What Health Professionals Know and Do About Alcohol and Other Drug Use During Pregnancy

Trecia Wouldes, PhD
Department of Psychological Medicine

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EXECUTIVE SUMMARY

There is now a preponderance of evidence that has found consuming alcohol and smoking cigarettes can be harmful to a woman's health. In addition, there is clear and convincing evidence that alcohol and tobacco use during pregnancy can have deleterious effects on the developing fetus and the child born exposed to these substances. Less is known about the effects of other drug use on the developing child, but research has shown that women of childbearing age in New Zealand and world-wide are using other "recreational drugs" such as cannabis (marijuana), opiates (heroin, MSTI, homebake, methadone), and methamphetamine (P, Pure, crystal meths, ice, speed, Ecstasy). In addition, women frequently use these drugs in combination. For instance, women who drink are also likely to smoke cigarettes and use cannabis. (Arria et al., 2006; Australian Institute of Health and Welfare, 2003; Boden, Fergusson, & Horwood, 2006; Counsell, Smale, & Geddis, 1994; Goransson, Magnusson, Bergman, Rydberg, & Heilig, 2003; Mathew, Kitson, & Watson, 2001; Parackal, Ferguson, & Harraway, 2007; Wouldes, 2001).

Health professionals who are routinely providing healthcare to women of childbearing age are uniquely positioned to deliver important information about the health risks around the use of alcohol, tobacco and other "recreational or psychoactive drugs". However, research to date suggests that a number of obstacles may prevent healthcare professionals from discussing substance use with their patients (Gilbert et al., 2007; Taylor et al., 2007; Wouldes, 2008). Some of these obstacles are lack of knowledge about the effects of these substances on the mother and her developing child, others are related to insufficient training to adequately assess the risk of using alcohol and/or other drugs. Therefore, the present research had three overall objectives.

1. To determine the current practice of healthcare professionals around alcohol and other drug use when treating women of childbearing age.
2. To investigate the knowledge and opinions of health professionals around the use of alcohol, tobacco and other drugs during pregnancy.
3. To identify the perceived needs of health professionals to manage women of childbearing age who report they are using alcohol, tobacco and other drugs.

To address the above objectives, we interviewed 241 health professionals who routinely treated women of childbearing age and/or women who were currently pregnant or planning a pregnancy. Approximately two-thirds of the participants in this study were midwives (68%) who provided antenatal and postnatal care to women in the greater Auckland region that included parts of Northland. The other third was made up of obstetricians, general practitioners and practice nurses. The clinical environments that were served by these health professionals were well distributed between the three main DHBs in Auckland and to a lesser extent Northland and Waikato. The clinical services included: hospital maternity services, independent midwife practices, private consultant practices, and fertility, family planning and sexual health clinics. The clinical population that was served by these clinicians included a wide range of ethnicities and was largely representative of the New Zealand population of women who are currently having babies. The following is a summary of the key findings.

Current Practice of Health Professionals

Healthcare providers should be able to assess the extent, frequency and timing of drug use in women of child bearing age, determine the level of risk associated with this use and know when to offer referrals. To establish the current practice of health professionals engaged in treating young women of childbearing age we asked the following: (1) whether they routinely asked about alcohol and drug use; (2) whether they used standardised questionnaires to obtain information about the risks; (3) what the barriers were to discussing alcohol and drug use, and (4) what they were likely to do if patients reported using alcohol, tobacco and other drugs. The following is a summary of the current practice reported by health professionals who participated in this study.

Routine Screening for Alcohol, Tobacco and Other Drug Use

- A large proportion of health professionals reported routinely asking about the use of alcohol (78%) and tobacco (88%), a much smaller proportion routinely asked about the use of other psychoactive drugs such as cannabis (52%), opiates (34%), or methamphetamine (33%).
- Fewer than 17% of health professionals were aware of any of a number of readily available, standardised questionnaires that have been shown to reliably screen for risk due to the use of psychoactive drugs or alcohol consumption.
- Fewer than 7% were currently using one of these standardised questionnaires.

Barriers to Screening for Alcohol, Tobacco and Other Drug Use

- Over 60% of the health professionals reported they were "more likely" to discuss alcohol and tobacco with their patient regardless of the context or circumstances. The remainder of respondents perceived the following to be barriers to inquiring about the use of alcohol and to a lesser extent tobacco.
  - It was the first visit and they had not established a relationship or rapport with the patient.
  - The patient was from an ethnic, culture or socio-economic group that the health professional believed put them at "no" or "low" risk for problems.
  - There was no clear procedure in the clinical environment for managing women who reported they were using alcohol or other drugs.
- Nearly 50% of health professionals in this study reported all of the above to be barriers for asking about other psychoactive or illegal drug use. A further barrier for asking about illegal drug use was the presence of a family member during the clinical interview.

Management of women who use alcohol and/or other drugs during pregnancy

- Over 80% of respondents in the present study reported they would ask more in-depth questions about the pattern and frequency of alcohol and other drug use.
- Only 59% of the participants were more likely to continue to monitor alcohol use, whereas a higher proportion were more likely to continue to monitor other illicit drug use (67%) throughout a woman's pregnancy.
- A higher proportion of health professionals were more likely to refer women to a specialty team to manage the pregnancy (78% vs 56%) or to offer a referral for illicit drug use (78% vs 62%) than for alcohol use.

Current Opinions and Knowledge About Alcohol and Other Drug Use

To obtain the current opinions and knowledge of health professionals about alcohol consumption and the use of other psychoactive drugs we asked the following: (1) whether women should abstain from drinking during their pregnancy; (2) what they considered heavy drinking; (3) what they knew about of Fetal Alcohol Spectrum Disorders (FASD); and (4) what they knew about the effects of prenatal alcohol and drug use on the developing fetus and child.

Opinions about abstinence or moderate drinking during pregnancy

- Over 85% of the health professionals in this study reported that they believed women who were pregnant or were planning to become pregnant should completely abstain from alcohol consumption.
- 75% of respondents suggested that 6 or more drinks per week would be considered heavy drinking during pregnancy.

Opinions about Fetal Alcohol Spectrum Disorder (FASD)

- Only one third of the participants in the current study thought that health professionals were sufficiently aware of FASD.
- Nearly two-thirds were of the opinion that a diagnosis of FASD may lead to a child or family being stigmatised.
- Most respondents agreed that an early diagnosis of FASD may improve treatment plans for the affected child (88%) and that it was possible to prevent FASD (93%).

Knowledge about the effects of alcohol and other drug use during pregnancy

- Only 25% of the health professionals were able to identify the four main criteria for Fetal Alcohol Syndrome (FAS)
- The majority of participants in the present study identified a wide range of health and developmental problems they considered were associated with alcohol, tobacco and other drug use during pregnancy.
- The opinions they held about the effects of alcohol and tobacco were largely consistent with the current and abundant evidence about the use of alcohol and tobacco during pregnancy.
- Despite a lack of research about the effects of illicit drugs, over one-third of the participants reported they considered all of the adverse outcomes listed in our questionnaire as potential adverse effects from exposure to cannabis, opiates and methamphetamine.

Perceived Needs for Knowledge, Training and Resources

The lack of agreement between the opinions of the health professionals in this study around the adverse effects of alcohol and other drug use during pregnancy and published evidence was reflected in their reported need of further knowledge, training and resources.

Perceived need for more knowledge and training

- Nearly half of the participants reported they needed more knowledge about the effects of alcohol (49%).
- A substantially higher proportion of professionals reported they needed more knowledge about cannabis (74%), methamphetamine (81%), opiates (81%) and methadone (84%).
- Only a small proportion of health professionals reported they did not feel confident advising women about drinking alcohol (14%) or smoking tobacco (8%).
- Two thirds of participants did *not* feel confident in their ability to advise women of childbearing age about the use of illicit substances.
- A substantial proportion reported a need for training to assess the risk of alcohol (57%) and other drug use (81%) during pregnancy.

Perceived need for resources

- Approximately 80% of the clinicians reported they would find a short standardised questionnaire useful in screening for alcohol and/or other drug use.
- Over two-thirds reported a need for printed material that accurately reflects the risk of cannabis, methamphetamine, opiates and methadone.

Summary of Implications for Health Service Provision

With the magnitude of impact on public health, mental health and society and the emerging evidence of intergenerational transmission of substance dependence, it would seem imperative that alcohol, tobacco and other drug use in women of childbearing age be a health policy priority. A focus on primary prevention effort alone is likely to be insufficient given the complexity of substance use. Prevention messages and public health interventions will be more effective if they fall along a continuum of interventions that are able to take into account and respond to multiple factors and that fall into 4 distinct but interrelated areas,

1. Universal or primary preventive – broad health promotion and educational material, and routine brief intervention advice. A national prevention campaign would provide information on the topic to the general public. This could be delivered through a combination of approaches such as health warning messages on alcohol containers and where alcohol is sold, mass media social marketing or community focused education

programmes. This approach would also provide a useful role to enabling healthcare professionals to initiate discussion and brief intervention screening with all women of reproductive age who present to a primary healthcare service.

2. Selective Preventive – Screening and intervention programmes for women who report some alcohol or other drug use during pregnancy. A number of short standardised screeners are available to ascertain the level of risk and to provide the opportunity for appropriate intervention. Some training to increase the healthcare professionals' knowledge and application of the tools and intervention options. This should include undergraduate training as well as professional development programmes for current practitioners.
3. Indicated Preventive – Interventions that serve women with moderate or modifiable substance abuse along with other potential risk indicators. This level of prevention requires more focussed non-judgemental attention to the person's medical and health needs to reduce the risk of existing substance use during the current and subsequent pregnancies.
4. Tertiary Preventive – Intensive treatment strategies that serve women with established substance abuse disorder and other high risk health indicators. As this usually involves multiple interrelated issues, this level of harm prevention requires a multi-disciplinary approach by trained specialist. It is important that such services are available for referral by primary healthcare professionals.

Education should include messages about drug use and addiction as a mental health or medical problem. Drug or alcohol use should not automatically be associated with inadequate parenting or irresponsible behaviour. These attitudes can only lead to punitive measures toward women who are attempting to manage their addiction problems, and set up barriers to treatment that ultimately affect the best interests of the child. Education should also target early child care providers, family courts, drug and alcohol treatment services and allied health professionals such as sexual health clinics and family planning. In summary, the results of this survey provide a clear indication that the education for healthcare professionals in relation to alcohol and other drug use before and during pregnancy is currently inadequate and requires a greater level of attention. Healthcare providers should be educated to (1) detect drug use during pregnancy, (2) identify and assess the risks associated with alcohol and other drug use for women of childbearing age, (3) know when to offer referrals and resources and where to

find these resources, and (4) develop brief counselling skills that can be used with women who are at the less extreme end of the spectrum of risk. Undergraduate curricula for health professionals should include general education about the hazards of alcohol and drug use to health and development along with current evidence about the burden of disease associated with substance use. For health professionals educational materials should be updated periodically to reflect current evidence on the effects of alcohol and other drug use. These materials should be easily accessible, web based or printed. Vocational training together with the development of guidelines for screening and referral would help to standardise approaches and build competence and confidence for current practitioners.

