female offenders had higher levels of education and were older compared to men (Wells-Parker et al. 1991). Similarly, the study by Robertson et al. (2013) reported it was estimated that more than three-quarters of the study participants reported having completed high school or their General Equivalency Diploma (GED) and at least one-third of these women also reported having initiated and/or completed some type of post-secondary education to obtain a professional degree, licence, or certificate. Additionally, a comprehensive review of impaired driving studies focussing on females concluded “educational underachievement is part of the pattern of risk for [impaired] driving for both young men and young women” (McMurran et al. 2011, p.918).

With regard to employment, a study of the Drinking Driver Program (DDP) in New York in 1992 reported that, of 800 female impaired driving offenders aged 18-77 almost 70% were employed full-time and had at least some college education (Parks et al. 1996). Conversely, Chang et al. (1996) reported lower rates of employment for female impaired driving offenders compared to males. A 2008 study of 729 repeat impaired driving offenders participating in a residential education and treatment facility in Massachusetts reported that female offenders had more education than males though their level of income was lower (Laplante et al. 2008). In a study by Robertson et al. (2013), female impaired drivers reported a wide range of occupations such as nurses, dental assistants, paralegals, teachers, corporate employees, self-employed entrepreneurs, and bartenders. Of interest, approximately one-third of participants had worked in bars and restaurants at some point in their employment history.

To summarize, female impaired drivers are generally older than men and have higher levels of education (Peck et al. 2008) but lower paying jobs (Chalmers et al. 1993; Shore and McCoy 1987). Low academic achievement in young females represents a risk factor for impaired driving comparable to that observed in males (McMurran et al. 2011).
Marital status. Research into the marital status of female impaired drivers has produced more consistency, showing that female impaired drivers, when compared to male impaired drivers, are even more likely to be divorced or single (McMurran et al. 2011; Chang et al. 1996; Shore and McCoy 1987; Argeriou et al. 1986).

A study of the Drinking Driver Program in New York in 1992 that involved 800 female impaired driving offenders aged 18-77 reported that 44% of females had never been married. It further noted that females who were not yet diagnosed (in relation to alcohol issues) were more often married (64%) than those in the abuse group (52%) or dependent group (55%) (Parks et al. 1996). In 2000, a study by Lapham et al. reported that female impaired driving offenders, when compared to male offenders, were less likely to be married, to have prior impaired driving convictions, or to be referred for treatment. In 2013, Robertson et al. reported that the lack of stable and supportive relationships among women was a common characteristic of the women in their study. It was estimated that more than one-half of women were single, separated, or divorced at the time of the study, and approximately one-quarter of women were currently in a relationship. Of those involved in a relationship, the majority of women reported having a partner or spouse who drank frequently and/or had a drinking issue whereas a minority of women reported having a sober, healthy relationship.

It has been suggested that the higher divorce rate among female impaired drivers compared to males may indicate that relationship failure has had a stronger impact on the drinking behaviour of females compared to males. This has been linked to the possibility that females have a more internalized response to stress than males, such as alcohol or drug use, which can increase their risk of other dangerous behaviour such as impaired driving. McMurran et al. (2011) concluded that females, distressed by their marital situation, may turn to alcohol as a coping mechanism. However, it should be noted that females in a relationship were most likely to be living with someone who had an alcohol problem (McMurran et al. 2011).

To summarize, a significant proportion of female impaired drivers are single, divorced, or separated, or are more likely to be living with a partner with an alcohol problem compared to women with no past impaired driving offences (McMurran et al. 2011; Chang et al. 1996; Shore and McCoy 1987; Argeriou et al. 1986). Generally speaking, female impaired drivers are more likely to be the primary caretaker of children at the time of arrest, are more likely to have experienced abuse, and are more likely to have physical and mental health needs compared to their male counterparts (Bloom et al. 2003).

4.2.2 Personality and psychosocial factors

In contrast to the availability of research examining this issue among male impaired drivers, there have been fewer studies examining the prevalence of personality and psychosocial factors among female impaired drivers. However, a few studies shed some light on this issue. A U.S. study by Moore (1994) involving 180 young women (aged 16-20) with an impaired
driving conviction revealed that antisocial females represented just 19% of the sample. However this subset reported the majority of incidents of binge drinking, intoxication, impaired driving, crash involvement, and drug use (other than alcohol). This group of females also indicated higher levels of psychosocial stress (e.g., boredom, problems at home and school), however they viewed this as a part of daily life and failed to recognize the influence of these stressors. In sharp contrast, the women in the sample who were diagnosed as neurotic experienced similar stressors but were upset by them. The results of this study illustrated that, as is the case with a population of male impaired drivers, there are also subgroups among female impaired drivers. A smaller study by Lex et al. (1994) involving female impaired drivers in prison suggested that adult onset of antisocial personality disorder in conjunction with substance abuse may manifest differently in females as compared to males.

A study of convicted female impaired drivers in New York by Parks et al. (1996) also examined this issue and reported females who were diagnosed as alcohol dependent possessed higher levels of sensation-seeking and hostility, were more anxious and depressed, had less external control, and were less interpersonally competent. In 2007, a study by Maxwell and Freeman examined differences between men and women convicted of impaired driving and who entered a public substance abuse treatment facility in Texas between 2000 and 2005. This study revealed that women were more likely to receive diagnoses of depression or bipolar disorder, and were also more likely to have prescription medication for a mood disorder in comparison to men.

In summary, a review of these studies suggests that psychosocial problems among female impaired drivers may not be uncommon and that, at least a portion of these women may experience depression, boredom, and problems at home and school that are related to their drinking (McMurran et al. 2011).

4.2.3 Alcohol misuse

Alcohol use among women is a very important factor to consider in relation to impaired driving for several reasons. Research shows that women metabolize alcohol differently than men. Women initially metabolize much less (only about one-quarter as much) alcohol in the stomach and intestines as compared to men. This means that more alcohol is absorbed into the blood as ethanol, which is then available to pass through the blood-brain barrier (Gudrais 2011; Greenfield 2002). In addition, females generally have less water in the body and a lower body mass. These factors work to intensify the effects of alcohol for women relative to men and, as a result, women become intoxicated after drinking half as much alcohol (Greenfield 2002; Waller 1997; Lex et al. 1991). Of equal concern, these physiological differences also contribute in part to the more rapid progression of alcohol dependence such
that women often require medical intervention an average of four years earlier than males who are problem drinkers (Gudrais 2011).

It is also important to note that a study by Elliott et al. (2006) found that women are more vulnerable to all types of traffic incidents following alcohol consumption. It reported that “there were significantly stronger associations between women’s alcohol use/misuse and crashes, and their marijuana use and offences, than among men” (p. 259). Research has also demonstrated that women arrested for impaired driving and female drivers testing positive for alcohol in fatal crashes were less intoxicated than their male counterparts (Popkin et al. 1988; White and Hennessey 2006). Women who had a BAC over .05 were found to be twice as likely as men to be involved in a motor vehicle collision (Elliott et al. 2006). As such, it appears that at any given BAC, women have a higher crash risk than men, making alcohol use and driving an issue of particular concern in women.

Age of onset. Studies show that youth who became drunk for the first time at a younger age (as compared to those who were drunk for the first time at 19), were more likely to “drive after drinking, drive after five or more drinks, and ride with a driver who was high or drunk” (Hingson et al. 2003, p.27). Even more worrisome was that those who were first drunk at a younger age also believed that they could drink more while still driving both safely and legally (Hingson et al. 2003). While research shows that females tend to consume less alcohol than males (Jones and Lacey 2001; Greenfield 2002), more recently the onset of drinking and heavier drinking among females is occurring at an earlier age, and the gender gap between young females and young males in relation to alcohol dependence is also shrinking (Greenfield 2002; Robertson et al. 2011a).

Robertson et al. (2013) reported that the extent of substance use varied substantially across study participants. It is estimated that almost one-half of women reported early onset of drinking with many experimenting with alcohol and/or drugs in their early or mid-teen years; the lowest reported age of onset drinking was nine years old. In many cases, they indicated that their first exposure to alcohol and drugs was either in their own home, with relatives, or with friends. Conversely, it is estimated that between one-quarter and one-third of women did not begin to regularly use or develop a problem with alcohol or drugs, or begin to drive after using these substances, until they were in their 30s or 40s.

Family history. A constellation of family history factors are associated with female impaired driving offending to varying extents, however the specific influence of each factor is unclear. Many female impaired driving offenders who were admitted to addiction treatment in Illinois possessed multiple characteristics that potentially contributed to their alcohol consumption. These included a history of alcoholism within the family, experience with abuse, anxiety and depression, and family and personal relationships that encouraged heavy drinking (White and Hennessey 2006).
Past and current literature has noted that there are a range of individual, family, environmental, and social factors that can contribute to the increased risk of drinking and driving among youth. Risk of general traffic offences and collisions has been correlated to substance abuse, poor school performance, lack of parental involvement, and other risky behaviours (Elliott et al. 2006). Similarly, close contact with family members who had problems with alcohol was associated with a higher risk for alcohol problems among female impaired driving offenders, as well as an increased recidivism risk (Lapham et al. 2000). Equally concerning, when offenders in treatment return to a family environment that lacks sources of support, they are more likely to repeat their pattern of alcohol and/or drug abuse (Maxwell and Freeman 2007).

Most recently, Robertson et al. (2013) revealed that the reported family history of women who participated in their study varied considerably. It was estimated that slightly more than half of women reported a history of dysfunctional family relationships combined with prevalent alcohol and drug use and/or abuse to varying degrees.

**Alcohol-related diagnoses.** Estimates of alcohol diagnoses among female impaired drivers vary but are significant and comparable to males. To illustrate, a five-year follow-up study of convicted impaired driving offenders revealed that 85% of female offenders (compared to 91% of male offenders) were diagnosed with either alcohol abuse or alcohol dependence (Lapham et al. 2000).

In contrast, a study of admissions of impaired driving offenders (who were either on probation for impaired driving, were referred to treatment by probation, or had been arrested for impaired driving in the past year) to publicly funded treatment in Texas between 2000 and 2005 found that women were more impaired and experienced more problems than their male counterparts (Maxwell and Freeman 2007). In addition to the finding of dependence on sedatives and other opiates among women, this study also found that there was a shorter period of time between the first use of these drugs and admission to treatment among women compared to men, which speaks to the addictive potential of these drugs (Maxwell 2011).

Of course, sampling may introduce an important bias in interpreting these findings since individuals in alcohol treatment are often alcoholic, and these findings are consistent with the alcohol literature in relation to clinical samples. However, while some of the treatment population may be alcoholic or dependent, not all of them can be assessed as such. Differences in the populations, instrumentation, related procedures, and interpolation, along with various jurisdictional policies may explain the disparate findings.

In the study by Robertson et al. (2013) it was estimated that study participants equally reported patterns of daily drinking or binge drinking. Approximately one-quarter of participants reported drinking heavily for a brief period which was followed by an extended
period of sobriety that could last several months. A universal theme that emerged in all of the interview focus groups was that women reported that they drank for emotional reasons, or that alcohol consumption was a coping mechanism to help them manage their emotions and stress.

These studies demonstrate that a substantial proportion of female impaired driving offenders are experiencing substance abuse problems, and that the gravity and complexity of those problems are significant (White and Hennessey 2006). There is also some evidence to suggest that female alcohol consumption in general may be a result of issues specific to women such as “their tendency to act as caretakers, sometimes to the exclusion of their own needs” (Gudrais 2011, p.10).

4.2.4 Mental health

Findings indicate that there is a need to treat some female impaired drivers not only for alcohol misuse problems but mental health problems as well (McMurran et al. 2011). A recent study by Freeman et al. (2011) of impaired driving and non-impaired driving patients in substance abuse treatment in Texas between 2005 and 2008 found that both were more likely to be diagnosed with mental health problems and more likely to be placed on medications upon admission to treatment compared to males. Female impaired driving offenders have significantly higher psychiatric co-morbidity relative to their male counterparts (Laplante et al. 2008). Diagnoses of anxiety, depression, and post-traumatic stress disorder (PTSD) are common among female impaired driving offenders.

Wanberg & Milkman (2008) reported that, in a study of 10 large judicial samples including impaired driving offenders, non-impaired driving probation clients, and non-impaired driving offenders sentenced to prison (total N=15,910), in every sample, female offenders scored significantly higher (with moderate effect sizes) on the scales in the Adult Substance Use Survey-Revised (Wanberg 2006) and the Adult Substance Use and Driving Survey-Revised (Wanberg and Timken 2006) that measure mood and psychological adjustment problems. The Level of Supervision Inventory-Revised (LSI-R: Andrews and Bonta 2003) was available for eight of these samples. In all of the samples female offenders scored significantly higher than males on the LSI-R Mental Health Scale.

Mental health issues were also frequently reported by female impaired drivers in a recent U.S. study by Robertson et al. (2013). It was estimated that three-quarters of the study participants reported using one or more prescription medications for disorders such as anxiety, depression, PTSD, bi-polar disorder, and schizophrenia. A small number of participants further acknowledged sexual assaults, domestic violence or abortions as influencing their mental state, and some also indicated prior suicide attempts, suggesting that histories of trauma are not uncommon.
Drug use. While drug use among female impaired drivers is prevalent, some research suggests that involvement in drug use may be more comparable among males and females. In a study of 812 female offenders in the New York Drinking Driver Program conducted by Parks et al. (1996) in which 43% of offenders were alcohol abusers and 25% were alcohol-dependent, among these two latter groups, 19% and 50% respectively, also reported drug problems. Similarly, a study of 1,105 impaired driving offenders in New Mexico found that of those with alcohol use disorders, 32% of females (compared to 38% of males) also had a drug use disorder (Lapham et al. 2000).

However, Maxwell and Freeman (2007) reported that the use of illicit drugs was higher among females as compared to males. More recently, a study examining the characteristics of convicted impaired drivers in treatment found that females were most likely to be diagnosed with a primary problem with sedatives or opiates, whereas males were most likely to be diagnosed with a primary problem with alcohol and cannabis (Maxwell 2011). Similarly, Freeman et al. (2011) found that females were more likely than males to have problems with methamphetamines, cocaine, and opiates.

More recently, Robertson et al. (2013) reported that, although prescription drug use was common, less than one-third of female impaired drivers reported use of illicit substances. Among many of these women, marijuana and methamphetamines were the most common drugs of choice, although use of cocaine, hashish, and ecstasy was also reported. Often the drug use was connected to the presence of a partner or spouse who also used drugs. There was also a very small minority of focus group participants who reported that alcohol was not their “drug of choice” and that they did not have a problem with alcohol.

In summary, given that the use of drugs appears to be somewhat common among female impaired drivers, it is important that female offenders are appropriately screened, identified, and treated for all drug use disorders.