Educational materials should be targeted to specific audiences so that they are easily understandable and easily accessed. For the general population media may include newspapers, radio, TV. However, other ways of communicating may be through the internet and websites frequented by young adults. Targeted audiences should include young men, as well as women, as alcohol and drug use can be influenced by family members and partners. Addressing the gaps in the provision of educative strategies would reduce the avoidable harm and cost burden associated with alcohol and other drug use during pregnancy and improve current and future maternal and child health. It is therefore necessary for workforce education on the topic to become a public health priority.

1. BACKGROUND

1.1. Prevalence of alcohol and other drug use during pregnancy

International Studies

A number of studies world-wide have attempted to produce estimates of alcohol and drug consumption during pregnancy. In Australia, the 2001 National Drug Strategy Household Survey reported that 36% of women did not consume alcohol while pregnant, 59% drank less during pregnancy and 4% drank the same or more than when they were not pregnant (Australian Institute of Health and Welfare, 2003). The U.S. National survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2007) reported that, among women aged 15 to 44 years who were currently pregnant, 11.8 % reported current alcohol use, 2.9 % reported binge drinking (drinking more than 5 drinks on one occasion), and 0.7 % reported heavy drinking. Among pregnant women aged 15 to 44 years, 4.0 % reported using illicit drugs in the past month based on combined 2005 and 2006 NSDUH data.

Higher estimates for alcohol and drug use during pregnancy have been reported by Arria et al. (Arria et al., 2006). The unselected screening sample in this study consisted of 1,632 mothers who consented to participate in a large-scale U. S. multi-site study focused on prenatal methamphetamine exposure. Participants included both users and nonusers of alcohol, tobacco, methamphetamine and other drugs. Substance use was determined by maternal self-report and/or GC/MS confirmation of a positive meconium screen. Overall, 5.2% of women used methamphetamine at some point during their pregnancy. One quarter of the sample smoked tobacco, 22.8% drank alcohol, 6.0 % used cannabis, and 1.3% used barbiturates antenatally. Less than 1% of the sample used heroin, benzodiazepines, and hallucinogens.

In Sweden, alcohol consumption has been reported to be even higher. Goransson et al. (Goransson et al., 2003) used the Alcohol Use Disorders Identification Test (AUDIT) to collect anonymous data from 1,103 consecutive pregnant subjects admitted to one antenatal clinic over the period of a year. The results of their study found 17% of the participants reported scores of 6 or higher on the AUDIT, indicating hazardous or harmful alcohol use in these women. Few individuals reported scores of 13 or higher (indicating abuse or

dependence), but almost half the participants (46%) reported binge drinking (defined as six standard drinks on a single occasion) once/month or more often, and 6% reported binge drinking on every occasion of alcohol consumption. One-third of the participants (30%) continued regular alcohol use during pregnancy and 6% reported consumption two to four times per month.

New Zealand Studies

Although a comprehensive, prospective study of alcohol, tobacco and drug use during pregnancy at a national level has not taken place in New Zealand, a number of studies suggest a good proportion of New Zealand women of *childbearing age* are consuming alcohol and other drugs (Boden et al., 2006; Counsell et al., 1994; Ministry of Health, 2004). In the 2002/2003 National Survey of Health, 80% of New Zealand women reported drinking alcohol in the past 12 months, 22% reported smoking cigarettes and nearly 4% reported smoking cannabis on a regular basis. Boden et al. (Boden et al., 2006) described the patterns of illicit drug use in the Christchurch Health and Development Study of 1,265 children born in Christchurch during 1977. They found that by age 25, 72.5% of the women in this cohort had used cannabis, while 37.2% had used other illicit drugs on at least one occasion. In addition, 7% of the cohort met DSM-IV criteria for dependence on cannabis, and 2.8% met criteria for dependence on other illicit drugs.

In addition, a handful of New Zealand studies have also shown that women are continuing to use alcohol and other drugs during their pregnancy (Counsell et al., 1994; Mathew et al., 2001; McLeod, Pullon, Cookson, & Cornford, 2002; Parackal et al., 2007; Parackal, Parackal, Ferguson, & Harraway, 2005; Wouldes, 2001). Counsell et al. (Counsell et al., 1994) reported on the drinking habits of 4,286 women who participated in the Plunket National Child Health Study. This longitudinal study of children born between July 1990 and June 1991 includes participants who are ethnically and geographically representative of the New Zealand population. They reported that 41.6% of the women in this study consumed alcohol during pregnancy. Of those women who consumed alcohol, 13.6% used alcohol only rarely (between one and three times in pregnancy), 67.7% reported occasional use (more than three times during the current pregnancy, but less than weekly), and 18.7% reported frequent use (more than once a week).

Data from a study surveying primary maternity caregivers about their clients'

alcohol consumption patterns during pregnancy suggested that 36.8% of the women in their care continued to drink during their pregnancy (Mathew et al., 2001). The majority of those who drank were occasional drinkers, 7% were regular drinkers and about 13% were drinking more than a glass a day or were binge drinkers and could be considered as at-risk drinkers.

In a report prepared for the Alcohol Advisory Council and the Ministry of Health, Parackal et al. (Parackal et al., 2005) reported on the awareness of the effects of alcohol consumption during pregnancy in a representative sample of 1,256 New Zealand women of childbearing age. One of the objectives of this research was to assess the prevalence of alcohol consumption during pregnancy over the last 5 years (2001 to 2005). To achieve this they selected women who had a baby between 2001 and 2005 (n = 425) and asked them about alcohol consumption in their last pregnancy. They also included a further 127 respondents of the original sample that were currently pregnant for a combined sample of 552 women. Of this sample, 53% reported to have consumed some alcohol during their pregnancy in some instances this was before they realized they were pregnant. Of this group, 14% reported consuming alcohol "more than once a week", 11% "once a week", 13% "once or twice a month" and 15% less than once a month.

Further evidence of continued alcohol, tobacco and other drug use during pregnancy in a New Zealand sample comes from a study carried out to determine the effects of methadone and other drugs on a sample of women who attended antenatal clinics at National Women's Hospital from 1998 to 2001 (Wouldes, 2001; Wouldes, Roberts, Pryor, Bagnall, & Gunn, 2004). Seventy-four women participated in this prospective study of the developmental effects of maternal methadone maintenance treatment during pregnancy on the exposed fetus and infant. Of the 74 women 32 were women who were being treated with methadone for their opiate dependence and 42 were a non-opiate dependent group of women who were attending antenatal clinics at National Women's Hospital. Of the 74 participants, 69% had smoked cigarettes prior to their pregnancy, 97% had consumed alcohol and 66% had used cannabis. Thirty-six percent of the women in the study continued to smoke more than 10 cigarettes per day during their pregnancy, 12% and 22% met DSM-III-R criteria for alcohol dependence and cannabis dependence, respectively.

1.2. Perinatal and Developmental Effects of Maternal Drug Use

Early in gestation, are periods of critical importance for structural development that can be interrupted by drug exposure (Smith, 1980). These effects can be dramatic, as seen with the drug thalidomide where the result of early exposure was phocomelia, a congenital deformity in which the hands and feet are attached close to the trunk with the limbs being grossly underdeveloped or absent entirely. Later in gestation the effects of drugs on the developing fetus may be more subtle. The most commonly recognizable drug-related deficits beyond the embryonic stage are associated with growth, and the integrity and development of the central nervous system. The effects of drugs on the fetus can be caused directly through placental transfer of the drug or can be secondary to changes in the fetal environment. The fetus exists in a complex setting that includes amniotic fluid and its constituents, embryonic membranes, the uterus, umbilical cord, placenta, and other fetuses in the womb. It is continually acting on, as well as being acted upon by its intrauterine environment, and any change brought about by drugs can affect development (Garland, 1998). For instance, nicotine from cigarette smoking is believed to constrict placental blood vessels, temporarily depriving the developing brain of oxygen, stimulating the cardiovascular system and depressing the respiratory system. Women who smoke during pregnancy have a higher incidence of spontaneous abortions, preterm deliveries, low birth weight, and intrauterine growth retardation (Fried, 1993).

In a recent review article Burd and colleagues reported the numerous effects of alcohol on the intrauterine environment, particularly the fetus and the placenta (Burd, Roberts, Olson, & Odendaal, 2007). The placenta has many complex functions such as maintaining the pregnancy, promoting and sustaining fetal growth, and protecting the fetus from foreign substances. The results of the Burd et al. (Burd et al., 2007) review reported substantial evidence that ethanol the essential psychoactive ingredient in alcoholic beverages freely crosses the placenta and accumulates in the fetus at levels proportionate to maternal blood alcohol levels within one hour of ingestion. In addition, they provided evidence that it takes a period of three hours to eliminate alcohol from amniotic fluid after the equivalent of a single drink. This means there may be prolonged fetal exposure to alcohol. Second, they found a number of studies that showed that alcohol exposure rapidly constricts placental blood flow to the fetus. The constriction of blood flow can be rapid, last as long as ethanol is present and is

further enhanced by nicotine from maternal smoking. Third, they found evidence that maternal ingestion of alcohol impaired placental transport of nutrients such as vitamin B_6 and biotin to the fetus. Vitamin B_6 and biotin are vitamins that are essential for growth and development of tissues and multiple metabolic reactions. The fetus is exclusively dependent on its supply of vitamin B_6 and biotin from the mother via the placenta.

Like women who smoke, women who drink excessively during pregnancy also experience higher incidences of spontaneous abortions, stillbirths, and preterm deliveries, pre- or postnatal growth retardation (less than 10^{th} percentile), central nervous system abnormalities such as microcephaly and seizures, low muscle tone and motor impairments. In addition, infants exposed to high levels of alcohol may exhibit the facial dysmorphologies associated with Fetal Alcohol Syndrome (FAS) (Jones, Smith, Ulleland, & Streissguth, 1973; Roebuck, Mattson, & Riley, 1999). Alcohol use during pregnancy has also been associated with deficits in intellectual, academic and adaptive living skills (Streissguth et al., 1991). Other adverse life outcomes have been reported for children diagnosed with FAS. One study of 415 patients with FAS or FAE found 80% were not raised by their biological mothers, 61% had disruptive school experiences, 60% had a history of arrests or trouble with the law, 50% had been in detention, jail, prison or a psychiatric or alcohol/drug inpatient setting, and 49% had problems with inappropriate sexual behaviours on repeated occasions, and 35% for alcohol/drug problems (Streissguth et al., 2004).