4.2.5 Cognitive impairment

While there has been limited research investigating cognitive deficits specifically among a female impaired driver population, a recent five-year longitudinal study related to predictive role of executive function in DWI recidivism was conducted by Brown, T. et al. (2013). This study involved a sample of 225 community-recruited first-time impaired driving offenders that included 136 males and 87 females, with a control group comprised of 79 individuals (37 males and 42 females). In particular, the study found that female offenders, not male offenders, showed more signs of poorer executive control compared to their non-offender controls, both functionally and psychometrically. Overall, it revealed a pattern of reduced executive control in female first-time impaired driving offenders with alcohol use disorder, and that, among alcoholics, females are more susceptible to alcohol’s neurocognitive effects than
males. No differences were found between male and female offenders on relative measures of abuse even though males typically use and misuse alcohol more than females.

A cross-sectional analysis suggested a greater role for executive control deficits in the transition from first-time impaired driving to repeat impaired driving status in male offenders than in female offenders. However, the MMPI-Mac Scale (a measure of cognitive impairment, reward-seeking, and externalizing personality features associated with alcoholism) distinguished female first-time impaired driving offenders from controls, but not in males.

The authors further noted that executive control appears to be a feature of female first impaired driving offending and that their ability to identify goals, plan, execute, inhibit old behavior patterns, and learn from experience is reduced. These impairments worsened with alcohol intake. As such, alcohol appeared to contribute to female first impaired driving offending through acute and chronic disruption of executive control functioning (Brown et al. 2013).

4.2.6 Driver and criminal history

There are limited data to suggest that a smaller number of female impaired driving offenders relative to males have a history of other traffic offences or criminal offences, although more research into this topic is needed. Common criminal offences in females may include drug offences, theft offences, and assault (Caldwell-Aden et al. 2009). This finding was echoed in the study by Robertson et al. (2013) who estimated that less than 20% of participants reported prior involvement in other criminal activities in addition to their impaired driving arrest(s). Most often, their involvement in criminal activities was linked to an existing relationship with a male partner, or a group of friends engaged in criminal activity.

4.2.7 Repeat female impaired drivers

Female repeat impaired driving offenders often share similar characteristics to their male counterparts. Older research suggests that repeat female offenders are approximately 30 years old but more current research on this issue is needed. Similar to males, there is also evidence that this population has lower levels of education, employment, and income, and is much more likely to be single, separated, or divorced than first offenders. Like their male counterparts, repeat female offenders are more likely to drink more frequently and exhibit higher levels of impairment, more often abuse drugs, and utilize treatment services (Argeriou et al. 1986).

However, there are some differences between female and male repeat offenders. For example, repeat female impaired driving offenders have higher levels of psychiatric co-morbidity than male repeat offenders and are more likely to also use drugs (Laplante et al. 2008; Maxwell 2011).
Recidivism rates among male and female impaired drivers show some consistent patterns, depending on the studies consulted. Available data suggest recidivism risk may be higher for young males than women (Argeriou et al. 1986; Jones and Lacey 2001; McMurran et al. 2011; Webster et al. 2009; Wells-Parker et al. 1991), but it appears that risk of recidivism may converge as adults of both genders age (Lapham et al. 2000). A study in 2000 involving a five-year follow-up of 2,615 convicted first-time impaired driving offenders in New Mexico revealed that overall 26% of offenders had been re-arrested (20% of females and 33% of males according to Lapham et al. 2000). The study further reported that, after controlling for a range of factors, young males had a recidivism rate 2.5 times that of women. However, a comparison of rates among older offenders revealed few differences between sexes (Laplante et al. 2008).

A more recent population-based study (2010) in Maryland, reported that following their first conviction for impaired driving offences, the risk of recidivism is equivalent between female and male offenders. The study also noted that on average, drivers with repeat alcohol offences (as measured by violations on their driving record) were younger than drivers who did not have repeat alcohol offences on their driving record (Rauch et al. 2010). As relatively few studies have specifically examined this issue, more research is needed.

4.3 Summary of Characteristics

In the past four decades, much has been learned about the profile and characteristics of impaired drivers. Nevertheless, there is far more research about males compared to females, with much of the female research being dated. This is an important research gap. However, there are some important similarities and differences between men and women that are worthy of our attention and consideration to inform efforts to better manage this offender population. What is perhaps most important however, is that impaired drivers of both sexes represent a heterogeneous population that is comprised of many different subgroups that require closer investigation and study.

4.3.1 Similarities between male and female impaired drivers

On average, impaired drivers of both sexes are generally aged 20 to 40, with many offenders being in their 30s. Relative to the general population, impaired drivers of both sexes also are more likely to have less education and lower levels of employment and income; this finding is more pronounced among repeat offenders. Similarly, impaired drivers of both sexes are more likely to be single, separated, or divorced. Again, this finding is more pronounced among repeat offenders.

Alcohol-related diagnoses are very common among impaired drivers of both sexes. In particular, the age of onset of drinking and family history warrant attention. To reiterate, while such diagnoses are highly correlated with impaired driving offending, they are not
necessarily a causal factor. Both male and female impaired drivers have higher levels of psychiatric symptoms relative to the general population so co-occurring disorders should not be overlooked during screening and assessment of this population. Moreover, recidivism rates for impaired driving among men and women of adult age appear similar following a first alcohol-related conviction.

4.3.2 Differences between male and female impaired drivers

There are also some important differences between male and female impaired drivers. Men appear to exhibit a higher degree of antisocial attitudes and behaviours relative to women, although research comparing these populations on this dimension is sparse. Conversely, women experience more severe psychological and mental health symptoms as well as report greater involvement in drugs. Men may be more defensive about alcohol problems and, in particular, repeat male impaired drivers may demonstrate a greater readiness for change.

In addition, younger males appear to have higher recidivism rates relative to females in this age category. Male impaired drivers also have more extensive histories of driving offences and other criminal offences as well as more prior experience with impaired driving interventions.

To summarize, this research makes abundantly clear why the interventions based upon simple theoretical models that emphasize distinct aspects of behaviour, as opposed to a broader examination of the constellation of behaviours that are intimately linked to impaired driving, have failed to produce more dramatic results. This critical fact was succinctly captured in Wanberg et al. (2005) who stated “there is no simple cause and effect model that can explain, let alone predict, impaired driving conduct. Many factors - early age drinking, environmental events, problem behaviour, personality characteristics, stress and the emotional syndromes of stress, cognitive and behavioural reinforcement and the impaired control - that interact with drinking and driving to result in impaired driving behaviour” (p.20).

Of clinical importance, this highlights the need for increased collaboration across disciplines to inform the development and delivery of interventions that are better suited to both match and target the diverse characteristics of this offender population.
5. IMPAIRED DRIVING RISK FACTORS

Risk factors are characteristics that are identified (according to sufficient research evidence) to be indicators of the potential for a group of individuals with shared characteristics to engage in a specific behaviour in the future. It cannot be underscored enough that “understanding the factors associated with recidivism is critical to our capacity for better detection of high-risk offenders and our ability to orchestrate effective countermeasures” (Ouimet et al. 2007 p. 743).

Generally speaking, risk factors are organized in two distinct categories: 1) static factors (e.g., number of prior offences) that cannot be changed; and, 2) dynamic factors (e.g., substance abuse) which may change over time (Gendreau et al. 1996; DeMichele and Lowe 2011). Again, risk factors are relative to a group and not an individual and, subsequently, these measures are not very robust (Nadeau 2010).

Risk assessment is a process that utilizes identified risk factors (usually in relation to multiple domains) to predict future behaviour. Risk assessment is not an exact science and risk factors only provide insight into the probability or likelihood of recidivism of offenders based upon existing research that is available. In this regard, much of the research around risk prediction has focused on criminal offenders and, in particular, those who have committed violent and/or sexual offences.

Historically, risk assessment instruments were viewed as little more than educated guess work and, generally speaking, studies have demonstrated that the accuracy of risk assessment tools is questionable. As such, practitioners are cognizant of the potential for both false-positives and false-negatives (Miller and Brodsky 2011). False-positives are the application of a high-risk classification to offenders who do not recidivate. False-negatives, on the other hand, are the application of a low-risk classification to offenders who do recidivate. Strategies used to reduce the frequency of false-positives and negatives often utilize multiple factors and combine actuarial evaluation and clinical observation.
More recently, the quality of instruments used with offenders generally has greatly improved (Andrews & Dowden 2006) as our understanding of risk factors has grown. To illustrate, a study conducted by Latessa et al. (2009) found that, among offenders who were three years post-release, 10% of offenders classified as low-risk were re-arrested compared to the re-arrest of 70% of offenders classified as high-risk. Risk assessment instruments that possess a higher degree of accuracy in prediction generally account for multiple risk factors to reach a determination as to the probability of recidivism, and place a greater emphasis on objective measures as opposed to just the reliance on professional judgment which is more often subjective.

A broad range of risk factors have been noted in the literature regarding impaired drivers including: sex, age, marital status, socio-economic status, history of prior treatment, impaired driving history, criminal history of violent aggression, prior traffic offences, test refusal or high-BAC, and drinking patterns to name a few (Syrcle and White 2006). Yet, these studies vary dramatically in terms of the population studied, sample size, variables and measures utilized, data sources, analyses conducted, comparison groups employed, the time period used to measure recidivism, and the interpretation of results. Moreover, the number of studies that have examined the reliability of each individual risk factor is relatively small, which makes the drawing of conclusions a challenge.

Hence, to date, there are no reliable predictors of risk among impaired drivers (Nadeau 2010). Moreover, what research there has been regarding the prediction of risk among impaired drivers has focused more on males than females (Lapham et al. 2006).

In light of the limitations associated with research investigating risk factors associated with impaired driving, what is currently known about impaired driving risk factors should be interpreted cautiously. At best, no single impaired driving risk factor provides a clear indication regarding the potential for future impaired driving recidivism. Collectively, however, these risk factors may provide some insight that enable practitioners to gauge the need to further explore individual cases and the need for more intensive interventions. This recommendation is consistent with recommendations in the research literature (C’dé Baca et al. 2001; Nochajski and Stasiewicz 2006; Syrcle and White 2006). It has also been recommended that studies should assess relevant self-reported measures for response bias as this can influence outcomes in studies investigating predictors of recidivism (Schell et al. 2006).

A brief overview of some of the key research studies that have been conducted on impaired driving risk factors is provided below. Inconsistent findings across studies are clearly evident in relation to some factors. An emphasis has been placed mainly on studies that have been conducted since 2000 with a few exceptions. Practitioners interested in more detailed

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14 It is equally important that risk assessment instruments demonstrate proven reliability and are scientifically validated and standardized on an appropriate population.
information about risk factors are encouraged to consult the individual studies cited and to carefully consider the research designs that were used in the drawing of conclusions.

5.1 Male Risk Factors

5.1.1 Demographic factors

Age. A number of studies examine age as a factor. Lapham et al. (2000) determined that age group at screening was strongly associated with impaired driving recidivism for males but not for females. In particular, it was noted that younger age among males was an important factor in predicting recidivism. Other studies that have similarly reported that offenders that are of a younger age (under 30) are at greater risk to receive a subsequent impaired driving offence include C’de Baca et al. (2001), Taxman and Piquero (1998), and Syrcle and White (2006). Most recently, this finding was again affirmed in a study by Rauch et al. (2010) which reported that younger males have a higher risk of recidivism than older males or females of any age group.

Sex. A number of studies have suggested that males are more likely to be repeat offenders and this is perhaps one of the most common factors that is noted in the risk literature (Nochajski 1999; C’de Baca et al. 2001; Syrcle and White 2006). However, more recently, a study by Rauch et al. (2010) reported that adult males and females are at equal risk for recidivism following their first alcohol-related violation. Although, the proportion of female drivers varied little between 1999 and 2004, their proportion decreased dramatically with increasing counts of prior violations. Women accounted for 51%, 18%, 13%, and 8% of the drivers with 0, 1, 2, and 3 or more prior violations, respectively. The male to female ratio of violation rates also decreased with increasing prior counts. The risk for men relative to women was 1.2 for drivers with 1 prior violation, 1.0 for drivers with 2 prior violations, and 1.0 for drivers with 3 or more prior violations (Rauch et al. 2010).

Marital status. Lapham et al. (2000) reported that marital status is significant as a predictor but only when using a univariate model and not when included in a multivariate model. A study by Syrcle and White (2006) indicated that marital status, in particular, having never been married or being divorced, was a predictor for men and women. Most recently, in the development of the Impaired Driving Assessment (IDA) instrument for screening impaired driving for risk, needs, responsivity, and traffic safety (American Probation and Parole Association (2013)), never-married marital status was found to have a significant correlation with and contributed significant variance in predicting a twelve-month outcome scale comprised of variables measuring: any arrests, positive for drugs, missed judicial supervision appointments, revocation of probation, and re-arrest for impaired driving during the 12 month period of judicial supervision.
**Ethnicity.** The number of studies that have investigated this specific factor have been fairly limited, however a few studies have reported that ethnicity is a predictor of recidivism (Lapham et al. 2000; Christopherson et al. 2002). Of note, findings vary according to the nature and location of the study and are not consistent. C’de Baca et al. (2001) noted that ethnicity was a predictor using a univariate model, but not in a multivariate model.

**Life history.** Lapham et al. (2000) reports that the presence of family members or spouses with alcohol problems is predictive both of higher risk for alcohol problems among offenders, and also increased recidivism risk, and this finding was based upon self-reported characteristics. The study further notes that “given the association of these indicators with recidivism, it appears prudent to elicit this information during a DWI evaluation” (p.1653). Similarly, Wieczorek and Nochajski (2005) also reported that a father with a drinking problem and a relative arrested for impaired driving were the family factors most strongly associated with the number of prior impaired driving offences.

Taking a slightly different approach, Begg et al. (2003) reported that aggressiveness at age 18 when combined with alcohol dependence at age 21 was a predictor for future involvement in an alcohol-related crash.

**5.1.2 Personality and psychosocial factors**

According to a study by Mann et al. (2004), aggression is a risk factor for future impaired driving recidivism and also other public safety risks such as road rage. This is further substantiated by recent findings of alcohol problems among those involved in road rage incidents as Zuckerman (2000) found reckless driving was related to drinking.

A number of studies have examined personality and psychosocial factors, including Wieczorek and Nochajski (2005) which suggest that psychiatric conditions could be useful for identifying potential recidivists. Conversely, Schell et al. (2006) conclude that “there are no strong psychological predictors of recidivism” (p. 34).

**5.1.3 Substance misuse**

Early onset of alcohol and drug use and abuse is predictive of adult impaired driving (Hingson et al. 2002; Hingson et al. 2003; NHTSA 2001). Specifically, early onset drinking is a predictor of several relevant behaviours including: future driving after any drinking, driving after five or more drinks, riding with an intoxicated driver, and involvement in alcohol-related crashes (Hingson et al. 2003).

Frequency of drinking has been reported by Schell et al. (2006) as the single strongest predictor of driving after drinking. He further noted that persons who expect positive emotional outcomes as a result of drinking, and who drink frequently are more likely to continue to drive after drinking.
Lapham et al. (2000) reported that admission to lifetime use is a risk factor for recidivism. Similarly, Schell et al. (2006) noted that impaired driving offenders with the most severe alcoholism had the greatest risk for repeat impaired driving convictions. Finally, a 2006 study by Syrcle and White confirmed that drinking larger quantities of alcohol over extended periods of time prior to driving was also a predictor of recidivism risk.

An examination of drug use as a factor by Wieczorek and Nochajski (2005) revealed that there were significant differences in drug use according to the number of prior offences, and indicated higher levels of drug use among repeat offenders.

### 5.1.4 BAC

Although often cited as a reliable predictor of recidivism, research findings on this specific variable are mixed at best. C‘de Baca et al. (2001) reported that BAC was a significant predictor of recidivism whereas Wieczorek and Nochajski (2004) reported that offenders with lower BACs were more likely to recidivate. This is consistent with their earlier findings (Nochajski and Wieczorek 1997) which noted that a low BAC (under .16) is a better predictor of recidivism than a high BAC (.18 or greater).

This is not to suggest that BAC is not an important variable for other purposes. In particular, BAC is a significant predictor of degree of involvement in and disruption from alcohol use and abuse and it should be used along with information about alcohol and drug use as a key factor in determining appropriate placement in treatment interventions. BAC at the time of arrest is generally recognized as an important factor to distinguish between different types of impaired drivers and their need for assessment and/or intervention (Wanberg et al. 2005; Syrcle and White 2006).

In a study examining the characteristics of impaired driving recidivists, Caviola et al. (2007) concluded that BAC may have limited utility for the purposes of screening. In particular, the study reported that “this should not be interpreted to mean that high blood alcohol levels at the time of arrest do not have clinical utility. Rather, it is recommended that BAC be interpreted cautiously or in conjunction with other predictors of potential DUI recidivism risk” (p.859). Most recently, a study by Dugosh et al. (2013) provides evidence to indicate that a driver’s BAC level at arrest, in the absence of other information, also may not be a reliable indicator of the degree of alcohol-related problems including diagnoses of abuse and dependence.

### 5.1.5 Instruments

There are several risk assessment instruments that have reported some strength in predicting impaired driving recidivism risk. First, the MAST has been found to significantly predict recidivism status as reported in two key studies (Lapham et al. 2000; Caviola et al. 2003). However, the Lapham et al. (2000) study only determined that the MAST was associated with
recidivism when univariate analyses were conducted, and when a multivariate model was utilized the results were no longer significant.

Second, the MAC scale of the MMPI, which measures general personality traits characterized by sociability, boldness, rebelliousness, and pleasure-seeking also has shown some positive results. In particular, high scores on the MAC (a raw score of 23 or higher) have been shown to be predictive of impaired driving recidivism (Lapham et al. 1997). Most recently, a review of the evaluation literature in relation to risk assessment instruments by Brown and Ouimet (2013) concluded that “there is support for the MAC’s scale’s predictive validity for [DWI] risk assessment but more mitigated support for other MMPI scales” (p.310).

Third, a study by Nochajski and Wieczorek (1998) (cited in Cavaiola et al. 2007) reported that subtle items of alcoholism included in the RIASI were predictive of recidivism. Finally, a study by Syrcle and White (2006) reported that 14 of the 16 scales of the Adult Substance Use Survey Revised-Illinois (ASUDS-RI) (Wanberg and Timken 2006) uncovered significant differences between first and repeat impaired drivers.

A current demonstration project being conducted by the American Probation and Parole Association and funded by the National Highway Traffic Safety Administration (DeMichele et al. 2013) has developed a preliminary Impaired Driving Assessment screening instrument. Preliminary findings are promising with respect to providing probation intake services guidelines for judicial supervision placement and referral to outside services (Wanberg and Lowe 2013).

Of note, there is important research that illustrates “how variations in base rates of failure and selection ratios affect conclusions concerning the efficacy of different instruments” as a strategy to demonstrate the value of evaluation standards in order to make valid comparisons between risk prediction instruments (Anderson et al. 2000, p. 915). In layman’s terms, this means that different jurisdictions or offender samples will have higher or lower rates of failing, and that agencies need to make decisions about how to balance the positive and negative predictions. That is, assessment is an exercise in prediction, and prediction has error. Hence, some offenders will be predicted to recidivate but do not (false-positive), whereas others will be predicted to recidivate and they do (true positive). Similarly, those predicted to be low risk may recidivate (false-negative) and others will not recidivate (true negative). It is a bit of an art to balance these issues, but also a matter of agency capacity. The bottom line is that due to decisions regarding instrument precision, practitioners should be careful about comparing different assessments and even the same assessment across different populations.

5.1.6 Biomarkers

Impaired drivers, both first and repeat offenders, suffer from high rates of alcohol use disorders (AUDs) (Lapham et al. 2001). Biomarkers can detect the presence of these disorders
fairly accurately. A number of studies have investigated the extent to which biomarkers are predictive of impaired driving recidivism. Couture et al. (2010) showed biomarkers were not a good predictor of recidivism, individually or as a group. They failed to differentiate between first and repeat impaired driving offenders. The primary reason for this is that biomarkers may not capture the drinking patterns that are most common among impaired driving offenders – e.g., binge drinking (Couture et al. 2010). Biomarkers more accurately identify severe and chronic patterns of alcohol use as opposed to the episodic heavy drinking that often precipitates impaired driving. Moreover, alcohol misuse alone is not enough to identify the propensity of an individual to recidivate as there are a combination of other factors (such as personality traits or cognitive impairments) that can interact with substance misuse to lead to high-risk behaviour such as impaired driving (Brown et al. 2009; Nochajski and Stasiewicz 2006; Ouimet et al. 2007). As such, biomarkers of chronic patterns of heavy drinking may not be adequate in and of themselves to “capture the multiple processes that appear to promote recidivism” such as binge drinking and other risky behavioural and personality features (Couture et al. 2010, p. 307).

5.1.7 Driver and criminal history

Driver history. In a study by Peck et al. (1994), driving records of first and repeat impaired drivers (using a four-year follow-up period) were analyzed using multivariate analyses to assess predictors of impaired driving recidivism. Prior involvement in crashes and traffic violations were the strongest predictor of membership in the repeat offender group. Similarly, NHTSA (1996) reported that the risk of future arrests rises in conjunction with the number of prior impaired driving arrests. A major study in Maryland by Rauch et al. (2002) involving several thousand driver records confirmed that any alcohol-related driving event is predictive of future impaired driving behaviour. In 2005(a), Wieczorek and Nochajski confirmed this finding as did Schell et al. (2006) who noted that high-risk driving style was a significant predictor with a moderate effect size. Most recently, Cavaiola et al. (2007) also concluded that a poor driving record that includes offences both prior to and following the initial impaired driving offence is predictive of recidivism. However, some have noted that prior impaired driving arrests may not be a good predictor as the presence of prior arrests is influenced to a large extent by the level of impaired driving enforcement as well as the length of the “look-back” period for counting prior arrests (Nochajski and Stasiewicz 2006).

Criminal history. Some studies have reported that prior criminal history other than impaired driving offences is a predictor of impaired driving recidivism (Syrcle and White 2006). A 2007 study by Labrie et al. examined criminality and continued impaired driving offences and concluded that rates of recidivism increased with the severity of criminal behaviour (e.g., crimes progressing from substance-related crimes to property crimes to crimes against persons). “ Compared to the DUI only type, the property crime subjects were 1.4 times more
likely to be re-arrested for DUI and person crime subjects were twice as likely to recidivate” (Labrie et al. 2007, p.611-612).

Moreover, research investigating risk factors associated with criminal re-offending has identified a number of objective and verifiable risk indicators that are useful to distinguish between first and repeat impaired drivers. These variables are associated with an offender’s criminal history and include “age at time of first arrest for any criminal act, age at time of first impaired driving conviction, having a prior summary of alcohol- or drug-related offence, having a prior misdemeanor offence, having a misdemeanor offence for a crime against persons, or having five or more prior moving violations” (Dugosh et al. 2013, p.8).

In addition, other risk variables that have been shown to differentiate between first and repeat impaired driving offenders include “age of onset of substance abuse, having a prior treatment episode, or loss of employment or expulsion from school because of drug or alcohol use” (Dugosh et al. 2013, p.8).

5.1.8 Interlock fails

Research suggests that a high rate or pattern of BAC fail readings from the alcohol interlock, particularly in excess of .02, is predictive of the likelihood of impaired driving recidivism (Marques et al. 2003; Beirness and Marques 2004). A major study conducted in Alberta analyzed 5.5 million BAC tests provided by 2,200 offenders (Marques et al. 2001). It was subsequently demonstrated that the likelihood of future impaired driving convictions in the first two years following the removal of the interlock can be strongly predicted based on the rate of elevated (greater than .02) interlock BAC tests (Beirness and Marques 2004). A subsequent study in Quebec involving 7,200 offenders who provided 18.8 million breath tests confirmed this finding (Marques et al. 2003). In fact, more interlock warnings and failures logged during the first five months of interlock usage predict greater than 60% of repeat impaired driving offence with a false-positive rate (which occurs when a clean breath sample is erroneously determined as containing alcohol) of less than 10% (Marques et al. 2001).

Researchers have also determined that the presence of elevated BAC tests during early morning hours can also assist in predicting future impaired driving offences (Beirness and Marques 2004). Early morning high BAC tests are usually a result of drinking the prior evening and indicate the extent of drinking that occurred. The presence of two or more elevated BAC test results during the morning hours further bolsters the predictive model regarding the likelihood of future impaired driving offences (Marques et al. 2003).

Prediction of repeat offences has been associated with a profile of drivers who are both multiple offenders and who have more than a few elevated interlock BAC tests (Marques et al. 2003). Marques and Voas (2008) found that the number of failed BAC tests logged is predictive of repeat impaired driving offenders. The higher the rate of failed tests, the more likely offenders will recidivate once the interlock is removed. Also, those offenders who are
in the top 20-30% of elevated interlock BAC tests have significantly higher levels of alcohol biomarkers associated with problem drinking (Marques and Voas 2008).

5.1.9 Repeat and/or hard core impaired drivers

According to a presentation by Nadeau (2010) at an international conference in Canada, a number of recent studies have identified risk factors among repeat offenders in comparison to first offenders. Low levels of participation or involvement in treatment and treatment interventions is considered predictive of recidivism (Aharonovich et al. 2003; Crews et al. 2005). This is further confirmed is a study by Syrclle and White (2006) and a review of the literature by Wanberg et al. (2005). Neurocognitive deficits have also been reported as predictive of recidivism among repeat offenders. More specifically, these deficits can contribute to variation in affect, impulsivity, problem solving, perception and memory (Glass et al. 2000; Ouimet et al. 2007). Finally, a reduced ability to change is also predictive among repeat offenders of future impaired driving offences (Buntain-Ricklefs et al. 1995; Glass et al. 2000; Ouimet et al. 2007).

5.2 Female Risk Factors

There is one key study that examined differences in risk factors among men and women. For the most part, few differences were found in terms of predictive variables with the exception that women were more likely to report a history of aggressive behaviour towards a partner than were males, and this indicator was associated with increased recidivism (Lapham et al. 2000).

Of interest, the Lapham et al. (2000) study further noted that, while rates of physical and sexual abuse among men and women are high among those with substance abuse problems, this factor is not associated with recidivism for either sex.

5.3 Summary

While it is clear that a wide range of risk factors have been examined in relation to the prediction of repeat impaired driving offences in the past two decades, the findings from this research are inconsistent in many cases and far from conclusive. There are only a small handful of common factors that have been investigated across several studies, however with regard to criminological research, more is known about risk factors among repeat drunk drivers. For these reasons, practitioners in the field are encouraged to take a broader view of and approach to the use of these factors, and focus on the presence of a number of risk factors collectively as a basis to inform decisions, as opposed to the presence or absence of individual factors. Much more research on this issue is needed before definitive conclusions can be reached.
5.4 Some Reflections on Estimating Impaired Driving Recidivism

By: Dr. Ken Wanberg & Dr. David Timken

There are a number of problems and questions that impact on this approach or any recidivism-risk prediction model. First, given the evidence thus far, the best set of predictor variables or scales that can be gleaned from multivariate studies will serve only as estimates of recidivism. Most models are linear: those with high scores are high risk or positive for recidivism; those with low scores are low risk or negative for recidivism. And, these models can do a fair job of estimating the percent of individuals who will or will not recidivate. Predictive models become complex when we look at the false-positive and false-negative issue because these models tend to focus on identifying those who are positive for re-offending. Those who do not offend in this positive group are false-positives. Thus, if the false-positive rate is 35%, then the predictive model is correct 65% of the time. However, what about the residual group, or those negative for re-offending? What percent of those do re-offend? If the linear model is reliable, then we can decrease the false-positives by choosing a higher cut-off value and putting fewer clients in the potential to re-offend. However, this just increases the risk of false-negatives or a higher percent of those not positive for re-offending who do re-offend.

Second, there are many unknown or un-measured idiosyncratic variables that can occur in the individual’s life that will contribute variance to outcome. For example, a never-married male with high potential for recidivism based on the best predictor variables gets married, has a child, and engages in a life-path of responsibility. Or, someone identified as a low risk for recidivism experiences a traumatic life-event (e.g., divorce, losing a job), becomes depressed and “doesn’t care” and drives impaired. In our clinical experience we have found these to be rather frequent occurrences. These “new events” usually cannot be predicted by retrospective measures and certainly, evaluators do not have a “magician’s ball” to predict these occurrences.

Third, any measured prediction of recidivism at either the group level or individual level will be affected by service interventions provided to impaired driving offenders. Most, if not all, sentenced impaired driving offenders receive judicial supervision, education and/or treatment services or a combination of all three. If these are effective, and the literature indicates this to be the case, then they will mitigate the estimated prediction. That is, effective intervention services will tend to increase the false-positives. Any risk-prediction model must consider the variance resulting from intervention services. Unfortunately, since intervention services vary considerably as to method, type and efficacy, one can only estimate the impact of these services (e.g., reducing recidivism rates by 10 to 20%).
Fourth, since it is common to provide fewer services for those evaluated as having a low recidivism risk, this can contribute to an increase of false-negatives. This is based on the common view held among judicial workers that those identified as low risk need minimal or no intervention services. What this does is generate a relatively large cadre of those identified as negative for re-offending which increases the probability of a false-negative. It is quite likely that the Wieczorek and Nochajski (2005) findings that those with lower BACs had a higher probability or recidivism had more to do with a significant percent of those with low BACs being placed in no or very minimal intervention services.

Fifth, the difficulty of predicting impaired driving recidivism is increased by the low variance of outcome variables. Outcome measures such as revocations, re-arrests, missing judicial supervision appointments, and so forth, taken at six-month post-probation intake typically have low variance (Wanberg and Lowe 2013). This can limit the use of predictive statistical methods when samples are relatively small. For example, if only 5% of the clients are re-arrested six months post-sentencing, even a sample of 500 will provide only 25 offenders in the re-arrest category.

Sixth, re-offending statistics are usually based on the big-face valid variable of re-arrests. However, the literature indicates that the percent who drive impaired is much greater than those who are re-arrested (see Wanberg, Timken and Milkman 2010). The pool of re-arrests must come from that group; but, is it a random sample of that group? Most likely it is not. Thus, recidivism prediction models should take into account those who drive impaired but are not arrested which provides an outcome variable that has a higher percent of variance.