Less is known about the effects on the fetus of other psychoactive drugs used by women of child-bearing age, however, at present there is no convincing evidence of congenital defects being linked to illegal drugs such as cannabis, heroin, or methamphetamine. Yet, research with animals and humans has shown that the psychoactive ingredients associated with the use of these drugs also cross the placenta and are stored in the amniotic fluid and fetal tissue (Harbison & Mantilla-Plata, 1972; Kreek, 1979; Kreek et al., 1974). Also of concern are the effects of methadone a commonly prescribed drug for the treatment of opiate dependence in New Zealand and world-wide (Wouldes, 2001).

Maternal use of methadone and other psychoactive drugs during pregnancy have also been associated with growth retardation, placental abruption, premature labour and a higher risk of infant mortality, including sudden infant death syndrome (SIDS). In addition, babies born to heroin dependent mothers are themselves addicted at birth, and may exhibit signs of neonatal abstinence syndrome (NAS) or withdrawal from their addiction within 1 to 3 days

after birth (Wouldes, 2001). Withdrawal symptoms can be severe and include tremors, irritability, vomiting, diarrhoea, perspiration, and sleep disturbances (Stone, Salerno, Green, & Zelson, 1971). Unfortunately infants born to mothers who have been prescribed methadone to treat their opiate dependence also may be addicted at birth and require extended detoxification prior to release from hospital postnatally (Wouldes, 2001). One New Zealand study has found the median number of days in hospital for methadone-exposed infants was 10.5 days (range 4-91) compared to 3.0 days (range 0.5 – 34) for a non-drug dependent comparison group. Of those infants that had extended stays in hospital 46% of the methadone-exposed infants remained in hospital for more than two weeks compared to only 2.4% of the comparison group. This prolonged stay in hospital is not only expensive as many of these babies need to be looked after in the special care baby units, but may affect the early mother-infant bond and relationship that begins at birth and is a critical process in early development.

At present, no New Zealand studies have been done to ascertain the postnatal outcome of infants and children exposed prenatally to alcohol.

1.3. Dose or the Extent of Alcohol and/or Drug Exposure and Timing of Exposure

The term ‘teratogen’ in its broadest sense includes any reproductive and/or developmental toxicant that induces structural malformations, metabolic or functional deficits, growth retardation or psychological/behavioural anomalies in the offspring, whether at birth or in any defined postnatal period (Pollard, 2007).

Psychoactive substances or agents are defined as teratogenic if they meet the following four criteria: 1) the agent must cause death, malformations, growth retardation and/or functional disorders; 2) the effects of this agent should be dose-related, with larger doses resulting in greater damage; 3) there must be critical periods during development of susceptibility; 4) the susceptibility to alcohol or drugs must be affected by an interaction of genetic and environmental factors. Traditionally, exposure to teratogens has been considered to happen in two ways, either through single or intermittent doses such as the occasional consumption of a small amount of alcohol, or chronically through repeated daily consumption of alcohol (Gardella & Hill, 2000; Kalter, 2003). Consideration should also be given to the effects “binge drinking” or isolated bouts of heavy drug use over short periods of time may

have on the developing fetus, especially if those periods coincide with the particularly sensitive periods during fetal development.

It is now generally accepted that both abusive and heavy drinking are associated with FAS (Claren & Smith, 1978). Subsequent research that has aimed, in part, to establish the level of drinking (dose) that would be dangerous to the fetus has suggested that the original facial dysmorphologies that have characterised FAS substantially under-represents the range of patients damaged by prenatal exposure to alcohol (Stratton, Howes, & Battaglia, 1996). Current arguments suggest that the extent of brain damage is not tightly controlled by the presence or absence of the facial dysmorpholgies, but may represent a range of central nervous system effects (CNS) that have been variously referred to as "fetal alcohol effects" (FAE), "alcohol-related birth defects" (ARBD), "prenatal alcohol effects" (PAE), "prenatal exposure to alcohol" (PEA), alcohol-related neurodevelopmental disorder (ARND), and most recently, "fetal alcohol spectrum disorder" (FASD) (Bookstein, Sampson, Connor, & Streissguth, 2002).

The varied subcategories suggested by the above lexicon of effects has been interpreted as an attenuated or less severe form of FAS (Aase, 1994). This has resulted in a body of literature that has generated mixed, if not opposing, views as to the amount of alcohol consumption during pregnancy that is safe. One prevalent view proposes that even small amounts of alcohol during pregnancy may cause "fetal alcohol effects" or result in some form of FASD. The main basis for this proposition is twofold: First, research has been unable to establish the level or dose at which alcohol consumption is likely to cause FAS. Second, the varied neurological effects on infants and children that has been reported in the extant literature investigating antenatal exposure to alcohol has been interpreted to mean even small to moderate doses of alcohol can cause FASD.

A further view suggests that FAS may result in a range of anomalies, however, it is more likely that the damage is the same whether it occurs as a singular anomaly or as a component of a pattern of anomalies. One explanation supporting this argument is that one or more anomalies resulting from maternal "alcohol abuse" is the result of exposure on specific days of fetal development while the full blown syndrome results from exposure throughout pregnancy (Abel, 2006). Therefore, the timing, the amount consumed on any one occasion, and the chronicity of exposure are all, important factors in determining the varied effects of FAS (Abel, 2006; Barr & Streissguth, 2001; Streissguth, Barr, Sampson, & Bookstein, 1994).

Supporting this view is the large number of clinical case studies that report an association between FAS and maternal alcohol consumption only at very high levels, or levels considered to be "alcohol abuse". Consumption in these studies ranged from 14 drinks a day during pregnancy (Abel, 2006), to over 20 drinks (Azouz, Kavianian, & Der Kaloustian, 1993; Qazi, Chua, Milman, & Solish, 1982); a bottle of liquor a day (Beattie, Day, Cockburn, & Garg, 1983); a gallon of wine and a half case of beer every Friday and Saturday evening (Ernhart, 1991); three to four pints of liquor a day (Pierog, Chandavasu, & Wexler, 1979), two to three quarts of beer daily interspersed with an unknown amount of whiskey, and 1.5 quarts of beer per day for 7 years. Many of these mothers have been described as drinking themselves "senseless" (Abel, 2006).

In addition to the clinical case studies that suggest FAS is associated with "abusive drinking", there are a number of studies that have found no or little adverse effect of maternal alcohol consumption at low to moderate levels (defined as less than 2 drinks per day). Polygenis et al. (Polygenis et al., 1998) conducted a meta-analysis of studies examining moderate alcohol consumption during pregnancy and the incidence of fetal malformations. Moderate consumption was defined as the range of 24-168 g/week. In terms of drinking pattern, moderate drinkers were those who consumed at least two drinks per week and up to and including two drinks per day. The meta-analysis included 130,810 pregnancy outcomes and reported a Relative Risk for fetal malformation of 1.01 which suggested no increased risk. A further systematic review of 46 studies examining the effects of low-moderate prenatal alcohol exposure on pregnancy outcome found no convincing evidence of adverse effects during infancy of prenatal alcohol exposure at low-moderate levels of exposure (Henderson, Gray, & Brocklehurst, 2007).

Only a few studies have evaluated the effects of "binge drinking" on pregnancy outcome, and for most of them, there has been very little consistency regarding the definition of a "binge", the study population of pregnant women has varied relative to their usual consumption of alcohol (complete abstinence vs small amounts periodically), and the measures of pregnancy outcome have differed widely (Shepard et al., 2002). For instance, one study evaluated a number of perinatal outcomes of women who normally abstained from drinking, but had binged on a few occasions early in their pregnancies. They found no increased risk for intrauterine growth retardation, prematurity, spontaneous abortion, decreased birth length, weight or occipitofrontal head circumference, or features consistent

with FAS among the offspring of 58 otherwise abstaining women who binged to the point of feeling drunk on one, two or three occasions during the first trimester of their pregnancies. Tolo and Little (Tolo & Little, 1993) also investigated the effects of occasional alcohol binges on birth outcomes in a cohort of live singletons born to 709 moderate drinkers recruited from a health maintenance clinic before their sixth month of pregnancy. They compared infants of women with one or more binges in the month before pregnancy or in the first two trimesters with those whose mothers reported no binges in either period. Mean values of birth weight, length, head circumference, gestational age, intrauterine growth, and Apgar scores did not differ notably between the two groups. Their conclusion was that occasional binges, during a broad window of exposure and among otherwise moderate drinkers, did not adversely affect the birth outcomes examined in their study. Both of these studies were cross-sectional and did not measure any neurobehavioural or subtle outcomes that may occur later in development.

Streissguth and colleagues (Barr & Streissguth, 2001; Streissguth et al., 1994) have evaluated the effect of binge drinking in a longitudinal study measuring more subtle neurobehavioural outcomes. Using a more sensitive measure of self-reported maternal alcohol use they were able to identify the drinking pattern that was the best predictor of neurobehavioural deficits in alcohol-exposed children. This pattern was a binge consumption pattern, (ever reporting five or more drinks on one occasion, more than 7 drinks per drinking occasion, greater than 1 oz of alcohol per day) in both the month before pregnancy recognition and during pregnancy.

A large population-based study in Denmark has found an association between binge drinking, defined as 5 or more drinks per day on one occasion, and an increased risk for epilepsy, and neonatal seizures. In this large national study of 80,526 live born singletons infants exposed to binge drinking between 11 and 16 weeks were 3.15 times more likely to have neonatal seizures and had a 1.81-fold increased risk of epilepsy. These results suggest that maternal binge drinking during a specific time period of pregnancy may be associated with an increased risk of specific seizure disorders in the offspring.

Much of the research in the alcohol, tobacco and drug literature has found similar inconsistencies in the results of studies examining the developmental effects of antenatal exposure. These inconsistencies are often due to measures that do not adequately measure the extent and timing of maternal alcohol and/or drug use and developmental tests that are not sensitive enough to identify subtle neurobehavioural deficits.

1.4. Context of Alcohol and Drug Use During Pregnancy

A number of studies that have investigated the effects of substance use during pregnancy have used a biological model to determine whether there are any adverse effects of a specific drug on fetal and later child development. Using a biological model, the question clinicians and researchers have been attempting to answer is, *"what are the developmental effects of maternal alcohol and other drug use during pregnancy?"* Results of human studies using a biological model have often found adverse effects in the studied population, however, they have often added caveats suggesting the adverse outcomes could be the result of other drug use or other lifestyle factors. Recognizing the limitations of this model, more and more researchers have turned to examining alcohol and/or drug use within the context of a number of common lifestyle factors that have been associated with alcohol and drug use. These include maternal multiple drug use, ethnicity, age, education and psychological well-being, and the postnatal home environment.

One study that explored the use of common substances by 607 pregnant women in their first trimester of pregnancy found substance use was associated with a number of these factors (Muhajarine, D'Arcy, & Edouard, 1997). The women participating in this study reported the most commonly used substance was caffeine (87%), followed by alcohol (46%), tobacco (30%), and psychoactive drugs (7%). However, they also found evidence of multiple drug use as 36% of the women reported using two substances, 16% three, and 4% all four substances. Other contextual factors that were identified in this sample of women found that in general, drug use was more prevalent among women with lower education and income levels, Aboriginal or Metis background, those not living with a partner, those with previous births, and, in some cases, younger women.

A New Zealand study that investigated mothers who were prescribed daily doses of methadone to treat their opiate dependence found that these mothers and a comparison group of non-opiate dependent mothers continued to use a range of drugs during their pregnancy (Wouldes, 2001). Of the 32 mothers who were receiving methadone treatment a substantial percentage reported continued heavy use during pregnancy of alcohol (50%), cannabis (41%), amphetamines (20%), hallucinogens (25%) and benzodiazepines or sedatives (63%). In addition, a DSM-III-R diagnosis of substance dependence on three or more of the above substances was found for 68% of these women. Although the 42 women in the comparison

group who were selected at random from antenatal clinics in Auckland were less likely to be dependent on alcohol or drugs, they had a history of drinking alcohol (78%), smoking cigarettes (52%) and cannabis (43%), and using hallucinogens (7%). Thirty-eight per cent of these women reported using three or more illegal substances prior to pregnancy and 10% continued to use alcohol and smoke cigarettes during pregnancy.

These findings illuminate the needs of particular groups of pregnant women and the importance of understanding alcohol and drug use within the structural and cultural realities of women's lives. Therefore, when we investigate the outcomes of children exposed antenatally to substances and when we consider the clinical management of women during their pregnancy, we need to consider the context in which children develop not simply the direct effects of one drug. The context includes both the fetal and the postnatal environment. The fetal environment is likely to include a number of maternal factors that have been shown to affect infant and child health and development. These factors will include biological as well as psychological factors such as multiple drug use (alcohol use in combination with cigarettes and cannabis), obstetric history, maternal diet, maternal stress, anxiety and depression. The context of the postnatal environment may include such factors as continued drug use by one or more parents, the psychological well-being of those parents, the socio-economic status of the family, parental education, number of siblings and the neighbourhood and wider community.

Therefore, when we our attempting to determine the impact of alcohol and/or other drug use on the developing fetus and child we should be asking the following questions: First, *"what impact does antenatal exposure to alcohol and/or other drug use have on the developing fetus within the context of other risk factors?"* For instance, is the mother using alcohol as well as smoking cigarettes during her pregnancy, and is she depressed and, therefore, not eating or sleeping properly. Individually, all of these factors have been shown to have an adverse affect on the developing fetus; collectively, there may be additive or interactive effects on the health and integrity of the fetus. In addition, the drug-exposed fetus may result in an infant that is growth retarded at birth or born preterm. This physically vulnerable infant may then be exposed to a less than optimal postnatal environment that includes a mother who continues to be depressed, continues to use alcohol and/or other drugs and may have to manage three or four other siblings. Therefore, the second question becomes, *"what impact does a less than optimal environment have on the health and development of a child who is already vulnerable at birth?"*

Of particular interest to this report was the knowledge and attitudes of health professionals surrounding not only alcohol use but the use of other drugs individually or in combination, and their effects on the perinatal outcomes of exposed infants.

1.5. Health professionals' knowledge, practice and opinions about alcohol and other drug use during pregnancy

International studies

An Australian study that surveyed health care professionals' about their knowledge, practice and opinions regarding fetal alcohol syndrome (FAS) and alcohol use during pregnancy found an overall need for more educational materials for themselves and their clients (Payne et al., 2005). Of the 1,143 health professionals surveyed only 12% identified all four essential diagnostic features of FAS. Most (95%) had never diagnosed FAS, although 82% believed that making a diagnosis of FAS might improve treatment plans and 85% agreed FAS was preventable, 53% said the diagnosis might be stigmatising. Only 2% felt very prepared to deal with FAS and most wanted information for themselves and their clients. Of the 659 health professionals in this study that were caring for pregnant women, only 45% routinely asked about alcohol use in pregnancy, only 25% routinely provided information on the consequences of alcohol use in pregnancy and only 13% provided NHMRC guidelines on alcohol consumption in pregnancy (Payne et al., 2005). In a further survey of Australian paediatricians, researchers reported that 88% of their sample acknowledged that FAS was preventable and that they found it easy to ask pregnant women about their alcohol consumption. The majority of paediatricians (87%) also reported that they routinely advised pregnant women to consider not drinking alcohol at all during pregnancy, and this was the only advice they offered. However, only 9% reported they provided advice consistent with the National Health and Medical Research Council (NHMRC) guidelines, and over 89% reported they hadn't read the guidelines themselves.

A further study carried out in Los Angeles and Orange Counties, California examined a group of women participating in a Women, Infants, and Children's program who reported drinking alcohol post-pregnancy recognition (O'Connor & Whaley, 2005). The purpose of this study was to examine the extent to which women were counselled by their health care

providers to stop drinking during pregnancy and to describe the characteristics of women who received advice. A second purpose was to identify variables associated with post-conception drinking in this population of low-income minority women. They found that despite the fact that many women in their sample did report being told to stop drinking, the health care professionals' advice proved to be a poor predictor of alcohol consumption in that there was no difference in the levels of alcohol consumed between those women who received advice and those who did not receive advice. They suggested these results were an indication that although health care providers are making some attempts to advise low-income minority women about the dangers of alcohol consumption during pregnancy, there are other important factors associated with drinking behaviour that need to be addressed for women to benefit from that advice. Of particular concern in this sample was the finding that 62.5% were continuing to drink at levels associated with potential harm for the fetus, 46% were drinking two drinks or more per drinking occasion and a high number of depressive symptoms was reported by 60% of the participants.

A qualitative study carried out in the U.S. compared health care providers' approaches to addressing four different risks during pregnancy, alcohol, tobacco, drugs and domestic violence. They found the following differences in how health professionals approach each risk: (1) an ambivalence about abstinence messages for alcohol; (2) a relative ease and confidence about assessing smoking and counselling to reduce smoking in comparison to other drugs; (3) disparities across practice settings for toxicology screening for drugs; and (4) discomfort and pessimism with domestic violence (Herzig et al., 2006). Many health care professionals in this study disagreed with current recommendations of abstinence; nearly all expressed some tension between what they recommend to family, friends, and some worried patients, and their official stance with all other patients. Herzig et al. (2006) reported their results were consistent with other quantitative studies in that health care professionals working with pregnant women need current information about specific alcohol risks (Diekman et al., 2000), and that primary care counselling for alcohol is inconsistent and applied in a biased way which often reflects the socio-economic or ethnic status of the patient (Arndt, Schultz, Turvey, & Petersen, 2002).

New Zealand studies

In 1995 Leversha and Marks reported the results of a study examining the knowledge and attitudes of New Zealand doctors surrounding the use of alcohol during pregnancy (Leversha & Marks, 1995). They sent out questionnaires to all paediatricians, obstetricians and a random sample of general practitioners throughout New Zealand. Results of this study found that 89% of obstetricians and 84% of general practitioners reported they felt sufficiently knowledgeable to inform people of the risks of alcohol consumption during pregnancy. However, the respondents' perception of public awareness of the risks of alcohol consumption in pregnancy was judged to be poor and over 90% believed awareness needed to improve. As to their attitudes and opinions towards alcohol use during pregnancy, all of the respondents felt there should be a limit on alcohol consumption in pregnancy. However, quite often their reported clinical practice did not reflect beliefs. Of the sample that responded to this questionnaire, only 46% recommended abstinence and only 59% of obstetricians and 40% of general practitioners routinely enquired about alcohol consumption at the first antenatal contact.

More recently, a report prepared for the Alcohol Advisory Council summarized a survey of 421 midwives who responded to a questionnaire about their clients' pattern of alcohol consumption and the midwives awareness of and attitudes toward alcohol intake during pregnancy (Mathew et al., 2001). It also aimed to assess the prevalence of various symptoms associated with in utero alcohol exposure in infants. Ninety-eight percent of the midwives in this study reported they had heard of FAS and 77% reported they had heard of other alcohol related effects. However, the study did not go on to inquire as to their specific knowledge of the developmental effects on the fetus, neonate or child. Therefore, it was not clear whether this group of midwives understood the potential risks for the exposed child.

To address the midwives opinions and attitudes toward drinking during pregnancy the survey asked whether they would drink during their own pregnancy or abstain totally. To address their professional attitudes toward drinking during pregnancy, they asked whether they would advocate drinking during specific trimesters. Sixty-five percent of the midwives said they would totally abstain from alcohol compared to 32% who thought they would drink some alcohol in their own pregnancy. The authors of this report found that midwives personal opinions of whether they would abstain from drinking during their pregnancy were associated with their professional attitude toward alcohol use during pregnancy. Midwives who reported

they would abstain from drinking during their pregnancy were significantly more likely to advocate total abstinence in all three trimesters of pregnancy than midwives who reported they would drink. Midwives who reported they would drink during pregnancy, however, were more likely to advocate abstinence in the first trimester than in the second and third trimesters.

A particularly important finding of this study was that 93% of midwives wanted more general education around alcohol use during pregnancy, 91% wanted to receive more information about how much alcohol is safe, 78% wanted to receive training in effectively communicating alcohol risks and 93% wanted to receive training to recognise the early symptoms of the effects of fetal alcohol effects.

Although, these New Zealand studies provide an indication of the knowledge, opinions and practices of health care professionals around the use of alcohol during pregnancy, it is clear that health care professionals were not asking all of their clients/patients about their clients' individual patterns of use. Nor were they inquiring about the use of other drugs during their pregnancy. We now know that alcohol quite often is used in combination with other drugs such as smoking cigarettes or cannabis, and that drugs used in combinations such as this can act in ways that may increase the risk to the fetus beyond the effects of exposure to a single drug. Further studies in the U.S. have looked at some of the circumstances and barriers to discussing alcohol use with women of child-bearing age. These studies can provide some insight into not only the extent to which women are counselled to quit using alcohol during pregnancy, but some of the barriers to screening women for alcohol use and subsequently providing accurate information around alcohol use.

A more recent qualitative study used focus groups to explore what health professionals in the Auckland region know and do about alcohol and drug use during pregnancy. Focus groups were made up of health professionals who provided maternity care or health care for women of childbearing age. This research was carried out in the department of Psychological Medicine in collaboration with Alcohol Healthwatch and has informed the design of the present research.

A summary of these findings are as follows: (1) Most of the Health professionals in the focus groups routinely asked whether women smoked, however, only a few routinely asked about alcohol and other drug use. (2) Participants in the focus groups were often hesitant to inquire about alcohol and drug use if they perceived their client and/or patient was from a higher socio-economic class or an ethnic group they judged was unlikely to use alcohol or

other drugs. Two ethnic groups they reported they would *not* ask were Middle Eastern and Asian. (3) If they did ask their clients about alcohol or drug use, they usually delayed this until they felt they had established a rapport with the client, which might be well into the second trimester. (4) None of the participants reported using a standardised procedure or questionnaire to screen for alcohol or drug use. Some felt the information they obtained about alcohol and drug use from such a questionnaire would not be valid. (5) Most participants reported their knowledge of the effects of alcohol and other drug use on the developing fetus was incomplete. Of particular importance to the midwives was the inclusion of current, "standardised information" that provided skills in interviewing women about drug use as well as up-to-date knowledge about the effects on the developing child.