Seventh, the value of impaired driver screening and assessment is significantly diminished when its main focus is only on risk assessment. More importantly, its value lies in providing guidelines for the type of intervention services including judicial supervision and alcohol and other drug and impaired driving intervention services.

Finally, impaired driving assessment becomes more effective when it is based on a convergent validation model (Wanberg and Milkman 1998; 2008; 2010; Wanberg et al. 2005). Based on the classic study of Campbell and Fiske (1959), the convergent validation assessment model holds that both self-report and other report information and data are used to converge on the best estimate of the individual’s conditions related to alcohol and other drug use and factors contributing to impaired driving conduct and the best estimate of the individual’s service needs. Self-report is seen as essential in this model in that it is a valid representation of where the individual is at the time of assessment and their willingness to self-disclose. Comparing self-report with other report data provides a basis for not only estimating the individual’s condition and service needs, but also their level of defensiveness at the time of assessment. If services are working and the individual’s willingness to self-disclose increases, this increases the probability of favourable outcomes.
The effective management of the many different types of impaired drivers is based upon the identification and development of a range of supervision strategies and interventions specifically geared towards those offenders who are more or less amenable to behaviour change. This is a fundamental principle of evidence-based practices. Of considerable importance, the use of valid and reliable risk assessment instruments is essential to accurately differentiate between the different types of impaired drivers that exist and ensure that they are streamed into appropriate interventions designed to address their specific risks and needs.

A number of standardized assessment instruments are available to help quickly identify current and potential alcohol problems. Generally speaking, these instruments are based upon a series of cutoff scores associated with the probabilities of re-offending to place offenders into specific groups or types (DeMichele and Payne 2013). Regarding their use with impaired driving offenders, it has been suggested these instruments place a disproportionate focus on alcohol use and, as such, suffer from “tunnel vision.” Importantly, research has shown that some offence types are more accurately classified when using instruments developed specifically for those offence categories (e.g., domestic violence offenders, sex offenders).

These assessment tools are designed to identify as many potential cases as possible, while at the same time minimizing the number of false-positives (i.e., identifying someone as “high-risk” for re-offending when they are not). Some of these instruments are not as strong and have demonstrated limited validity and reliability in relation to the accurate prediction of future impaired driving events, including the following:

- Mortimer Filkins (MF) (Chang et al. 2002; Wendling and Kolody 1982); and
- Driver Risk Inventory (DRI) (Chang et al. 2002).

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15 It is important to recognize that not all screening instruments commonly used among impaired drivers are designed to detect drug use. Instruments that will detect drug use include Alcohol, Smoking, Substance Involvement Screening Test (ASSIST), Cut-down, Annoyed, Guilty, Eye-opener Adapted to Include Drugs (CAGE AID), Addiction Severity Index (ASI), and Global Appraisal of Individual Needs (GAIN).
In light of the strengths and weaknesses associated with many of the available instruments, a majority of jurisdictions rely on the outcomes of several instruments during the assessment process in order to produce a more complete picture of impaired driving offenders. This section briefly describes some of the instruments that are most commonly used across Canada and the United States. Each instrument is described in terms of type of administration, who it can be administered by, number of items, time required for administration, training required for administration, scoring, summary of psychometrics, limitations, cost, and source. In addition, a few key references are identified in relation to each instrument in order to provide additional information to practitioners seeking more knowledge about the risk assessment instrument.

The following is a list of the instruments described in this section:

- ADS (Alcohol Dependence Scale);
- ASUDS-R (Adult Substance Use and Driving Survey – Revised);
- ASI (Alcohol Severity Index);
- AUDIT (Alcohol Use Disorders Identification Test);
- IDTS (Inventory Drug-Taking Situations);
- DAST (Drug Abuse Screening Test);
- LSI-R (Level of Service Inventory-Revised);
- MAST (Michigan Alcoholism Screening Test);
- SASSI (Substance Abuse Subtle Screening Inventory);
- RIASI (Research Institute on Addiction Self Inventory); and,
- Biomarkers.

There are no clear indications of the superiority of any one screening instrument or set of instruments and procedures. Research suggests that the selection of specific instruments and procedures should be guided by the needs and resources in particular jurisdictions (Beirness et al. 1997). It warrants mentioning that adapting instruments can jeopardize their validity and may require further research. More importantly, relevant laws pertaining to copyright should be reviewed.

When reading through the summary of psychometrics for each instrument there are some important caveats to note with regard to the metrics pertaining to reliability and validity. Validity measures examine how well an instrument separates recidivists from non-recidivists. The area under the curve is a commonly used statistic to assess predictive discrimination. Reliability looks at how consistently the instrument can be scored across raters (e.g., if ten
raters each score the same case to what extent will there be agreement among raters). The intraclass correlation coefficient (ICC) is a commonly used measure of inter-rater reliability. In particular, Cronbach’s alpha provides another look at reliability insofar as it examines internal consistency among items. So in these instances, Cronbach’s alpha is, in fact, a somewhat narrow, albeit important, look at reliability as it examines internal consistency among items.

With regard to the studies reviewed, a commonly accepted interpretation of these numbers is 0.80 and over is considered a very good; 0.70 to 0.80 is considered acceptable; 0.60 to 0.70 is considered questionable; 0.50 to 0.60 is poor; and less than 0.50 is unacceptable (George and Mallery 2003).

6.1 Alcohol Dependence Scale (ADS)

Brief description

The ADS provides a quantitative measure of the severity of alcohol dependence consistent with the concept of the alcohol dependence syndrome. The 25 items cover alcohol withdrawal symptoms, impaired control over drinking, awareness of a compulsion to drink, increased tolerance to alcohol, and salience of drink-seeking behaviour. The ADS yields a measure of the severity of dependence that is important for treatment planning, especially with respect to the intensity of treatment.

The printed instructions for the ADS refer to the past 12-month period. However, instructions can be altered for use as an outcome measure at selected intervals (e.g., 6 months, 12 months, 24 months) following treatment.

The ADS can be completed in approximately five minutes and as a result can be used for screening and case-finding in a variety of settings including health care, corrections, general population surveys, workplace, and education. Guidelines are given for using the ADS with respect to treatment planning, particularly with respect to the level of intervention.

A French language translation is available.

Type of administration

Pencil-and-paper self-administered

> Interview

> Computer self-administered

Administered by

> Self

Number of items

> 25
Time required for administration
> 5 minutes

Training required for administration
> Yes, only basic training needed

Scoring
> Administrator or by computer

Summary of psychometrics (reliability/validity)

The ADS is widely used as a research and clinical tool, and studies have found the instrument to be reliable and valid. The ADS can be used for basic research studies where a quantitative index is required regarding the severity of alcohol dependence. For clinical research, the ADS is a useful screening and case-finding tool. It is also of value with respect to matching clients with the appropriate intensity of treatment and for treatment outcome evaluations.

Items making up the ADS were found to have good internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores; $a = .92$ Skinner and Horn 1984). The scale consists of three factors: the first major factor accounted for items reflecting withdrawal symptoms, the second and third smaller factors were made up of items reflecting obsessive compulsive drinking patterns and loss of behavioural control (Skinner and Horn 1984).

The ADS has good concurrent validity (demonstrated that test correlates well with a measure that has previously been validated). Skinner and Horn (1984) reported that the ADS score was correlated with both daily consumption of alcohol and lifetime use of alcohol, social consequences from drinking, prior treatment for alcohol abuse, use of alcohol to change mood and feelings of guilt over drinking. The ADS was also significantly correlated with the MAST (Skinner and Horn 1984; Ross et al. 1990).

The ADS has been successfully adapted for use with a variety of different cultures and ethnic groups (Fu et al. 2008; Rajendran and Cheridan 1990; Solis et al. 2007). The translated versions of the ADS were found to have high internal reliability (referring to the extent to which a measure is consistent within itself). The ADS was found to correlate well with alcohol-related problems and post-release drinking goals with incarcerated male offenders (Hodgins and Lightfoot 1989).

The ADS appears to be an equally valid and reliable measure of alcohol dependence in women (Chantarujikapong et al. 1997; Drake and Mercer-McFadden 1995). Internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores) is also high in this population (ranging from .85 [dependent participants] to .99 [total sample]; Chantarujikapong et al. 1997). The ADS has been used
successfully in several studies investigating alcohol dependence in homeless and incarcerated women, and studies of alcohol misuse in Australian female university students (e.g., Biron et al. 1995; Chantarujikapong et al. 1997; Williams et al. 1998).

**Limitations**

- Cost for use
- Limited to alcohol dependence assessment only

**Cost**

**User’s guide**

- ISBN 978-0-88868-091-4 • 34 pages • booklet/guide
- $17.95 • published 1984 • product code PG010
- Available in English only

**Questionnaires (package of 25)**

- $11.00 • published 1984 • product code P143
- Available in English and French

**ADS kit (User's Guide and 25 Questionnaires)**

- $20.95 • published 1984 • product code PG011

Download a PDF version of the Order Form: http://www.camh.net/Publications/CAMH_Publications/camh_publications_orderform.pdf

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Website: http://www.camh.net/Publications/CAMH_Publications/alcohol_dependence_scale.html
Source
Harvey Skinner
Multi-Health Systems regarding the Computerized Lifestyle Assessment:
1-800-268-6011 (Canada)

References


Solís, L., Cordero, M., Cordero, R., & Martínez, M. (2007). Caracterización del nivel de dependencia al alcohol entre habitantes de la Ciudad de México. [Characterization of level of alcohol dependence in Mexico City inhabitants.]. *Salud Mental*, 30(6), 62-68.
6.2 Adult Substance Use and Driving Survey – Revised (ASUDS-R)

Brief description

The ASUDS-R is a 123 item psychometric-based, self-report screening instrument that also incorporates information gathered through collateral data and an individual interview. Its purpose, according to Wanberg and Timken (2006) is to “provide a differential screening assessment of the driving while impaired (DWI) offender in the areas of substance use and abuse, alcohol involvement, and other areas of life-adjustment problems” (p.8).

The ASUDS-R assesses an individual’s alcohol and other drug use involvement in ten categories of drugs, and measures the degree of disruption that might result from the use of these drugs. The ASUDS-R provides a specific measure of the degree of involvement in the use of alcohol, and a specific measure of driving-risk attitudes and behaviours. It also provides a screen for emotional or mood adjustment problems, a measure of social non-conformity, a measure of legal non-conformity, a measure of defensiveness or resistance to self-disclosure, and a scale to assess motivation and readiness for treatment. It provides measures of alcohol and other drugs (AOD) involvement and legal conformity for the most recent six month period the client has been in the community.

The ASUDS-R can be used to provide guidelines for assessing levels of alcohol or other drug problems, abuse, and dependence. It can also be used to provide referral guidelines for various levels and types of services for impaired driving offenders. It can be used to assess during and post-treatment changes.

Type of administration

- Pencil-and-paper and automated version

Administered by

- Self or practitioner

Number of items

- 123

Time required for administration

- 20-30 minutes
Training required for administration

- Comprehensive training is required to administer the instrument and interpret its scores.

Scoring

The ASUDS-R is scored using four weighted scales and can also include collateral data, including BAC at arrest, prior substance abuse treatment, and prior impaired driving arrests or convictions.

Summary of psychometrics (reliability/validity)

A study conducted by Wanberg and Timken (2007, unpublished) of the psychometric properties found the analytical results were largely favorable. Internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores) reliabilities were within optimal range. Each scale was found to render a unique dimension, inter-correlations among scales were consistently positive, consistency of measurement among different samples was strongly supported, and robust correlations were found with external criterion tests and scales. Evidence was found to support the use of the ASUDS-R scales independently and in combination with collateral variables to provide service guidelines for impaired driving offenders.

Wanberg and Timken (2007, unpublished) also found the ASUDS-R to be a valid self-report differential screening instrument that provides sound guidelines for decision-making, particularly when integrating findings from other report data (e.g., BAC, prior offences), and when used in combination with placement criteria such as those developed by the American Society of Addiction Medicine.

The User’s Guides for the original ASUDS and ASUDS-R provide a detailed summary of scale construct validation studies.

Limitations

- Cost of use
- Limited peer reviewed examination of the psychometric properties in published journals
- Review of instrument has only been done by the authors of the instrument
- Has not been included in any meta-analysis reviews of screening instruments

Cost

Costs are not listed on website. Please use the following links to contact Dr. Wanberg about costs.
The computerized version can be purchased from Dr. Wanberg’s web site: http://aodassess.com/software_applications/how_to_buy.htm.

To inquire about use of the paper version, see http://aodassess.com/apps/contactus.aspx.

**Source**

Center for Addiction Research and Evaluation (CARE)

P.O. Box 746147

Arvada, CO 80006-6147

Tel: 303-421-1261

**References**

http://www.wilder.org/download.0.html?report=2025


### 6.3 Alcohol Severity Index (ASI)

**Brief description**

The ASI is an assessment instrument designed to be administered as a semi-structured interview. The instrument gathers information about seven areas of a patient’s life: medical, employment/support, drug and alcohol use, legal, family history, family/social relationships, and psychiatric problems. In approximately one-hour a trained interviewer can gather information on recent (past 30 days) and lifetime problems in all of the aforementioned areas. The ASI provides an overview of problems related to substance, rather than focusing on any single area.

The ASI can be used effectively to explore problems within any adult group of individuals who report substance abuse as their major problem. It has been used with psychiatrically ill, homeless, pregnant, and prisoner populations, but its major use has been with adults seeking
treatment for substance abuse problems. The ASI has been used extensively for treatment planning and outcome evaluation. Outcome evaluation packages for individual programs or for treatment systems are available.

More recently, the Treatment Research Institute (TRI) that developed the ASI has released a Risk and Needs Triage (RANT) decision support tool for judges and other justice decision makers to assist in matching drug-involved offenders to the community corrections program best suited to their supervision and treatment needs. Efforts are underway to develop a similar tool that is designed for an impaired driving offender population (Marlowe 2008).

**Type of administration**

- Pencil-and-paper self-administered
- Interview
- Computer self-administered

**Administered by**

- Self

**Number of items**

- 161

**Time required for administration**

- 45 to 75 minutes

**Training required for administration**

- Training is required. There is a self-training packet available, as well as onsite training by experienced trainers.

**Scoring**

- Takes about 5 minutes to score.
- The ASI provides two scores: severity ratings are subjective ratings of the client’s need for treatment, derived by the interviewer; composite scores are measures of problem severity during the prior 30 days and are calculated by a computerized scoring program.

**Summary of Psychometrics (reliability/validity)**

According to SAMHSA (2005) “The ASI is highly correlated with objective indicators of addiction severity. The ASI is also one of the few instruments that measure several different functional aspects of psychosocial functioning related to substance abuse and provide a concise estimate of the history of substance abuse as well as recent use. The instrument
provides severity ratings in each functional area assessed, which are useful both clinically and for research purposes” (p. 20).