Overall, the results of the qualitative content of these focus groups suggested two main issues responsible for the ambivalence of the health professionals' attitudes towards discussing alcohol and other drug use with their clients: the *first* issue was an incomplete knowledge about the effects of alcohol and drug use during pregnancy on the developing fetus and child; and the *second* issue was around "mixed messages" about the effects of alcohol and other drugs on the fetus and the developing child. They reported these "mixed messages" came from the media, the internet and from anecdotal comments made by family members of their clients who reported they used alcohol throughout their pregnancy and their children turned out "fine". Both of these issues can be addressed through better education of health professionals about the effects of alcohol and drug use on the fetus and developing child. In addition, a variety of easily accessible resources need to be made available to women who are considering getting pregnant or who are pregnant. These resources need to be in a variety of forms such as CDs, written pamphlets, and websites that give consistent up-to-date information and recommendations.

2. SUMMARY AND RATIONALE

There is a great deal of research that has found that consuming alcohol and smoking cigarettes can be harmful to a woman's health. Of particular concern is the widespread use of alcohol and tobacco by women of childbearing age and women who are pregnant. Less is know about the effects of cannabis, opiates and stimulants such as methamphetamine and party drugs such as Ecstasy. However, it has become clear that New Zealand women of childbearing age are using these drugs, and emerging evidence suggests that these drugs may affect fetal and child development.

Health professionals who are providing healthcare to women of childbearing age are uniquely positioned to provide information about the health risks around the use of alcohol, tobacco and other "recreational or psychoactive drugs". For those women who are pregnant and continuing to use alcohol, tobacco and other drugs during their pregnancy, health professionals have an opportunity to routinely screen for continued use, offer brief interventions and/or referrals to specialist teams that may reduce the harm to the mother and her infant.

However, the literature to date suggests that a number of obstacles may prevent health professionals from discussing alcohol, tobacco and other drug use with women of childbearing age. Some of these obstacles are concerned with the health professionals' lack of knowledge about the effects of these substances, others are related to insufficient resources available for patients that accurately reflect the effects of alcohol and other drug use, and finally, some are a perceived need by the health professional for more training to assess the risk of using alcohol and/or other drugs in their clinical population.

A handful of studies have investigated the knowledge, opinions and practice of health professionals around alcohol, tobacco and other drug use, however, a number of these were qualitative studies and the findings cannot be generalized to the wider population of healthcare providers. In addition, most studies have been carried out overseas where the maternity care for women is often provided by obstetricians. In contrast, approximately 75% of maternity care in New Zealand is provided by midwives. The current study was designed to address the above limitations in the extant literature and provide a clearer picture of the knowledge, opinions and practice around alcohol, tobacco and other drug use in women of childbearing age.

3. OBJECTIVES AND AIMS

The present study was designed to address three main objectives. These objectives and their related aims are as follows:

The first objective was to determine the current practice of healthcare professionals around alcohol and other drug use when treating women of childbearing age. The specific aims were:

- To determine whether health professionals routinely screened for alcohol, tobacco, cannabis, opiate and/or methamphetamine use.
- To determine whether health professionals use a standardised screening instrument.
- To investigate how health professionals manage women who report they are using alcohol, tobacco and other drugs.
- To identify potential barriers to screening and effectively managing the care of women who report they use alcohol tobacco and other drugs.

The second objective was to investigate the knowledge and opinions of health professionals around the use of alcohol, tobacco and other drugs during pregnancy. The specific aims related to this objective were:

- To determine the knowledge and opinions of health professionals about the effects of substance use during pregnancy.
- To investigate the knowledge of Fetal Alcohol Spectrum Disorders and the diagnostic criteria for Fetal Alcohol Syndrome.

The third objective was to identify the perceived needs of health professionals to manage women of childbearing age who report they are using alcohol, tobacco and other drugs. The specific aims of this objective were:

- To determine the need for training about the developmental effects of alcohol, tobacco and other drug use.
- To identify the printed resources and clinical guidelines required to better disseminate information to the health professionals' patient population.

- To determine the need of a standardised screening instrument to assess the risk of alcohol, tobacco and other drug use.
- To investigate the perceived need of training to assess the risk of alcohol and other drug use in patient populations.

4. METHOD

4.1. Participants

All participants were recruited between August 2008 and January 2009 from the greater Auckland region. The majority of health professionals who agreed to participate were from the three main District Health Boards (DHB), Waitemata, Auckland and Counties Manukau. A smaller percentage of participants came from the Waikato and Northland District Health Boards.

To ensure a representative sample, health professionals who were working in both the major hospitals as well as those working in the community in private or independent practices were approached. The major hospitals included Middlemore in the Counties Manukau DHB, North Shore and Waitakere Hospitals in the Waitemata DHB, Auckland City Hospital in the Auckland DHB and Kawakawa and Whangarei Hospitals in the Northland DHB. Those working in the community included general practitioners, practice nurses, independent midwives, obstetricians involved in maternity care and fertility clinics, and those health professionals working in family planning, and sexual health clinics.

Prior to approaching participants, a list was compiled of all the above health professionals using listings in the Auckland regional phone book of Registered Medical Practitioners and Medical Centres. In addition, internet searches for general and independent midwife practitioners in the Auckland region and in Northland were carried out. The listings on the internet and the listings from the Auckland phone book were merged to form a list that was then organised into geographic areas.

4.2. Interview Process

Prior to approaching health professionals about their participation in this study, the research protocol and the questionnaire were reviewed and approved by the University of Auckland Ethics Committee.

Eight interviewers with experience in conducting research with health professionals were trained to carry out the interviews by the Principal Investigator. Each interviewer was given a list of health professionals that practiced in specific regions of the community that

they could approach to participate in the study. In addition, individual researchers were assigned to approach midwives employed in maternity services in the targeted hospitals. This procedure allowed us to obtain a representative sample of participants that included all geographic regions in the greater Auckland area and parts of Northland. This also allowed us to obtain a representative sample of health professionals who worked in both the community and in hospital maternity care. Finally, this procedure allowed us to maintain a two-thirds, one-third ratio of health professionals whose predominant clinical practice involved women who were pregnant and women of childbearing age, respectively.

When the interviewer met with the healthcare professional the questionnaire and the study was explained and informed consent was obtained in writing. Interviews were then conducted face-to-face, or the questionnaire was left with the healthcare professional to complete in their own time. In a few instances the interview was carried out over the phone. On completion of the questionnaire the participants were offered a $15.00 Gift Card in appreciation of their contribution to the study.

Trends for participants' responses on a number of the key questions in this study were identified after the collection of 120 questionnaires were entered into the database. These trends did not change after 200 questionnaires had been entered, therefore, data collection was terminated after 241 questionnaires were obtained.

Out of the 241 health professionals who participated in the study, two-thirds were health professionals whose predominant clinical practice was involved with maternity care. These were mainly midwives employed in hospital maternity services, or independent midwives. One-third were health professionals who provided healthcare to women of childbearing age and were made up of general practitioners, practice nurses, and health professionals working in family planning clinics and sexual health clinics (Table 1).

All questionnaires and consent forms were returned to the Principal Investigator. At that time the Principal Investigator checked to verify that all questions were completed correctly. Incomplete questionnaires were returned to the interviewers so that unanswered questions could be completed before being entered into the database. The consent forms were filed separately in locked cabinets in the Department of Psychological Medicine so that confidentiality as to individual participant data was maintained.

4.3. Questionnaire Development

The questionnaire used in this study was informed by the results of a qualitative study carried out in Auckland in 2007 (Wouldes, 2008) and studies in the literature investigating health professionals' knowledge, practice and opinions about alcohol and other drug consumption during pregnancy (Gilbert et al., 2007; Herzig et al., 2006; O'Connor & Whaley, 2005; Payne et al., 2005; Taylor et al., 2007). The questionnaire was developed in consultation with Alcohol Healthwatch with input from health professionals working in maternity care. The questionnaire had two types of response categories that included the following: (1) "yes", "no", "don't know"; and, (2) likert scales such as, "Never", "Unlikely", "Likely", "Most Likely", "Always".

Included in the questionnaire were the characteristics of the health professional (sex, occupation and site of clinical practice, date of clinical registration and past and current use of alcohol, tobacco and other drugs) and the characteristics of the women they managed in their clinical practice. The knowledge, attitudes and practice of health professionals about alcohol, tobacco and other drug use by women of childbearing age and by women during pregnancy were the main focus of the questionnaire and included questions about the following: (1) routine screening for alcohol, tobacco and other drug use; (2) the use and/or knowledge of standardised screeners; (3) what health professionals do when a patient reports alcohol, tobacco or other drug use during pregnancy; (4) barriers to screening for alcohol, tobacco and other drugs; (5) general knowledge about alcohol use during pregnancy, including Fetal Alcohol Spectrum Disorder and the diagnosis for Fetal Alcohol Syndrome; (6) general knowledge about tobacco, cannabis, opiates and methamphetamine; and (7) the perceived need by health professionals for training, alcohol and other drug resources and a short standardised questionnaire.

The questionnaire was piloted to determine the length of time required for completion during face-to-face interviews. It was also piloted as a self-report questionnaire for those who preferred to answer the questions in their own time or in private. The results of these pilots demonstrated that the questionnaire was suitable for both face-to-face interviews and as a self-report instrument.

5. RESULTS

5.1. Statistical Analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) version 16.0.

Exploratory data analysis

Exploratory data analyses were performed visually using boxplots and histograms and means, medians and ranges were examined to test for the presence of outliers, and missing values in the data set. Initially, any scores falling outside of the possible range for each question and or variable were checked against original scoring sheets. If necessary, these scores were re-entered to ensure accurate data entry.

Boxplots were then examined to identify potential outliers. Any identified outliers were, again, checked against original scoring sheets to protect against data entry errors.

As different interviewers may potentially generate different responses to these questionnaires a variable with the interviewer's initials was created. A further variable was created that identified whether the questionnaire was completed face-to-face or self-completed. Crosstabs between each of these variables and a number of responses were computed to determine whether there was any association between the interviewer and a bias to respond in a particular way. These analyses were also completed to determine whether a pattern of responses was associated with the way in which the questionnaire data was obtained. No trends were identified that were associated with either the individual interviewer or whether the interview was completed face-to-face, over the telephone or by the respondent in private.

Likert scales that used "Never", "Unlikely", "Likely", "Most Likely", "Always" were presented using these categories in Tables. Graphically they were collapsed into two categories. The first category was made up of "Never", "Unlikely" and "Likely" and is graphically presented as "Less Likely". The second category was made up of "Most Likely" and "Always" and is graphically presented as "More Likely". The terms "Less Likely" and "More Likely" were used to discuss results of the likert questions.