The instrument has demonstrated high reliability and concurrent validity (demonstrated that test correlates well with a measure that has previously been validated - Leonhard et al. 2000; McLellan et al. 1992a; Schottenfeld and Pantalon 1999). The items in each of the seven areas have been tested for understanding and test-retest reliability (measures stability of the scores over time) as well as concurrent, predictive, and discriminate validity (tests whether concepts or measurements that are supposed to be unrelated are, in fact, unrelated) among adults of both genders and most large ethnic groups (McLellan et al. 1985; Kosten et al. 1983; Hendriks et al. 1989). The ASI has become very widely used mainly due to extensive psychometric testing, a comprehensive training manual (plus other instructional materials), and its availability in the public domain.

A self-report version of the ASI has been shown to be a reliable and accurate alternative to the counselor-administered instrument (SAMHSA 2005), however, the latter is the more preferred approach given the recognized limitations associated with self-report instruments.

Numerous publications were found reporting the reliability and validity of the ASI for opioid users, crack and cocaine users, those with mental illness, the homeless, gamblers, and those in rehabilitation, detoxification, and various drug treatment programs (Drake et al. 1995; Fureman et al. 1994; Hendricks et al. 1989; Hodgins and El-Guebaly 1992; Joyner et al. 1996).

Limitations

- It should not be used in group testing or for fast screening
- Limited research using an impaired driving offender population
- Designed as an assessment tool and not a screening tool

Cost

There is no cost as a result of the instrument being public domain. A minimal charge for photocopying and mailing may apply. A free scoring disk is provided with the training materials, and there is a software program to provide written evaluations and treatment plans (there is a cost for this program).

Source

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References


Marlowe, D.B. (October 9, 2008). Personal communication.


6.4 Alcohol Use Disorder Identification Test (AUDIT)

**Brief description**

The AUDIT was developed by the World Health Organization (WHO) to identify persons whose alcohol consumption has become hazardous or harmful to their health. The AUDIT is a 10-item screening questionnaire with three questions on the amount or frequency of drinking, three questions on alcohol dependence, and four questions on problems caused by alcohol.

The AUDIT screening procedure is linked to a decision process that includes brief intervention with heavy drinkers, or referral to specialized treatment for patients who show evidence of more serious alcohol involvement.

A French language translation is available.

**Type of administration**

- Pencil-and-paper self-administered
- Interview
- Computer self-administered

**Administered by**

- Health professional

**Number of items**

- 10

**Time required for administration**

- 2 minutes

**Training required for administration**

- Yes, there is a user’s manual and a videotape training module that explains proper administration procedures, scoring interpretation, and clinician management.

**Scoring**

- An easy-to-use brochure has been designed to guide the interviewer and to assist with scoring and interpretation.
Summary of psychometrics (reliability/validity)

AUDIT’s test-retest reliability has shown good temporal stability ($r = .88$) (Daeppen et al. 2000). Internal reliability (referring to the extent to which a measure is consistent within itself) has been consistently strong, with Cronbach’s alpha scores in the range of .80-.94 (Allen et al. 1997; Bohn et al. 1995; Shields and Caruso 2003). AUDIT scores have been used to predict alcohol-related physical disorders and social problems (Conigrave et al. 1995a; Conigrave et al. 1995b). Similarly, the AUDIT score was also shown to be a better predictor of subsequent alcohol-related medical and social problems than standard biochemical markers (Conigrave et al. 1995b).

The psychometric properties of the AUDIT have been explored in a number of populations, including inpatient care, rural and urban communities, emergency room patients, the unemployed, and college students (Reinert and Allen 2002). Research shows that the AUDIT may be especially useful when screening women and minorities (Reinert and Allen 2002).

A 2007 meta-analysis of 19 relevant studies (Berner et al.) reported that sensitivity ranged from .31 to .89 and specificity ranged from .83 to .96 across the eight studies conducted in primary care. A single trial in general hospital inpatients found a sensitivity of .93 and a specificity of .94; another trial in emergency department patients found a sensitivity of .72 and a specificity of .88. A study involving university students found a sensitivity of .82 and a specificity of .78. Three studies in elderly patients found sensitivities between .55 and .83 at a pooled specificity of .96. The authors concluded the large heterogeneity between results could only partly be explained by setting diversity (Berner et al. 2007).

Limitations

- Limited to alcohol screening
- Not enough research has been completed to determine precise cut-off points
- Designed for early detection of alcohol problems in the general population

Cost

- Test and manual are free
- Training module costs $75.00

Source

World Health Organization
Division of Mental Health & Prevention of Substance Abuse
CH-1211, Geneva 27, Switzerland
Website: http://whqlibdoc.who.int/hq/2001/who_msd_msb_01.6a.pdf
References


6.5 Inventory of Drug-Taking Situations (IDTS)

Brief description

The IDTS, developed by Annis and Martin (1985), is a 50-item self-report questionnaire that provides a profile of the situations in which a client has used alcohol or another drug over the past year. The IDTS is a treatment-planning tool that provides a profile of a client’s high-risk situations for drinking (or other drug use) that can be used in the development of an individual treatment plan. It is a parallel instrument to the Inventory of Drinking Situations (IDS). Clients are asked to indicate their frequency of heavy drinking or drug use in each of 50 situations on a four-point scale ranging from “never” to “almost always.” The questionnaire
may be administered in either pencil-and-paper or computerized version; the latter allows a client to name up to three substances that are currently causing a problem; the 50 IDTS items are presented for each substance in turn, and a computer-generated report is produced for each substance. Eight subscales are used, providing a profile of the client’s use across eight types of high-risk situations: unpleasant emotions, physical discomfort, pleasant emotions, testing personal control, urges and temptations, conflict with others, social pressure to use, and pleasant times with others (Marlatt and Gordon 1980; 1985).

A French language translation is available.

**Type of administration**

- Pencil-and-paper self-administered
- Computer self-administered

**Administered by**

- Self

**Number of items**

- 50

**Time required for administration**

- 10 minutes

**Training required for administration**

- No, detailed instruction for administration and scoring are given in the User’s Guide. The software version presents instructions for administration on-screen and provides instantaneous scoring and presentation of the client’s profile.

**Scoring**

- Can be done by hand or computer

**Summary of psychometrics (reliability/validity)**

The IDTS is a well-validated assessment tool that has been used in a wide array of clinical and treatment contexts. This instrument is appropriate for use in both individual and group programs, and with clients whose substance problems range from mild to severe. Within some programs, the IDTS is used to provide an individualized profile of a client’s drug and/or alcohol use. This information is used to plan treatment, identify and address high-risk triggers for relapse, and assist in planning for aftercare.

Turner et al. (2007) established validity evidence for the IDTS by demonstrating correlations with measures of drug consumption, problem severity, and dependence. Clients who
reported drinking heavily or using drugs across situations on the IDTS also reported higher levels of consumption and greater problem severity (i.e., years of problematic use, perceived seriousness of the problem, and perceived difficulty quitting). There has been a strong pattern of correlations observed between IDTS scores and measures of dependence, such as DAST and ADS (Skinner 1982; Skinner and Horn 1984), which provides further external validity evidence for the IDTS. In addition to a strong association with IDTS total score, high levels of drug dependence were most strongly associated with elevations on the IDTS negative subscales (i.e., Unpleasant Emotions, Physical Discomfort, and Conflict with Others) and with the Urges and Temptations to Use subscale. These results are in agreement with previous findings involving cluster analysis of scores on the IDS; high negative profile clients were found to have higher alcohol dependence scores (Annis and Graham 1995). Internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores) values for each subscale range from .59 - .92, and most were over .80 for a sample of incarcerated offenders (Addictions Research Foundation 1998).

**Limitations**

- Limited in scope (because it focuses on drug use) but useful in examining specific aspects of substance use.

**Cost**

**IDTS user’s guide**

- ISBN 978-0-88868-290-1 • 148 pages • paperback
- $34.95 • published 1997 • product code PG082

**IDTS alcohol questionnaires (package of 30)**

- $16.45 • published 1997 • product code P162

**IDTS drug questionnaires (package of 30)**

- $16.45 • published 1997 • product code P163

**Source**

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References


6.6 Drug Abuse Screening Test (DAST)

Brief description

The DAST was developed in 1982. It is constructed similarly to the earlier MAST, and the DAST items tend to be parallel with those of the MAST. The purpose of the DAST is to provide a brief, simple, practical, but valid method for identifying individuals who are abusing psychoactive drugs and to yield a quantitative index score of the degree of problems related to drug use and misuse. Respondents are instructed that “drug abuse” refers to the use of prescribed or over-the-counter drugs in excess of the directions and any non-medical use of drugs.
Since the DAST is one of the few instruments for assessment of drug use and related problems that has reported the relationship of the scores obtained to diagnosis of abuse, it may be of interest to those programs that are more diagnostically or psychiatrically oriented. The DAST provides a score that should be sensitive to changes in substance using experiences over a 6 and 12-month follow-up period.

The questions do not refer to the use of alcoholic beverages.

**Type of administration**

- Pencil-and-paper self-administered
- Interview
- Computer self-administered

**Administered by**

- Self

**Number of items**

- There is a 10-item version, a 20-item version, and a 28-item version

**Time required for administration**

- 5 to 20 minutes depending on the version

**Training required for administration**

- For a qualified drug counsellor, only a careful reading and adherence to the instructions in the “DAST Guidelines for Administration and Scoring,” which is provided, is required. No other training is required.

**Scoring**

- Administrator or by computer

**Summary of psychometrics (reliability/validity)**

The DAST has been evaluated and demonstrated excellent reliability and diagnostic validity in a variety of populations and settings.

The DAST has been shown to have good internal consistency reliability (measuring whether several items that propose to measure the same general construct produce similar scores; 28-item DAST, Cronbach’s alpha = .92; 20-item DAST, Cronbach’s alpha = .95) and criterion validity (assessing the correspondence between the score on the instrument and the scores on selected outcome variables; Skinner 1982). It was found to correlate highly with the ASI (Skinner and Goldberg 1986). Scores have also been found to correlate highly with the
frequency of use for a range of drugs including cannabis, barbiturates, amphetamines, and opiates.

DAST scores also discriminated accurately between alcohol and drug problems (Appleby et al., 1997). The authors suggest a cut-off score of 5/6 for optimum sensitivity and specificity on the 28-item DAST. Similarly, a cut-off score of 3 on the 10-item DAST correctly classified 93% of patients (Bohn et al. 1991). In a recent meta-analysis, the DAST was found to be an easy to administer, reliable, and valid tool with good sensitivity and specificity. In general, all versions of the DAST yielded satisfactory levels of reliability and validity for use as clinical or research tools (Yudko et al. 2007).

Internal reliability (referring to the extent to which a measure is consistent within itself) was consistently high (.74-.95) for each version of the DAST. A test-retest (measures stability of the scores over time) correlation coefficient of 0.85 was reported for DAST-28, 0.78 for DAST-20, 0.71 for DAST-10, and 0.89 for an adolescent version (DAST-A). A review also found evidence supporting the construct, criterion, and discriminant validity of the DAST (Yudko et al. 2007).

Research has evaluated the DAST with various populations and settings including psychiatric patients (Cocco and Carey 1998; Maisto et al. 2000; Staley and El Guebaly 1990), prison inmates (Peters et al. 2000), substance abuse patients (Gavin et al. 1989), primary care (Maly 1993), in the workplace (El-Bassel et al. 1997), and been adapted for use with adolescents (Martino et al. 2000). Overall, these studies support the reliability and diagnostic validity of the DAST in diverse contexts.

Limitations

- Does not screen for alcohol use/abuse
- Since the content of the items is obvious, clients may fake results
- Scores may be misinterpreted
- Should NOT be administered to persons actively under the influence of drugs or who are undergoing drug withdrawal reaction

Cost

- $18.95 • booklet/guide + pad of 100 questionnaires
  
  » published: 1992 • product code: PZ077

- $14.95 • pad of 100 questionnaires only
  
  » published: 1992 • product code: PZ075
Source and copyright
Copies of the DAST may be obtained from H. Skinner,
Centre for Addiction and Mental Health,
33 Russell Street, Toronto, Ontario,
Canada M5S 1A8,
Telephone: 1-800-463-6273
E-mail: harvey.skinner@utoronto.ca
http://www.camh.net
A computerized version of the DAST is included in the Computerized Lifestyle Assessment (Skinner 1994) published by Multi-Health Systems, Toronto (http://www.mhs.com)
Telephone: 1-800-268-6011 in Canada

References


### 6.7 Level of Service Inventory-Revised (LSI-R)

**Brief description**

The foundation of the LSI-R instrument is entrenched in social and psychological theories that explain the propensity towards criminal behaviour. It is a quantitative survey of attributes of offenders and their situations relevant to level of supervision and treatment decisions. Designed for ages 16 and older, the LSI-R helps predict parole outcomes, success in correctional halfway houses, institutional misconducts, and recidivism. The 54 items are based on legal requirements and include relevant factors needed for making decisions about risk and treatment. The LSI-R has ten domains including criminal history, education/employment, financial, family/marital, accommodation, leisure/recreation, companions, alcohol/drug problem, emotional/personal, and attitudes/orientation. The LSI-R Manual explains the use of the LSI-R and summarizes research studies on its reliability and validity.

The LSI-R can be used by probation and parole officers and correctional workers at jails, detention facilities, and correctional halfway houses to assist in the allocation of resources, help make decisions about probation and placement, make appropriate security level classifications, and assess treatment progress.

**Type of administration**

- Interview

**Administered by**

- Health professional

**Number of items**

- 54

**Time required for administration**

- 30–45 minutes
Training required for administration

- A professional with advanced training in psychological assessment or a related discipline must assume responsibility for the use, interpretation, and communication of the results.

Scoring

- Administrator or by computer

Summary of psychometrics (reliability/validity)

According to the manual the LSI-R has strong reliability and validity, which has been demonstrated in the many studies presented in the Technical Manual. The following psychometrics come from the LSI-R User’s Manual including details on the reliability and validity of the LSI-R assessment (Andrews and Bonta 2001).

The test-retest reliability (measures stability of the scores over time), which is consistent over the short term, can be seen because many items are dynamic and the LSI-R is changeable over the long term. Internal consistency reliability (measuring whether several items that propose to measure the same general construct produce similar scores) shows mild to moderate statistically significant positive correlations. Face validity (a property of a test intended to measure something) is evident because the LSI-R items were based on practitioner input. Construct validity (the extent to which what was meant to be measured was actually measured) is shown through LSI-R scores’ relationship to rule violations. The LSI-R has a low false-negative rate which demonstrates discriminant validity (tests whether concepts or measurements that are supposed to be unrelated are, in fact, unrelated; Andrews and Bonta 2001).

Limitations

- The LSI-R is somewhat effective in predicting the risk for offenders; it was developed for the purpose of correctional management, not for correctional counseling.
- Does not include items that assess how offenders perceive themselves and interactions with others and how they explain their conflicts.

Cost

- LSI-R Complete Kit - $484.00
  - Includes Manual; 25 Interview Guides; 25 Forms; 25 Profile Forms
- Hand Scoring Materials
- LSI-R Manual - $143.00
- LSI-R Interview Guides (25) - $176.00
> LSI-R Forms (25) - $110.00
> LSI-R ColorPlot Profile Forms (25) - $55.00
> LSI-R Training DVD Series - $660.00
  » A training DVD series presenting a non-technical approach to using the LSI-R.
> LSI-R Trainer Workbook - $93.50
> Computer Scoring Materials
  » LSI-R Manual - $143.00
  » LSI-R Data Entry Sheets (50) - $66.00
  » Pack of 50. Optional for use when computer scoring.
> Computer Generated Reports
  » LSI-R Profile Report (V5) - Min. purchase of 10 reports. Price per report. - $19.80
  » Minimum purchase of 10 reports. Price per report.

Source and copyright
Don Andrews, Ph.D. & James Bonta, Ph.D.

MHS Inc.
3770 Victoria Park Ave.
Toronto, Ontario M2H 3M6
Phone: 1.800.268.6011 or 416.492.2627

References


6.8 Michigan Alcoholism Screening Test (MAST)

**Brief description**
The MAST is one of the most widely used measures for assessing alcohol abuse. The instrument is a 25-item questionnaire designed to provide a rapid and effective screening for lifetime alcohol-related problems and alcoholism. The MAST has been productively used in a variety of settings with varied populations.

**Type of administration**
- Pencil-and-paper self-administered
- Computer self-administered

**Administered by**
- Practitioner or self

**Number of items**
- 25

**Time required for administration**
- 10-15 minutes

**Training required for administration**
- No training required

**Scoring**
- Scoring completed by staff

**Summary of psychometrics (reliability/validity)**
The original MAST validation sample of 526 included hospitalized alcoholics, drivers convicted of driving under the influence or who had amassed numerous driving penalty points, persons convicted of drunk and disorderly behaviour, and a control sample (Selzer 1971). Psychometric work includes internal consistency, predictive and concurrent validity, and factor analysis for confirmation of the purported domains.

Early studies showed strong internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores; Cronbach’s alpha = .95) but more recent studies suggest a number of items are not highly correlated and that the instrument itself might not be measuring one factor but rather several factors related to problem-drinking (Selzer et al. 1975; Crook et al. 1994; Parsons et al. 1994; Saltstone et al. 1994). Selzer (1971) suggested a cut-off point of 5 to identify harmful or hazardous drinking.
However, a cut-off score of 13 (at which the test has sensitivity of .91 and specificity of .76) is suggested for detecting the presence of alcohol abuse and dependence (Ross et al. 1990).

Reliability and validity data are available across a number of populations; internal consistency ranges from .83 to .95, while test-retest reliability (measures stability of the scores over time) values range from .84 to .97 (Kitchens 1994); lower values are associated with longer delays between administration. The original normative male-only sample covered a wide age range and assessed both clinical and non-clinical populations, and the popularity of the MAST has resulted in data available across numerous special populations, including offender populations (Millson et al. 1995; Swett 1984). Some factor analyses of the MAST have revealed four and six factors (Parsons et al. 1994); the four-factor structure has held across a number of samples, including a female offender population (Saltstone et al. 1994). However, the MAST is generally considered to be a uni-dimensional instrument.

Modifications of the MAST include the 10-item Brief MAST (bMAST), the 13-item Short MAST (SMAST), and the 9-item Malmo modification (Mm-MAST); these briefer instruments would seem perhaps more appropriate for screening purposes than the original 25-item scale. Connor and colleagues (2007) found the bMAST to have good construct validity (the extent to which what was meant to be measured was actually measured) and both single-factor and two-factor scoring were equally effective as the AUDIT in assessing dependence severity. In a recent meta-analysis of the MAST and the SMAST, Shields et al. (2007) found that both the MAST and the SMAST observe moderate to good internal consistency reliability (measuring whether several items that propose to measure the same general construct produce similar scores) estimates. However, in individual assessment and outcome measurement where personal and social costs are considered significant, the MAST and SMAST should be used with caution.

**Limitations**

- Does not discriminate between past and present drinking (Dawe et al. 2002)
- The MAST has been criticized for its obvious face validity
- The MAST has little sensitivity to change, as most items are prefaced with “Have you ever....”

**Cost**

- $40.00 for copy, no fee for use.

**Source and copyright**

Melvin L. Selzer, M.D.,

6967 Paseo Laredo, LaJolla, CA, 92037
References


6.9 Substance Abuse Subtle Screening Inventory (SASSI)

Brief description

The SASSI is a brief self-report, easily administered psychological screening measure that is available in separate versions for adults and adolescents. The SASSI was developed out
of concern about the potential for distortion of responses on substance abuse measures; the authors of the SASSI claim its resistance to efforts at faking. The SASSI includes both face valid and subtle items that have no apparent relationship to substance use. The subtle items are included to identify some individuals with alcohol and other drug problems who are unwilling or unable to acknowledge substance misuse or symptoms associated with it. Support materials for the SASSI include user’s guides containing easy-to-understand instructions for administering, scoring, and interpretation, and manuals providing comprehensive information on development, reliability, and validity.

Interpretations of the SASSI profiles suggest possible explanations that the clinician may find useful in understanding clients and providing effective feedback. Examples of clinical inferences that may be drawn on the basis of certain scale scores include indication of defensive responding, clients’ level of insight and awareness of the effects of their substance misuse, evidence of emotional pain, and relative risk of involvement with the legal/judicial system. In combination with other available assessment information, the clinical inferences suggested by examining SASSI profiles provide ideas for further evaluation and treatment considerations.

**Type of administration**

- Pencil-and-paper self-administered
- Computer self-administered

**Administered by**

- Support staff

**Number of items**

- 93

**Time required for administration**

- 20-30 minutes

**Training required for administration**

- No

**Scoring**

- Administrator

**Summary of psychometrics (reliability/validity)**

Allen and Columbus (1995) note the effectiveness of the SASSI in identifying early stage substance abuse in those who have not yet acknowledged their patterns to themselves.
A recent meta-analysis by Feldstein and Miller (2007) found internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores) is high for the overall SASSI and for its direct but not its indirect (subtle) subscales, suggesting that the instrument taps a single face-valid construct (a property of a test intended to measure something).

SASSI classifications converged with those from other direct screening instruments, and were also correlated with ethnicity, general distress, and social deviance. Studies found test–retest reliability (measures stability of the scores over time) lower than that reported in the test manuals. Sensitivity was found to be similar to that for public domain screening instruments, but on specificity the SASSI appears to yield a high rate of false-positives.

Results from several studies support high internal consistency (measuring whether several items that propose to measure the same general construct produce similar scores) for the direct scales (Myerholtz and Rosenberg 1997, 1998; Clements 2002; Laux et al. 2005; Gray 2001). Additional data from these studies revealed generally lower internal consistency for the SASSI subtle scales, with high variability across samples. For the direct scales, no study reported alpha coefficients as high as those reported in the test manual (Miller and Lazowski 1999).

Limitations

- SASSI is quite lengthy
- Limited literature that includes the SASSI
- More research is needed to examine the instrument’s psychometrics, since it has not been validated for an impaired driving offender population
- It may be vulnerable to intentional faking

Cost

- Starting costs around $125.00 and up
- Call for product catalogue or visit the SASSI website

Source

Source: The SASSI Institute

Phone: 800-726-0526

Website: www.sassi.com
References


Other SASSI References:

http://www.sassi.com/R&D/references.html

6.10 Research Institute on Addiction Self Inventory (RIASI)

Brief description

The RIASI was developed for the New York State Drinking Driver Programs. It is a simple screening instrument. The RIASI covers specific risk factors as well as family history associated with alcohol and drugs. The RIASI is designed to screen for alcoholism using “covert content items,” i.e., items which do not directly mention drinking. A training manual is available.

The inventory has three scales, one for detection of individuals with alcohol or other drug problems, a second scale for predicting impaired driving recidivism, and a three-question lie scale. Included are distal measures items, meaning the person cannot readily determine how to fake desirable versus undesirable responses to the question. Also these questions address
issues of hostility, sensation-seeking, depression, and other personality characteristics linked to impaired driving.

The RIASI represents a careful and empirical development of a screening device for use with the impaired driving population. Developed specifically for the New York State Drinking Driver Programs, it is now being used in several states.

**Type of administration**

- Pencil-and-paper self-administered
- Interview

**Administered by**

- Self or practitioner

**Number of items**

- 52

**Time required for administration**

- 15-20 minutes

**Training required for administration**

- Yes, only basic training needed

**Scoring**

- Administered by using a simple transparent overlay

**Summary of psychometrics (reliability/validity)**

The validity of RIASI has also been confirmed in the convicted drinking driver population in Ontario (Nochajski et al. 1997). In addition to a total score based on all the items on the instrument, Nochajski and colleagues developed a recidivism subscale of 15 items on the instrument that was able to correctly identify over 80% of individuals who were rearrested for drinking driving over a two-year period (Nochajski et al. 1993; Shuggi et al. 2006). Recommended cut-offs for referral of participants to more extensive follow-up were nine on the total score and three on the recidivism scale (Shuggi et al. 2006).

**Limitations**

- The authors have been engaged in research that has demonstrated some degree of validity, but more independent research is still needed
- Does not have the computer automation and summary printout with treatment recommendations
Cost

> Information on cost and material can be obtained from Thomas Nochajski (see Source)

Source

Thomas Nochajski, Ph.D.
Research Society on Addiction 1021 Main Street
Buffalo, NY 14203-1016
Phone: 716-887-2500
Email: thn@buffalo.edu

References


6.11 Biomarkers

Brief description

Alcohol biomarkers are physiological indicators of alcohol exposure or ingestion and may reflect the presence of chronic and/or high level of use of alcohol (SAMHSA 2006). Alcohol biomarkers can be used in several ways. The major uses of biomarkers are screening for alcohol problems; motivating change in drinking behaviour; identifying relapse to drinking; evaluating interventions for alcohol problems; and documenting abstinence (SAMHSA 2006; 2012). Alcohol biomarkers are not a substitute for self-report measures found using risk assessments instruments. However, when used in combination with risk assessment instruments, biomarkers can serve as objective measures.

Several biomarkers are considered useful including gamma glutamyl transferase (GGT), carbohydrate deficient transferrin (CDT), phosphatidyl ethanol (PEth), and fatty acid ethyl esters (FAEE). These biomarkers have been investigated and found to have moderate to
high diagnostic sensitivity and specificity. There has been increased use of two specific biomarkers (ethyl Glucuronide (EtG) and Ethylsulfate (EtS)), particularly in the United States, which are detectable in urine. These biomarkers are direct metabolites of ethanol alcohol and have varying levels of sensitivity depending on which biomarker is used. However, it has been emphasized that urine EtG should not be utilized as a quantitative measure of alcohol use, mainly because it is impossible to predict the level of alcohol consumption using urine EtG value. The variable production of EtG can occur as a result of enzyme system variations, urine concentration variations, the amount of time since the last drink, the rate of alcohol consumption, and chronic drinking.

For this reason, in 2012 the Center for Substance Abuse Treatment (CSAT) of the Substance Abuse and Mental Health Services Administration (SAMHSA) in the U.S. issued an updated advisory (http://kap.samhsa.gov/products/manuals/advisory/pdfs/Advisory_Biomarkers_Revision.pdf) that cautions against the interpretation and use of EtG results alone to assess alcohol use. While it is recognized that the higher the EtG level, the more likely it is that drinking occurred; no clear cut-off values have been identified.

**Type of administration**

- Alcohol biomarkers used to indicate impaired driving risk include samples of blood, urine, hair, and saliva.

**Administered by**

- Technicians obtain and analyze specific biomarkers using empirically determined cut points.

**Number of items**

- N/A

**Time required for administration**

- Varies depending on which sample (blood, urine, hair, or saliva) is used.

**Training required for administration**

- Varies depending on which sample (blood, urine, hair, or saliva) is used.

**Scoring**

- Testing of the samples is analyzed using a clinical chemistry instrument within a laboratory.

**Summary of psychometrics (reliability/validity)**

The findings of Couture et al. (2010) suggest that biomarkers of chronic patterns of heavy drinking may not be adequate to capture the multiple processes that appear to promote
recidivism (e.g., binge drinking, other risky behavioural and personality features). Despite their objectivity, caution is warranted in the interpretation of a positive score on these biomarkers in an impaired driving assessment. This study found that alcohol biomarkers failed to differentiate groups (first vs. recidivists), which is inconsistent with earlier findings by Caviola et al. (2003) and McMillen et al. (1992). However, the current study used a community-based sample whereas other studies used offender populations. Consideration of multiple biomarkers simultaneously did not significantly enhance prediction of recidivism status. A recent population-based study demonstrated that 88% of self-reported alcohol-impaired driving episodes involved binge drinking (e.g., for men an episode of five or more drinks) while 84% of the alcohol-impaired drivers were binge drinkers (Flowers et al. 2008). The results of the Couture study converge with other evidence that questions the emphasis on addiction approaches to impaired driving and its prevention for all offenders.

Limitations

> Biomarkers provide an important indication of drinking status when used appropriately, but they must be used with a clear understanding of their strengths and potential weaknesses (SAMHSA 2006; 2012). Specific issues to be cognizant of are:

  » Understanding the difference between a test’s sensitivity and positive predictive value;

  » Potential sources of false-positives;

  » High costs associated with testing and analyses;

  » High state of flux with new markers being discovered each year; and,

  » Many biomarkers are only detectible for relative short windows of time, meaning that the recovery time to normal levels is limited (i.e., 3 to 5 days up to 4 to 6 weeks). As such, the usefulness of biomarkers to detect alcohol consumption requires frequent testing following drinking events.

Cost

> Varies depending on which sample (blood, urine, hair, or saliva) is used.

References


### 6.12 Summary

There are many impaired driver assessment instruments that are available and utilized across North America. Yet not all of these instruments have been validated on an impaired driver population and few have undergone rigorous or independent evaluation efforts. It is for this reason that many jurisdictions rely upon a combination of these instruments to guide the assessment process.

It is essential to underscore that problem substance use behaviour in and of itself is not the source or cause of persistent impaired driving behaviour, but instead merely a correlate of it. So while assessment instruments designed to identify the likelihood of relapse among substance using and even impaired driving populations provide valuable information, these tools frequently overlook the role of criminogenic and socio-psychological factors that are important contributors to chronic offending.

Of the available risk assessment instruments to date, both the LSI-R and ASUS instruments appear to be the most well-grounded in theory and based upon a solid theoretical foundation. These instruments incorporate a range of recognized concepts stemming from several relevant disciplines including criminology, psychology, sociology and addictions, and these concepts have been repeatedly tested and validated through extensive research. Such a comprehensive approach is essential in light of the well-documented complexity associated with impaired driving behaviour and the diversity of underlying processes that have been used to explain persistent offending by this population. It should be underscored that assessment approaches that are multi-trait and multi-method provide more accurate results (Campbell and Fiske 1959).