Descriptive Statistics

Data analysis for this research was predominantly descriptive. The Frequencies function of SPSS was used to identify the percentage of total responses for individual questions. Means with standard deviations and medians with ranges are reported for

continuous variables where appropriate. Crosstabs was used to compare health professionals who spend 25% or *more* of their work week providing maternity care with those who spend *less* than 25% of their work week providing maternity care on two questions. The first question addressed the routine screening of alcohol, tobacco and other drugs, and the second compared these groups on their knowledge of the diagnostic criteria for Fetal Alcohol Syndrome.

5.2. Characteristics of Study Participants

Table 1 provides a description of the health professionals who participated in this research. It can be seen from this table that a broad range of participants who provide antenatal and general health care to women of childbearing age in the greater Auckland area are represented in this sample. Women made up the majority of respondents (93%) and a wide range of clinical professions including midwives, obstetricians, registered nurses, and general practitioners are represented. A substantial proportion of the sample reported they had consumed alcohol (96.6%), smoked cigarettes (52.7%) and used other recreational drugs (26.2%) in the past. Although 74.3% reported continued use of alcohol, most no longer smoked cigarettes (92.4%) or used any other recreational drugs. A wide range of ethnic groups were represented with the largest proportion of participants being New Zealand Pakeha (66.8%) followed by those who identified as being European (9.5%) and from the United Kingdom (9.5%). Slightly Less than two-thirds of the sample (64%) were educated in New Zealand and on average had completed their clinical training and registration within the past 18 years (M = 17.83, SD = 11.18).

Approximately two-thirds of the clinicians (68%) who participated in this study were midwives who provided antenatal and/or postnatal care to mothers and their babies. The remaining participants were clinicians who provided healthcare and advice to women of childbearing age. These included fertility, family planning, and sexual health clinics and nurses and doctors in general practice. The clinical environment that was served by these clinicians was well distributed between the three main District Health Boards in the greater Auckland region as well as Northland and Waikato DHBs.

Over one-third of the health professionals that took part in this research were educated outside of New Zealand. Nearly 10% were trained in the United Kingdom and a further 10%

in Europe. The number of years on average since participants had completed their training was 18 years and ranged from within the past 12 months to 41 years.

Table 1. *Description of health professionals who participated in the study.*

Characteristics of Participants	**Percent (*N*)**
Gender of Clinician	
Female	89.2 (215)
Clinician's Alcohol and/or Drug Use	
Ever used alcohol	96.6 (229)
Currently using alcohol	74.3 (176)
Ever smoked cigarettes	52.7 (125)
Currently smoking cigarettes	7.6 (18)
Ever used other drugs	26.2 (62)
Currently using other drugs	0.4 (1)
Self-Identified Ethnicity	
NZ Maori and NZ Maori/NZ Pakeha	5.4 (13)
NZ Pakeha	66.4 (160)
Pacific Islands and NZ Pacific Islands/NZ Pakeha	3.0 (7)
Asian and NZ Pakeha/Asian	6.2 (15)
European	9.5 (23)
United Kingdom (Irish, Scottish, British, Welsh)	9.5 (23)
Clinical Registration	
Mean years since clinical registration (SD)	18.24 (11.36)
Median years since clinical registration (Range)	18.00 (0 - 41)
Percentage educated in New Zealand	64.70 (156)
Clinical Environment	
Hospital Maternity	33.6 (81)
Independent Midwife Practice	26.1 (63)
Hospital Midwife/Independent Midwife Practice	8.0 (19)
General Practice	22.4 (54)
Private Consultant Practice (Obstetrics)	3.3(8)
Private Consultant (Fertility)	0.8 (2)
Family Planning Clinic	2.4 (6)
Sexual Health Clinic	3.3 (8)
Clinical Affiliation	
Midwife	59.8 (144)
Obstetrician	4.6 (11)
General Practitioner	14.9 (36)
Registered Nurse	8.7 (21)
Practice Nurse	7.5 (18)
Registrar, Medical	1.7 (4)
Other	2.9 (7)
District Health Board of Clinical Practice	
Auckland	38.6 (93)
Waitemata	36.9 (89)
Counties Manukau	13.7 (33)
Northland	5.8 (14)
Auckland, Waitemata, Counties Manukau, Waikato	4.9 (12)

5.3. Characteristics of Patient Population Managed by Study Participants

Table 2 shows the range of ethnic groups served by the respondents and the proportion of time clinicians spent either treating women of childbearing age or providing antenatal and postnatal care. Although there was a wide variability, the women seen in these clinical populations were largely representative of the proportion of the women who are having babies in the Auckland region and women of childbearing age. Approximately 50% of the clinical population was NZ Pakeha. NZ Maori (16%) and Pacific Islands (15%) women were equally represented followed by Asian women (12%). Fifty percent of the clinicians (50.2%) reported spending 100% of their typical work-week either providing antenatal and postnatal care or treating women of childbearing age. Clinicians who managed antenatal and postnatal care treated approximately 18 women per week and clinicians who provided health care to women of childbearing age were more likely to see on average 27 women per week. However, there was a wide variability for both which was mainly dependent on the clinical setting. Midwives in maternity services often had contact with many more women than midwives providing antenatal and postnatal care. GP practices and family planning clinics were also more likely to see more women than obstetric and fertility clinics.

Table 2. *Description of clinical population treated by study participants.*

Characteristics of Clinical Population	**Percent**
Percentage Ethnicity of clinical population	
NZ Maori	
Mean % NZ Maori (SD)	16.47 (17.83)
Median % NZ Maori (Range)	10.00 (0 – 100)
NZ Pakeha	
Mean (SD)	49.38 (26.73)
Median (Range)	58.00 (0 – 95)
NZ Pacific	
Mean (SD)	14.86 (16.97)
Median (Range)	10.00 (0 – 80)
Asian	
Mean (SD)	11.91 (11.72)
Median (Range)	10.00 (0 – 90)
Other	
Mean (SD)	6.40 (9.94)
Median (Range)	1.00 (0 – 63)

Characteristics of Clinical Population	Percent
% of Typical week spent treating women of childbearing age	
100% (*N*) of week	50.20 (120)
75% (*N*) of week or more	61.10 (148)
50% (*N*) of week or more	67.10 (174)
25% (*N*) of week or more	81.80 (197)
Number of women seen clinically – childbearing age (weekly)	
Mean (SD)	27.65 (16.74)
Median (Range)	25.00 (0 – 98)
Number of pregnant women seen clinically (weekly)	
Mean (SD)	17.46 (16.68)
Median (Range)	15.00 (0 – 100)

5.4. Screening for Alcohol, Tobacco and Other Drug Use

The percentage of health professionals who ask their clients or patients about the use of psychoactive drugs is reported in Table 3 and graphically represented in Figure 3. It can be seen from this table and figure that a large percentage of the participants routinely ask about the use of tobacco (88.0%) and alcohol (78.4%). In contrast, a much smaller proportion of health professionals routinely screened for other psychoactive drugs. Routinely screening for cannabis (52.3%) appeared to be more prevalent than routine screening for opiates (34.0%) and methamphetamine (31.1%). Notable were the comments by many of the health professionals that in their practice routine screening usually only involved asking one general question about other drug use which was, *"do you use any other recreational drugs"*, not specific inquiries about any particular drug. In addition, there were large proportions of these clinicians who reported "never" asking about methadone (49.4%), opiates (29.5%), or methamphetamine use (32%).

Table 3. *Percentage of health professionals who routinely ask about alcohol, tobacco or other drug use.*

Do you ask your clients/patients whether they are currently and/or have used the following.

Substance	Routinely Ask % (*N*)	Sometimes Ask % (*N*)	Never Ask % (*N*)
Tobacco	88.0 (212)	10.8 (26)	1.2 (3)
Alcohol	78.4 (189)	18.3 (44)	3.3 (8)
Cannabis	52.3 (126)	35.3 (85)	12.4 (30)
Heroin, MSTI, or Homebake	34.0 (82)	36.5 (88)	29.5 (71)
Methadone	12.9 (31)	37.8 (91)	49.4 (119)
Methamphetamine (P, Pure, Crystal Meths)	31.1 (75)	36.9 (89)	32.0 (77)

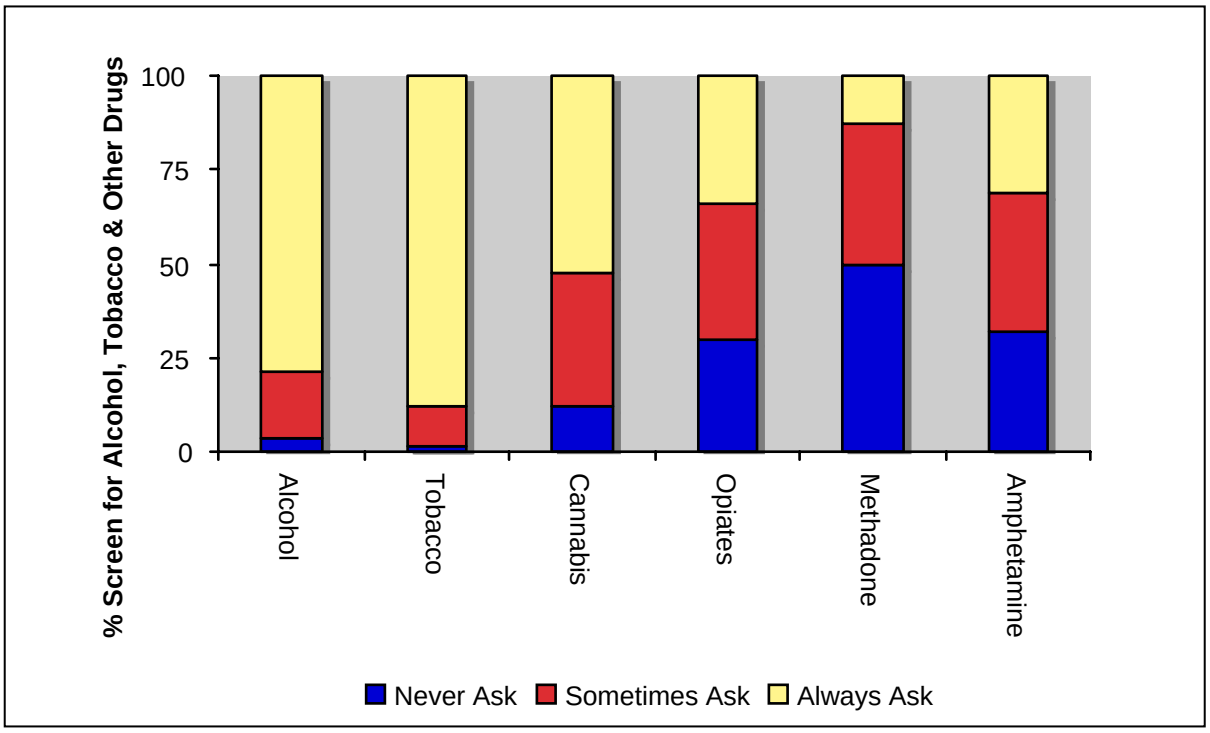

Figure 1. Percentage of health professionals who screen for alcohol, tobacco and other drug use. Data are presented as percentage of health professionals who responded to questions regarding screening.