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16 The Adult Substance Use Survey (ASUS) is a self-report survey that consists of 64 items designed to assess an individual’s perceived alcohol and drug use. The survey also provides a brief mental health screen. It can either be self-administered (paper-and-pencil) or administered orally by a practitioner. Unlike the ASUDS-R, this screening instrument is not specific to an impaired driving offender population although both tools were developed by the Center for Addiction Research and Evaluation (CARE).
Looking forward, there is some clear direction as to ways to strengthen research that can guide the development of empirically-based risk assessment instruments. First, with regard to the evaluation of risk assessment instruments, Brown and Ouimet (2013) underscore that “Longer duration perspective evaluations of assessment protocols for prediction of recidivism are urgently needed” (p.311). Second, the research undertaken by Dugosh et al. (2013) provides a basis to begin to integrate criminological theories and empirically-based risk factors to enhance risk assessment tools for impaired drivers. The inclusion of these factors in risk assessment tools can help to strengthen the internal validity of such tools.
7. TREATMENT INTERVENTIONS

Educational approaches to impaired driver programs have been utilized to target impaired drivers for more than four decades. A number of these programs have been evaluated and several comprehensive reviews have been produced, including a meta-analysis that reveals that these programs have limited effects in terms of reducing recidivism. Generally, these studies show an average reduction in recidivism of approximately 10% (NHTSA 1986; Wells-Parker et al. 1995). Among offenders who suffered from some degree of substance misuse problems, those programs that utilized a therapeutic approach are considered to have a greater effect, illustrating the value of treatment as an intervention to encourage rehabilitation and behavioural change (Wanberg et al. 2005).

As a general caveat, available interventions generally require offenders to be committed to addressing their substance use problems, and this often requires hard work on their part. This is perhaps most clearly illustrated by the fact that, according to probation officers across the United States, many impaired drivers elect to serve time in prison rather than enrol in treatment. It is underscored that offenders may be reluctant (to varying degrees) to participate in treatment because they are often challenged and taken out of their comfort zones in order to tackle substance misuse problems.

In the criminal justice literature, a strong emphasis is placed on the Risk–Needs–Responsivity model of offender rehabilitation (Ward et al. 2007). This model guides the selection of appropriate rehabilitation decisions for individual offenders according to three key principles: 1) the risk principle acknowledges that intensive services should be reserved for higher risk offenders; 2) the need principle recognizes that in order to reduce re-offending interventions must specifically target offender needs (Bonta et al. 2000; Ogloff and Davis 2004; Andrews and Dowden 2006); and, 3) the responsivity principle emphasizes the importance of designing and delivering treatment using strategies that accommodate offenders’ learning style, ability, ethnicity, and sex. The key feature of this model is matching an offender to an intervention based on their propensity or risk to re-offend (Ogloff and Davis 2004). This
has been a dominant model that has influenced the development of offender treatment programs, for more than two decades, with research that has shown that programs that incorporate these principles are more effective than programs that do not (Dowden and Andrews 1999).

The results of a risk assessment in conjunction with resources that are available are two critical components of any intervention strategy. It is these two factors that ultimately determine what types and to what degree treatment interventions are made available to offenders, how services are delivered and managed, and the skills and experience of staff that deliver these interventions. A majority of treatment agencies are equipped to provide a range of interventions that incorporate diverse techniques and approaches. Assessment results are used to match the most appropriate services (of those available) to individual offenders.

There is growing evidence to suggest that combining appropriate sanctions and supervision with treatment interventions can be more effective than either strategy alone. The partnering of these different strategies can expand opportunities to achieve long-term risk reduction and to reduce and/or prevent repeat offending. In order to maximize the effectiveness of this approach it must be assessment driven and combine appropriate levels of supervision with appropriate treatment interventions.

This section briefly describes a variety of common approaches to treatment including screening and brief interventions (SBI), motivational interviewing (MI), cognitive behavioural therapy (CBT), pharmacological interventions, and web-based interventions. Each intervention is described in terms of purpose and objectives, general effectiveness, staff training requirements, mechanism of delivery, and strengths and weaknesses. Note that some of these interventions have been specifically evaluated on an impaired driving population whereas others are merely a source of emerging interest and more research is needed to gauge effectiveness with impaired drivers. In addition, a few key references are identified in relation to each intervention in order to provide additional information to practitioners seeking more knowledge about specific strategies.

7.1 Screening and Brief Interventions (SBI)

**Purpose and objectives.** SBI is a structured set of questions designed to identify individuals at risk for alcohol use problems, followed by a brief discussion between an individual and the treatment clinician or provider, with referral to specialized treatment as needed. A brief intervention consists of one or more time-limited conversations between a client and a clinician. Screening asks several questions to determine whether clients are misusing alcohol; that is, are they drinking too much, too often, or experiencing harm from their drinking? The provider evaluates the answers and then shares the results and their significance with the individual. The goals are to (1) help the drinker increase awareness of his or her alcohol use.
and its consequences, and (2) encourage the person to create a plan to change his or her drinking behaviour to stay within safe limits. The conversations are typically 5-15 minutes, although they can last up to 30-60 minutes for as many as four sessions (NHTSA 2005). Brief interventions, as the name implies, are much smaller in number and shorter in duration than traditional treatment approaches.

Numerous types of brief interventions have been developed, ranging from providing advice to individuals to cut down on or quit drinking, to agreement on goals and objectives, to brief screening and feedback, motivational interventions, and contingency contracting. One of the more simple forms of brief intervention is screening itself. Given that screening often involves contact with the client in the context of questions and issues related to drinking behaviours, it can have some impact on the offender’s behaviour. This makes screening not only a valuable tool for determining the nature and extent of alcohol problems but also a part of the therapeutic process itself. SBIs are increasingly being applied in a variety of settings and are recommended for offenders who misuse alcohol and are at risk for dependence but who are not yet alcohol dependent (Lapham 2004; 2005).

**General effectiveness.** Brief interventions have been increasingly utilized as part of remedial programs for impaired drivers with alcohol-related problems. Studies conducted in the United States, Australia, Bulgaria, Mexico, the United Kingdom, Norway, and Sweden show that there is clear evidence that well-designed brief intervention strategies are effective, cost-efficient, and easy to administer (WHO 2010; Davis et al. 2012).

The effectiveness of brief interventions has been demonstrated in various setting (e.g., Moyer et al. 2002; Poikolainen 1999), but few studies have examined the benefits with criminal justice populations. The exception seems to be a brief motivational intervention (usually in the form of feedback regarding test results and diagnosis), which has been shown to produce significant benefits in a criminal justice population (Moyer et al. 2002; Poikolainen 1999; McMurran et al. 2011). There is some evidence that recidivists who are younger, male, and exhibit more negative consequences and ambivalence towards their problem drinking show the most improvement as a result of SBI as compared to other groups (Brown et al. 2012).

**Staff training requirements.** SBI does not require investment in extensive training or expensive instruments, and does not require lengthy amounts of time to conduct (APHA 2008). Screening can be done with a minimal amount of training depending on the screening tool(s) utilized. The process can be included in routine training and ongoing staff development.

**Mechanism of delivery.** SBI can be offered within the criminal justice system or more commonly in remedial programs.
**Strengths and weaknesses.**

**Strengths**

- Brief interventions are low in cost.
- They can serve as treatment for hazardous and harmful drinkers, and as a way to facilitate referral of more serious cases of alcohol dependence to specialized treatment.
- They require minimal clinician and client time.

**Weaknesses**

- Brief interventions (excluding motivational interviewing) are not designed to treat persons with alcohol dependence.
- They can provoke clinician apprehension in primary care settings. Common concerns are that screening and brief intervention will require too much time and can antagonize clients over a sensitive personal issue.

**References**


**Guides**


7.2 Motivational Interviewing (MI)

**Purpose and objectives.** MI is one form of brief intervention. MI is a collaborative, goal-oriented method of communication with particular attention to the language of change. It is designed to strengthen an individual’s motivation for and movement toward a specific goal by eliciting and exploring the person’s own arguments for change. The practice of MI involves the skilful use of certain techniques for bringing to life the “MI spirit,” demonstrating the MI principles, and guiding the process toward eliciting client change talk and commitment to change. Change talk involves statements or non-verbal communications indicating the client may be considering the possibility of change (Miller and Rollnick 2010). This tool can be very important in keeping reluctant clients in treatment. More recently, Miller and Rollnick expanded upon their work in the 3rd Edition of their manual to further elaborate on the four key processes of MI (engaging, focusing, evoking and planning). It also contains work related to the use of MI in group settings as well as efforts to combine MI, and CBT to increase effectiveness.

**General effectiveness.** There is 17 years of research on MI, beginning when the method was developed by Rollnick and Miller (1995) as a client-centred style of counselling that helps clients to explore and resolve their ambivalence about changing their behaviour. A meta-analysis conducted by Dunn et al. (2001) examined 29 randomized trials of MI and concluded that on average it took 15 hours to learn and deliver MI. Sixty percent of the 29 studies yielded at least one significant behavioural change effect size. There was substantial evidence that MI is an effective substance abuse intervention method when used by clinicians who are non-specialists in substance abuse treatment, particularly when enhancing entry to and engagement in more intensive substance abuse treatment (Dunn et al. 2001; Palmer et al. 2011).

Additional studies have found that although MI may not be more effective than other addiction treatment approaches, it does work faster in remedying the client’s addiction (Chanut et al. 2005). When provided as the sole treatment, MI can lead to improvements in outcomes that compare with those seen in a 12-step Alcoholics Anonymous (AA) program and in longer, more intensive cognitive-behavioural treatment interventions (Project MATCH Research Group 1997).
A recent study by Brown et al. (2010) suggests that MI may be more appropriate for impaired driving recidivists who were unmotivated, reluctant or resistant to participate in treatment, and who failed to acknowledge or recognize their problem(s) with alcohol. In particular, the brief nature of this strategy makes it easier to utilize with those hard-to-reach individuals who do not readily participate in impaired driver re-licensing programs. More recently, Brown and Ouimet (2013) also noted that, although initial studies investigating the use of MI with impaired driving populations have shown promising results, methodological differences across studies have made it difficult to generalize findings and to gauge which features or content associated with MI applications result in positive outcomes.

**Staff training requirements.** Training for MI varies. The most common method clinicians explore is to study print materials and view training videotapes. Although this can provide some understanding of the basic approach, self-training was not found to be effective in improving clinical skillfulness in MI (Miller and Rollnick 2010).

Training of up to one day can acquaint the audience with basic concepts and methods of MI, but is unlikely to increase the clinical skillfulness of participants in the practice of MI. With the 16-24 hours of training time, participants are provided with more in-depth understanding of the method of MI, and offered practical experience in trying this approach. Continuing education is also available.

**Mechanism of delivery.** MI is most often offered in remedial programs. However, it can be offered within the criminal justice system with proper training. These one-on-one patient-centred, non-confrontational counselling sessions are brief, and may be used in at least three different stages of an offender’s processing. First, if an offender screens positively for alcohol use problems, a health care professional can share the screening results and their significance with the offender in a short, 10-15 minute interview. These are patient-centred and encourage the offender to create a plan of action which ranges from reducing their drinking to seeking substance abuse treatment (NHTSA 2005). Second, offenders who have been assessed as being unready to receive treatment may also be engaged in motivational interviewing, where the focus is on facilitating an offender’s readiness for self-change or motivation to treatment (Marques and Voas 2005). The idea is to encourage the offender through engagement so they can accept their problem(s), understand the benefits of being treated for the problem, and then access the necessary services that are designed to help them overcome the problem. The premise of this technique is for professional staff to build a rapport with offenders and empower them to change on their own (Taxman et al. 2004). Third, MI is also useful throughout the supervision process for providing critical feedback to reinforce progress by helping offenders learn to “analyze” their own attitudes and behaviour and determine how they can advance their behavioural change (Taxman et al. 2004). Such aftercare programs may involve weekly counsellor-led sessions, offered at treatment sites (Harrison and Asche 2001).
Strengths and weaknesses.

Strengths

- Useful with clients in early stages of change.
- Draws out the client’s own ideas; based on the belief that the motivation to change comes from the client, not the clinician.

Weaknesses

- Change may not happen immediately.
- Outside influences may be stronger, if a client returns home with peers and daily life pressures, motivation to change may cease.
- Not all clinicians are willing to change their intervention approach in line with the practice of MI.
- Maintenance of MI fidelity requires constant surveillance and quality assurance efforts.

References


7.3 Cognitive Behavioural Therapy (CBT)

Purpose and objectives. CBT is a form of psychosocial therapy with an action-oriented perspective. CBT encompasses a wide range of cost-effective psychotherapeutic approaches that deal with cognitions and beliefs as a means to reducing problematic behaviours (Beck 1993). The objective of this approach is to identify thoughts, assumptions, beliefs, and behaviours that are related to negative emotions and underlying dysfunctional problems (e.g., drinking problems) and to replace these with more realistic and functional ones. Ultimately, the goal is to change an individual’s thoughts in order to change their behaviour.

**General effectiveness.** A number of studies support the effectiveness of CBT in treating alcohol abuse:

- Longbauch et al. (1999) found that alcohol abusers who received CBT had better drinking-related outcomes than those who did not receive therapy.
- More than 24 randomized control trials found CBT to be comparable to or more effective than other treatments for alcohol abuse (Carroll 1996).
- Carroll (1998) also found that CBT was particularly effective in reducing the severity of relapse.
- Offering offenders with a high level of alcohol dependence extensive treatment such as CBT has been shown to be highly cost-effective (Holder et al. 2000; Berglund et al. 2003).

There has also been some more recent research that demonstrates the effectiveness of combining CBT with MI (see Timken et al. 2012). However, it should be noted that, although CBT is one of the most studied substance abuse treatment interventions, research investigating the effectiveness of CBT in reducing impaired driving recidivism is limited and only a small number of studies have specifically and rigorously tested the effectiveness of CBT, or variations of it, in reducing either alcohol misuse or impaired driving behaviour among this offender population (Brown and Ouimet 2013).

**Staff training requirements.** With appropriate training and supervision, a diverse range of therapists can implement CBT effectively. However, most training manuals focus on specific cognitive-behavioural techniques and do not cover basic clinical skills.

Certain minimal requirements are recommended:

- A master’s degree or equivalent in psychology, counseling, social work, or a closely related field.
- At least 3 years of experience working with a substance-abusing population.
- Some familiarity with and commitment to a cognitive-behavioural approach.
Mechanism of delivery. CBT approaches are used with individual patients or with groups. Some of these approaches rely on more traditional client-therapist interactions; others rely on computer-based software.

Strengths and weaknesses.

Strengths

- Behaviour change is often a central part of the process.
- It is structured, which includes setting agendas and working toward clear goals.
- It is usually relatively short-term.

Weaknesses

- CBT does not suit everyone.
- It assumes the client has access to thoughts and emotions.
- Being committed and persistent in improving substance abuse problems can be hard work.
- Clients are challenged and often taken out of their comfort zones when tackling substance abuse problems.
- It has not been directly evaluated with an impaired driving population.

References


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7.4 Pharmacotherapies

**Purpose and objectives.** It is generally agreed that greater use of pharmacological interventions could enhance treatment progress since it stabilizes the patient and creates a facilitating environment. According to National Institute on Drug Abuse’s (NIDA) Principles of Drug Abuse Treatment for Criminal Justice Populations, “medications are an important part of treatment for many drug abuse offenders” (NIDA 2006, p. 5). Indeed, it has been argued that there is a need for greater receptiveness of the fact that medications may be an integral part of treatment (Robertson 2007), and despite immense progress in pharmacotherapy research, medications that have been approved to treat alcohol dependence are still underutilized (Arias et al. 2008).

Programs and services that include a medicinal component may be referred to as pharmacotherapy, medication, drug therapy, and so forth. There are many medications that can be used for alcohol treatment purposes. However, pharmacotherapies are not frequently used to treat impaired driving offenders and their availability/use among this population is not known. Three products that are currently approved for treating alcohol dependence are naltrexone, acamprosate, and disulfiram (NIAAA 2008). They have been shown to help patients reduce drinking, avoid relapse to heavy drinking, achieve and maintain abstinence, or gain a combination of these effects.

- Naltrexone (ReVia®; Vivitrol®) is an opioid antagonist that has a short half-life so it has limited clinical utility. Side effects include nausea, dizziness and fatigue. Usual adult dosage is 50 mg daily.

- Acamprosate (Campral®) is a synthetic compound that is a putative glutamate modulator. Usual adult dosage is 2-3 grams. Common side effects include mild diarrhea.

- Disulfiram (Antabuse®) interferes with the metabolism of alcohol by the liver, permitting a toxic breakdown product of alcohol to accumulate in the bloodstream. Usual adult dosage is 250 mg daily (ranging from 125 mg to 500 mg). Common side effects include metallic after-taste, dermatitis, and transient mild drowsiness.

These medications are often used in combination with brief psychosocial interventions. These medications have been shown to help patients reduce drinking, avoid relapse to heavy drinking, achieve and maintain abstinence, or gain a combination of these effects (NIAAA 2005). For a comprehensive review of available pharmacotherapies for treating alcohol use,
please refer to Arias et al. (2008) in Alcohol Research and Health, the Journal of the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

**General effectiveness.** A 2004 meta-analysis of 17 randomized controlled trials (Mann et al.) found that acamprosate was associated with a significantly higher number of abstinent days and continuous abstinence rates at six months were significantly higher. Acamprosate appears to be especially useful in a therapeutic approach targeted towards achieving abstinence in recently detoxified, motivated alcohol-dependent patients (Bouza et al. 2004). In a 2005 meta-analysis of 24 randomized controlled trials, Srisurapanont and Jarusuraisin reported that naltrexone significantly decreased relapses but not a complete return to drinking (i.e., relapse decreased, but eventually some subjects did start drinking again). Naltrexone seems more indicated in or appropriate for programs geared towards controlled consumption. Treatment compliance is a significant issue in these and other studies and needs to be addressed adequately to assure their usefulness in clinical practice.

**Staff training requirements.** Prescriptions are needed in order for a client to receive any pharmacological intervention; as a result, a clinician can only make a recommendation to a client to seek pharmacological treatment and management of alcohol misuse. Whether a medication should be prescribed and in what amount is a matter between clients and their health care providers.

**Mechanism of delivery.** Prior to suggesting any pharmacological intervention it is recommended that the physician conduct a screening using a clinical interview and a screening instrument to determine the client’s level of alcohol dependence. Most studies recommended that pharmacological interventions for alcohol dependence include some type of counseling, and it is recommended that all clients taking these medications receive at least brief medical counseling. Offering the full range of effective treatments will maximize patient choice and outcomes, as no single approach is universally successful or appealing to patients. The different approaches - medications for alcohol dependence, professional counseling, and mutual help groups - are complementary.

**Strengths and weaknesses.**

**Strengths**

- Naltrexone is especially helpful for curbing consumption in patients who have drinking “slips.”
- Acamprosate is thought to reduce symptoms of protracted abstinence such as insomnia, anxiety, restlessness, and dysphoria.

**Weaknesses**

- Generally speaking, compliance with the use of pharmacotherapies may be low. Long-acting injectable drugs such as Vivitrol may have greater compliance.
> Naltrexone is less effective in maintaining abstinence.

> Disulfiram can produce a very unpleasant reaction including flushing, nausea, and palpitations if the patient drinks alcohol.

> The utility and effectiveness of disulfiram are considered limited because compliance is generally poor when patients are given it to take at their own discretion.

References


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7.5 Internet-based Brief Interventions

Purpose and objectives. Computerized and web-based interventions for persons with substance misuse problems have increased in popularity with the growing availability and use of computers. The use of computerized interventions presents an opportunity for broad dissemination and improved access to services (Copeland and Martin 2004; Cunningham et al. 2005). These interventions are highly automated, non-resource intensive, and have the potential to reach large audiences in a convenient and timely fashion (Kypri et al. 2003; Riper et al. 2009; Bingham et al. 2010; Webb et al. 2010). In addition, with the exception of costs for program development, the typical cost associated with staffing and the requisite training to deliver the intervention is nominal and/or non-existent.

Internet therapies are accessible to a large segment of the population and can be a convenient option for those who may have difficulty accessing programming due to geographic location, time, or childcare constraints (Gainsbury and Blaszczynski 2010; Khadjesari et al. 2010). Another benefit associated with computerized or web-based applications relates to the level of openness and disclosure among subjects regarding their alcohol use patterns.

Online programs can also help ensure the consistent delivery of interventions as the material and content is identical for all of those who access the program (Noell and Glasgow 1999;
Carroll and Rounsaville 2007; Newton et al. 2010). Web-based interventions have the ability to be efficient – when changes to content are needed they can be implemented uniformly and immediately (Vernon 2010).

**General effectiveness.** There has been a growing body of research that examines the effectiveness of computerized or internet-based brief interventions designed to reduce alcohol use among a variety of populations. It is important to recognize that the effectiveness of these interventions with criminal justice populations generally, or impaired driving offenders specifically, has not been investigated and research on this application could not be located.

Web-based delivery may enhance the implementation of brief alcohol interventions. Studies have noted that there is great potential for web-based interventions to encourage changes in behaviours such as alcohol use (Pemberton et al. 2010). For example, Bendtsen et al. (2011) conducted a review of 85 studies (with a total sample of 43,236 subjects) and found that a variety of electronic screening and brief alcohol interventions showed small but significant effects on risky drinking behaviours for various age groups. Also, Rooke et al. (2010) conducted a meta-analysis and found that web-based interventions can be a cost-effective means of addressing uncomplicated substance use and related problems among adolescents, young adults, and adults (30+). Vernon (2010) notes that computer-based interventions for alcohol use designed for the general public are relatively new, rare, and scarcely studied. This would include programs targeted at an impaired driver population.

**Staff training requirements.** Staff training will depend on the computerized and web-based interventions utilized.

**Mechanism of delivery.** The computerized and web-based interventions can be delivered at the same time other interventions would take place. The only difference would be that the delivery will be by computer and not by a clinician.

**Strengths and weaknesses.**

**Strengths:**

- Highly automated.
- Convenient and can reach large audiences.
- Opportunity for broad dissemination and improved access to services.
- Consistently delivered and uniformly implemented.

**Weaknesses:**

- Could limit interaction with clinicians.
- Initial costs of purchasing multiple computers and training staff can be expensive.
References


7.6 Summary

There is a range of treatment interventions that have been shown to be promising or effective in reducing recidivism among impaired driving offenders. However, each of these strategies rely upon different levels of resources, staff with different backgrounds and qualifications, different amounts of time, and have varying levels of cost. In addition, some interventions are more easily implemented and delivered than others. Perhaps what is most important is that efforts are made to best match interventions to the individual risks and needs of each offender.
Health Canada produced a Best Practices report (2004) that was based upon a thorough literature review, consultation with experts, and interviews with key informants. The aim of the report was to compile current knowledge on driving while impaired remedial programs across Canada.

Specifically, the report addresses the planning and delivery of education programs and treatment and rehabilitation programs. The report in its entirety can be found at the link: http://www.hc-sc.gc.ca/hc-ps/alt_formats/hecs-sesc/pdf/pubs/adp-apd/bp_treatment-mp_traitement/treatment_rehab_driving_impaired_practices.pdf

For the convenience of practitioners in the field, the best practices identified and described in the Health Canada report are re-produced here.

- Remedial impaired driver programs delivered on behalf of driver licensing authorities should be part of a comprehensive impaired driving countermeasures program and participation should be a mandatory condition of licence reinstatement for all convicted impaired drivers. This should be the same for driving while impaired by drugs other than alcohol.

- Different types of remedial interventions for different types of impaired driving offenders and should incorporate at least two levels for people with differing levels of substance use and related problems. All programs for impaired drivers should incorporate both educational and therapeutic activities, regardless of program length. Mandatory clinical follow up post-reinstatement should be required for all participants in remedial programs.

- All convicted impaired drivers should complete a screening/assessment process to inform decisions about interventions. Proven instruments should be included in screening procedure and their performance should be monitored on an ongoing basis.

- Remedial programs should supplement and not replace licensing actions.
Individuals who receive roadside suspensions should be considered for referral to assessment and participation in remedial programs.

Remedial programs should be located in an environment in which a behavioural health perspective and treatment orientation are well established and can be maintained.

Those providing remedial services to impaired drivers should be trained in substance use issues and in adult education (particularly those delivering educational interventions) and group facilitation (particularly those delivering therapeutic interventions).

Those providing remedial measures programs to convicted impaired drivers should be supported in accessing provincial or national training opportunities on an annual or bi-annual basis.

Remedial programs should be operated using an administrative model, where program completion is a requirement of relicensing.

Remedial programs should be operated by an agency other than the licensing authority.

There is a need for formal and clear mechanisms of coordination and collaboration between licensing authorities and remedial programs to ensure reciprocal exchange of information to serve the best interests of the clients and the public.

Measures should be taken to reduce the financial burden for offenders, particularly those assigned to more expensive program options. This could include applying a single blended fee for all clients or providing some form of financial assistance for low-income clients.

Program evaluation should be part of any remedial measures program.

Program evaluation and research costs should be built into program budgets.

More emphasis should be placed on quality assurance (to ensure the program is delivered as intended with regard to all aspects of delivery), and studies of cost-effectiveness of programs and their component parts.

References

Much has been learned about the profile and characteristics of impaired drivers over the course of the past three decades. To a lesser extent, knowledge has also grown with regard to the factors that put them at risk, the types of assessment instruments that are appropriate for this population, and the types of treatment interventions that can begin to address their risks and needs.

Still, continued efforts are needed to increase understanding of these topics and to inform approaches that can best prevent impaired driving behaviour, as well as manage, supervise and treat those that are detected and processed through the criminal justice system. A number of topics that reflect gaps in offender research, gaps in intervention research, and gaps in implementation and practice warrant future attention. These are briefly highlighted below.

### 9.1 Gaps in Offender Research

Perhaps most pressing in the field of research is the need to integrate existing knowledge stemming from diverse disciplines as a basis to explore and develop more holistic, robust and complex models of impaired driving behaviour that acknowledge the heterogeneity of this population. In particular, this model must recognize the different developmental pathways of offenders who do not re-offend as well as those who persist in their behaviour. A core feature of this initiative should be to increase understanding of the interactions and effects of different characteristics of offenders. Such efforts can be useful to help identify clinically relevant subgroups and guide the development of appropriate interventions that specifically target them.

Greater knowledge and understanding of relevant risk factors that influence future offending is also a critical need. At the same time, the development of valid, reliable and practical screening and risk assessment instruments that can accurately distinguish between offenders not only with regard to risk related to substance use but also risk of re-offending and
individual-specific trajectories to impaired driving behaviour are essential to inform decision-making and the allocation of resources. This is a pressing concern in light of shrinking budgets and resources.

9.2 Gaps in Intervention Research

While knowledge of effective interventions has grown substantially since the 1990s, there has been a rather exclusive emphasis on research that has investigated individual interventions that are more punitive than rehabilitative in nature. Also of importance, effectiveness has largely been limited to measurement of alcohol use reduction and to lesser degree recidivism.

However, the reality is that most interventions are delivered in complex systems of justice, licensing and health, and a majority of offenders are subject to a multitude of interventions. Moreover, there is a much broader range of outcome measures, beyond recidivism (e.g., employment, family stability, engagement in pro-social activities, health benefits), that are worthy of attention. Hence three important trends have emerged that will significantly influence the direction of intervention research moving forward. First, since 2005 there has been growing recognition among researchers, policymakers and practitioners of the value of treatment and rehabilitation as essential goals of the justice system for long-term risk reduction. Second, sanctions that are increasingly applied to impaired driving offenders are imposed with the intention of achieving a better balance between supervision and treatment. This means that offenders are more often subject to a combination of interventions that are delivered in different systems with different goals and objectives. And, third, a variety of factors or outcomes in addition to substance use, are relevant to reductions in recidivism and should be considered part of research designs. Hence future efforts to investigate the effectiveness of interventions must account for not only the increasingly complex environment in which such interventions are delivered, but also the web of factors that play an important role.

And while much has been learned about effective interventions, a range of research questions remain that must be addressed. These include:

- Is it possible to achieve an optimal balance between sanction/supervision and rehabilitation/treatment for offenders with different levels of risk?
- What interventions or combination of interventions provide the best outcomes for different subpopulations of offenders.
- Are there commonalities and differences across interventions that can provide insight into the essential ingredients of effective interventions? This may include an examination of content, delivery mechanisms, training, duration, key features, and the emphasis that is placed on sanctioning, rehabilitation or both.
Is there an optimal duration for the various interventions that are available, including educational programs, treatment, probation, and alcohol monitoring technologies?

Is it possible to achieve the outcomes associated with longer-term and more intensive treatment interventions using well-designed programs that are more cost-effective and shorter in duration?

What characteristics of offenders are most useful to appropriately match them to effective interventions?

It must be underscored that answers to these questions may only be possible once our understanding of offenders has grown.

9.3 Gaps in the Implementation of Interventions

In an environment that is heavily influenced and compromised by a growing number of practical and economic constraints, policymakers, agency administrators and practitioners will be forced to consider a range of implementation issues in the coming years that can have significant implications for the delivery of interventions. Some of these issues are briefly discussed below.

First, recent increases in impaired driving behaviour among women (Perreault 2013), and research indicating that female offenders may possess clinically significantly differences relative to males (Robertson et al. 2011b) provide important food for thought. The same is true in relation to anecdotal evidence from frontline practitioners that perhaps more young drivers are participating in remedial impaired driver programs. These situations warrant close monitoring and may have important implications for the delivery of interventions in order to account for differences across sexes and ages.

Second, there is growing awareness that additional and complementary services may be required for specific sub-populations of offenders such as those who possess deficits in executive cognitive functioning, those who suffer from co-occurring disorders, and those offenders identified with polysubstance (i.e., alcohol and drugs) use. Additionally, service delivery in rural jurisdictions continues to be a source of concern as does the delivery of culturally appropriate services for the ethnically diverse population in Canada. In this regard, strategic partnerships will play a pivotal role in filling these gaps and efforts are needed to encourage and facilitate these collaborations.

Third, while much has been learned with regard to effective interventions, less work has been focused on the implementation of such programs to ensure that they are delivered in ways that demonstrate fidelity to the model. In some respects, this issue is intimately linked to efforts to promote high standards of effective and efficient programming across relevant systems. The achievement of this goal will require the prioritization of consistent training and
education for practitioners, the use of quality control procedures and, most importantly, an emphasis on both process and outcome evaluations of these interventions in the future.

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