5.5. Screening for Alcohol, Tobacco and Other Drug Use During Pregnancy

Figure 4 provides a comparison of health professionals who spend less than 25% of their time providing maternity care for women with those spending 25% or more of their time providing maternity care. It is apparent from this figure that those who spend more time providing maternity care are more likely to routinely screen for all drugs. This difference was not significant for alcohol, tobacco or methadone. However, significantly more health professionals who spent a greater percentage of their time providing maternity care reported that they routinely screened for opiates (39% vs 15%), cannabis (59% vs 25%) and methamphetamine (36% vs 15%). However, these results should be interpreted with caution as many of the health professionals reported they did not ask about specific drugs such as heroin (street names MSTI, homebake) or methamphetamine (street names "P", Pure, speed). They usually just asked about "*other recreational drug use*" or "*other medications"*.

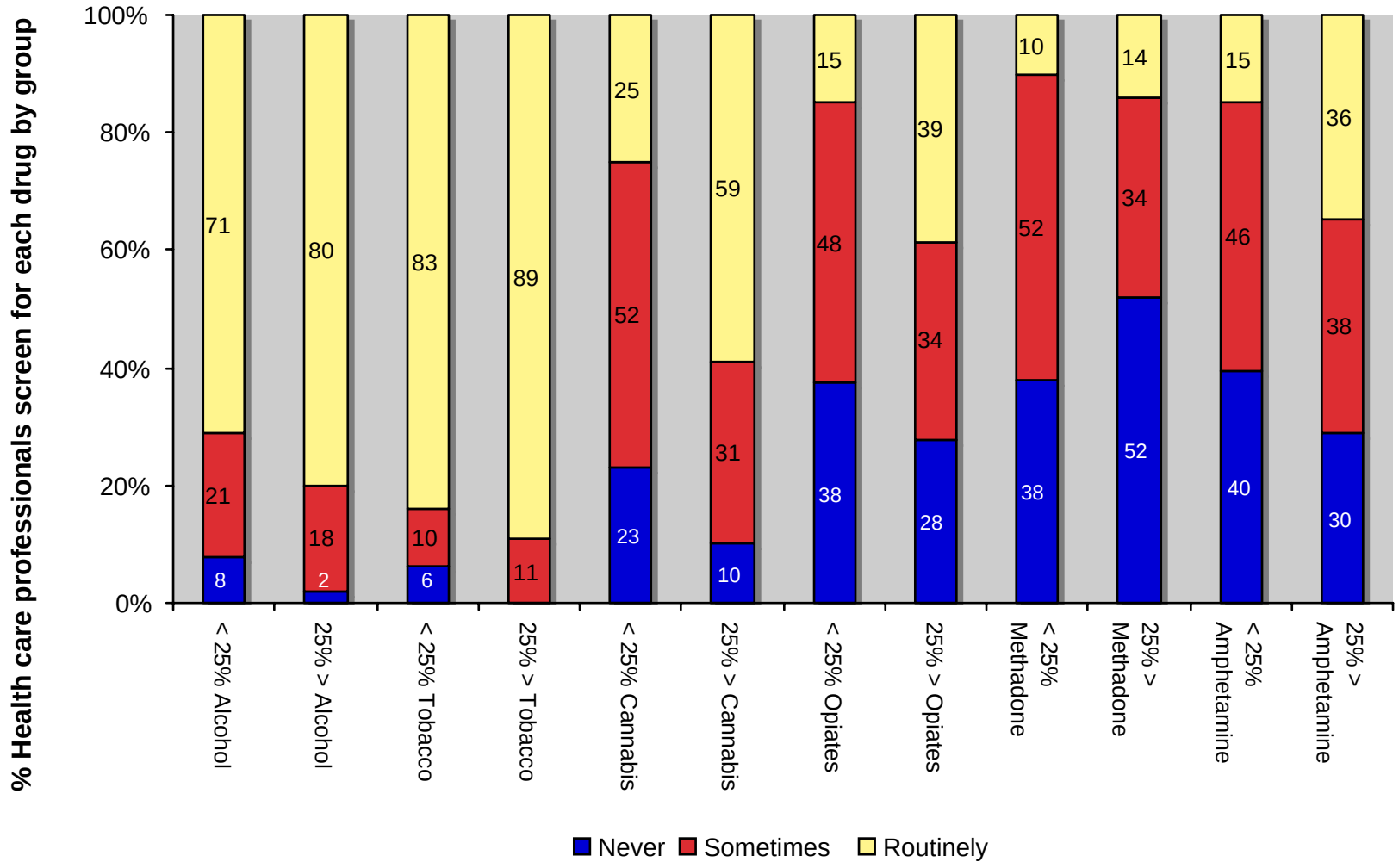

Figure 2. Comparison of health professionals who spend less than 25% of their work week providing maternity care with those who spend 25% or more of their time. Data are the percentage of responses for each group and each drug.

As the negative effects of alcohol, tobacco and other drug exposure on the developing child have been shown to be associated with the timing and frequency of exposure, it is important to know when health professionals providing antenatal care first ask about the use of these substances. It is also important to know whether the risk of smoking, consuming alcohol and using other drugs during the woman's pregnancy is assessed. Risk assessment may include a short standardised questionnaire that asks about the frequency of use or whether the use of alcohol, tobacco or other substances is interfering with the woman's health, employment, or relationships.

Table 4 shows that health professionals generally asked about alcohol (81.4%), tobacco (82.5%) and other drug use (77.3%) in the first trimester. However, many clinicians reported that "when" they first asked about alcohol and other drug use depended on when the woman presented for antenatal care, which in many cases may be later than the first trimester and as late as the third trimester.

Less than one-third of the clinicians reported using a standardised questionnaire. Those who did report using a standardised questionnaire often reported this was simply a *standardised maternity questionnaire* that only included one or two "yes/no" questions about alcohol or tobacco use. These questionnaires did not include questions around the frequency, quantity or timing of use.

Table 4. *Trimester that health professionals ask about alcohol, tobacco and other drug use and percentage that use a standardised questionnaire.*

In which trimester do you first ask about alcohol, tobacco and other psychoactive drug use.

Trimester	**1st % (*N*)**	**2nd % (*N*)**	**3rd % (*N*)**
Alcohol use	91.3 (209)	3.5 (8)	2.2 (5)
Smoke cigarettes	92.1 (211)	3.1 (7)	2.1 (5)
Use other psychoactive drugs	89.1 (197)	1.8 (4)	1.4 (3)
% Currently use a standardised questionnaire	29.2 (68)		

5.6. Health Professionals' Use and Knowledge of Standardised Screeners

The percentage of respondents who were familiar with standardised screeners that have been validated and shown to reliably identify problems related to alcohol and psychoactive drug use are presented in Table 5. It is clear from the data in this table that very few clinicians currently use or have ever used any of the brief standardised screeners that have been shown to be effective in determining the extent of the risk from continued alcohol and other drug use. A total of 16 (6.6%) respondents reported currently using one of these screeners.

Taken together the results of the questions on screening suggest that a large proportion of health professionals are asking whether women use alcohol and tobacco, and to a much lesser extent cannabis, opiates and methamphetamine, however, few are assessing the extent or frequency of use in a systematic way.

Table 5. *Percentage of health professionals who were familiar with standardised questionnaires measuring alcohol and other drug use risks.*

Have you ever heard of or used any of the following standardised screeners for alcohol and/or drug use?

Standardised Screener	Use Now % (*N*)	Have Used % (*N*)	Know Of % (*N*)
T-ACE	1.2 (3)	0.4 (1)	5.4 (13)
TWEAK	0.4 (1)	0.8 (2)	5.0 (12)
MAST	0.4 (1)	1.7 (4)	4.6 (11)
S-MAST	0.0 (0)	0.8 (2)	3.3 (8)
CAGE	0.8 (2)	4.1 (10)	8.3 (20)
AUDIT	2.1 (5)	2.5 (6)	5.8 (14)
4Ps	0.4 (1)	0.8 (2)	8.3 (20)
5Ps	0.4 (1)	0.4 (1)	5.4 (1)
NET	0.8 (2)	0.4 (1)	2.1 (5)

5.7. Health Professionals' Management of Women Who Report Using Alcohol or Other Drugs During Pregnancy

A description of the manner in which health professionals manage women who reported they were consuming alcohol or using other drugs during their pregnancy is reported in Table 6 and Figure 5. Table 6 reports the percentage of participants and number who responded to these questions as "Never", "Unlikely", "Likely", "Very Likely" or "Always". Figure 6 presents the data collapsed into two dichotomous categories as described in the Statistics section. The dichotomous categories of "Less Likely" and "More Likely" will be used to discuss these findings.

It is clear from the data represented in Figure 5 that health professionals tend to manage women who report alcohol or other drug use in a similar way. For instance, 80% of the clinicians reported they were more likely to ask in-depth questions about the pattern and frequency of alcohol and other drug use. Almost two-thirds of the clinicians reported they were more likely to continue to monitor alcohol (59.2%) and other drug use (66.7%) throughout a woman's pregnancy.

However, a higher proportion of health professionals reported they were more likely to refer women to specialised maternity clinics if they reported using other drugs (78.1%) than if they reported using alcohol (55.9%). These data also suggest that a substantial percentage of healthcare professionals who provide antenatal care to women who report alcohol (44.1%) or other drug use (21.9%) were likely to continue to be managed by their primary Lead Maternity Carer (LMC). This finding is important to educators who are training health professionals and for the allocation of resources to manage women who continue to use alcohol and other drugs during pregnancy.

Respondents in this study reported they would be less likely to offer women who report alcohol use (61.8%) a referral for counselling than drug use (78.1%). More clinician's reported they would be more likely to provide written materials about the effects of using alcohol (66.0%) during pregnancy than the effects of using other drugs (56.3%) during pregnancy. Respondents often reported this was due to the lack of written material in their clinical environment, rather than a lack of willingness to provide them. Despite the availability of written material, it appears that one-third of health professionals were less likely, to provide any written material about alcohol use during pregnancy and nearly 50%

reported being less likely to provide any written material about the risk of using other drugs during pregnancy (Figure 5).

Although, more and more people are using the internet to access information about a variety of topics, it is apparent that only a small proportion of health professionals are referring patients to websites that provide information about the effects of alcohol and drug use on the health of the mother and the developing child. Over two-thirds of the participants reported they would be less likely to refer their patients to websites for further information about alcohol (77.3%) and other drug use (62.3%) during pregnancy (Figure 5).

Overall, it appears that a higher proportion of health professionals in this study reported they were more likely to monitor, refer and offer counselling to women who reported they were using other drugs than if they reported using alcohol.

Table 6. *Description of how health professionals manage women who report continuing to use alcohol and other drugs during pregnancy. Data are presented as percentage of total sample that responded and the number.*

If a client/patient reports they are continuing to use alcohol or drugs during their pregnancy how likely are you to do the following?

ALCOHOL	**Never % (*N*)**	**Unlikely % (*N*)**	**Likely % (*N*)**	**Very Likely % (*N*)**	**Always % (*N*)**
Ask more in-depth questions about the woman's pattern and frequency of alcohol use.	2.5 (6)	3.4 (8)	12.6 (30)	23.9 (57)	56.3 (134)
Monitor the woman's pattern and frequency of alcohol use throughout the pregnancy.	6.7 (16)	19.3 (46)	13.4 (32)	23.5 (56)	35.7 (85)
Refer the woman to a specialty team that manages women who are alcohol dependent during pregnancy.	5.5 (13)	13.9 (33)	23.5 (56)	27.7 (66)	28.2 (67)
Offer the woman a referral to a counsellor or to Community Alcohol and Drug Services (CADS).	5.5 (13)	10.1 (24)	21.4 (51)	31.1 (74)	30.7 (73)
Provide written material about alcohol use during pregnancy.	7.1 (17)	6.7 (16)	18.9 (45)	24.4 (58)	41.6 (99)
Provide information about useful websites where women can obtain more information about alcohol use during pregnancy.	18.5 (44)	29.8 (71)	18.9 (45)	21.4 (51)	10.1 (24)
OTHER PSYCHOACTIVE DRUGS INCLUDING OPIOIDS AND METHAMPHETAMINE					
Ask more in-depth questions about the woman's pattern and frequency of drug use.	3.0 (7)	3.4 (8)	11.8 (28)	27.0 (64)	53.6 (127)
Monitor the woman's pattern and frequency of drug use throughout the pregnancy.	8.4 (20)	14.3 (34)	9.3 (22)	22.4 (53)	44.3 (105)
Refer the woman to a specialty team that manages women who are drug dependent during pregnancy.	3.8 (9)	5.1 (12)	11.8 (28)	30.0 (71)	48.1 (114)
Offer the woman a referral to a counsellor or Community Alcohol and Drug Services (CADS).	4.6 (11)	4.6 (11)	14.7 (35)	27.3 (65)	47.5 (113)
Provide written material about drug use during pregnancy.	10.5 (25)	10.9 (26)	21.0 (50)	26.5 (63)	29.8 (71)
Provide information about useful websites where women can obtain more information about drug use during pregnancy.	16.8 (40)	31.9 (76)	16.0 (38)	23.1 (55)	10.9 (26)

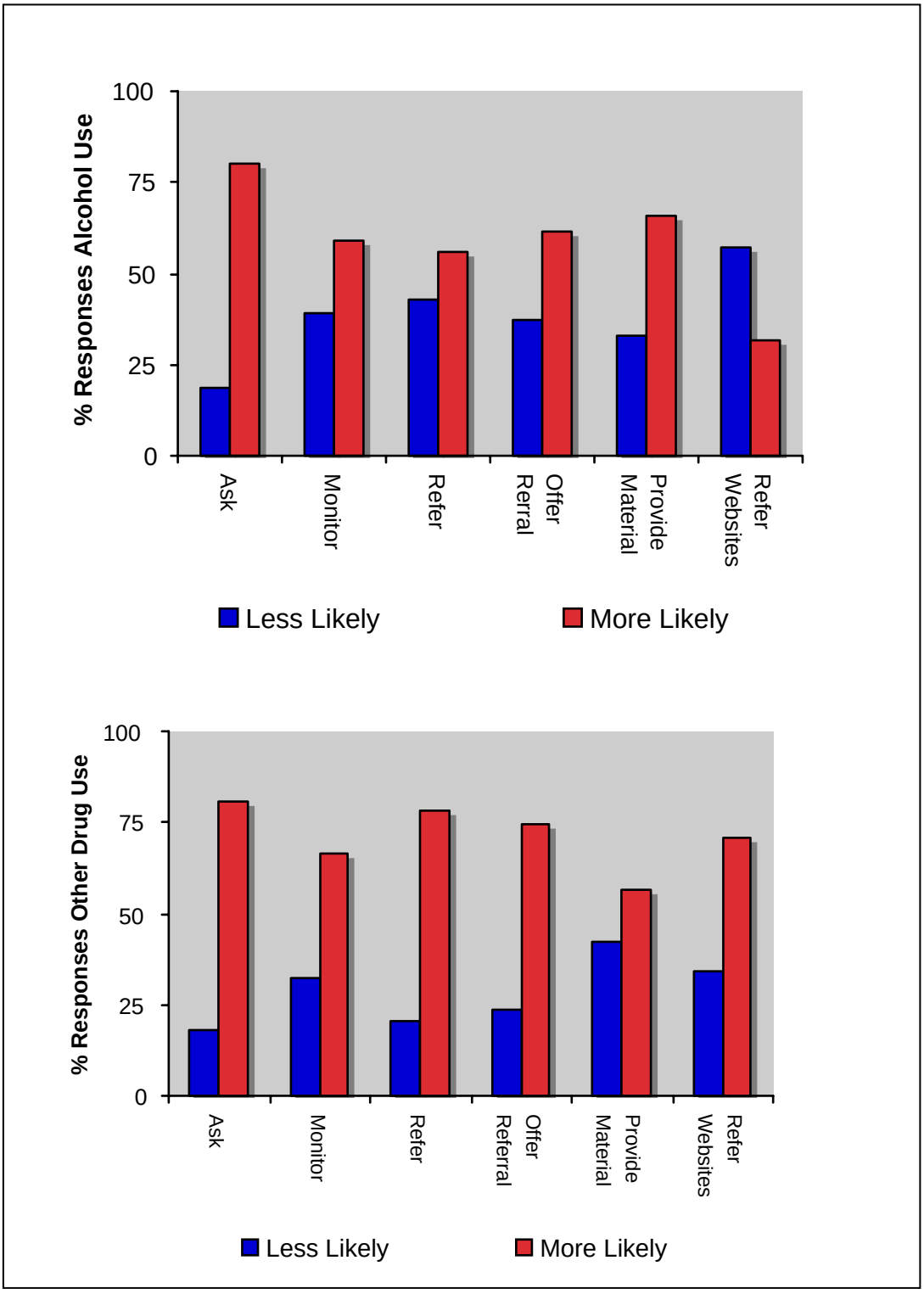

Figure 3. Proportion of health professionals who reported what they were likely to "do" if a patient reported using alcohol or other drugs during pregnancy. Data are percentage of health professionals who responded to these questions. These data have been collapsed into two categories from data presented in Table 6.

5.8. Barriers to Screening for Alcohol, Tobacco and Other Drug Use

Tables 7-9 show the proportion of clinicians in the study that responded to the likelihood of each circumstance providing a barrier to screening. The charts in Figure 6 show the data collapsed into two categories ("less likely" and "more likely") that represent the likelihood of each potential barrier for screening. The terms "less likely" and "more likely" will be used to discuss these results.

It is clear from the charts in Figure 6 that 60 to 70% of health professionals were more likely to discuss alcohol and tobacco regardless of the context. Yet, this left between 30 to 40% of the participants who found there were circumstances in which they found it more difficult or reported they were less likely to discuss smoking cigarettes these included: (1) the patient was from a culture they perceived would be at "low" risk of smoking cigarettes (34.9%); (2) there was a family member present during the clinical interview (41.9%); (3) the woman was from a socio-economic class that they perceived would put them at "low" risk for smoking (34.9%); (4) it was the first meeting between clinician and patient (30.2%); (5) there was no established protocol for discussing smoking in the clinical setting (34.5%).

There were also certain circumstances in which health professionals found it more difficult to discuss alcohol use, these were similar to those reported for cigarette smoking. Respondents were less likely to discuss drinking alcohol if women were from a culture they perceived would be at "low" risk of using alcohol (38.2%), there was a family member present during the clinical interview (58.9%), the woman was from a socio-economic class that they perceived would put them at low risk for drinking alcohol (38.1%), it was the first meeting between the clinician and patient (38.2%) or there was no established protocol for discussing alcohol use in the clinical setting (43.1%).

A different pattern of results for "other drug" use was reported by health professionals. Nearly 50% of respondents found most of the above to be barriers for discussing other drug use. Two exceptions were the findings that over 60% were less likely to discuss other drug use when family members were present and a similar percentage (62%) said they were more likely to discuss other drug use when there were signs of psychological or social problems that have been related to alcohol and drug use.

Table 7. *Description of circumstances in which health professionals suggest they would find it difficult to inquire about alcohol use. Data are presented as percentage of total sample that responded.*

Indicate how likely you are to ask or discuss alcohol in the following circumstances.

ALCOHOL	**Never % (*N*)**	**Unlikely % (*N*)**	**Likely % (*N*)**	**Very Likely % (*N*)**	**Always % (*N*)**
Patient /client is from a culture or ethnicity you feel would be at "no" or "low" risk of using alcohol.	2.5 (6)	14.3 (34)	21.4 (51)	16.4 (39)	45.4 (108)
A family member such as a husband or parent is present during the interview and you are concerned about privacy issues.	5.9 (14)	27.7 (66)	22.3 (53)	18.5 (44)	25.6 (61)
Patient/client is from a socio-economic or social class that you believe put them at "no" or "low" risk for alcohol use.	2.9 (7)	10.5 (25)	24.8 (59)	17.2 (41)	44.5 (106)
It is your first meeting with patient/client and you are still getting to know them.	2.9 (7)	12.2 (29)	23.1 (55)	18.9 (45)	42.9 (102)
There is no clear procedure in your clinical environment for managing women who report they are using alcohol during their pregnancy.	7.2 (17)	13.5 (32)	22.4 (53)	23.6 (56)	33.3 (79)
There are signs of psychological or social issues that may be related to alcohol or drug use such as a history of domestic violence, mental health problems.	2.9 (7)	4.2 (10)	15.8 (38)	25.2 (60)	51.7 (123)

Table 8. *Description of circumstances in which health professionals suggest they would find it difficult to inquire about tobacco use. Data are presented as percentage of total sample that responded.*

Indicate how likely you are to ask or discuss smoking tobacco in the following circumstances.

TOBACCO	**Never % (*N*)**	**Unlikely % (*N*)**	**Likely % (*N*)**	**Very Likely % (*N*)**	**Always % (*N*)**
Patient/client is from a culture or ethnicity you feel would be at "no" or "low" risk of using tobacco.	4.6 (11)	11.3 (27)	18.5 (44)	17.6 (42)	47.9 (114)
A family member such as a husband or parent is present during the interview and you are concerned about privacy issues.	5.0 (12)	15.1 (36)	21.8 (52)	19.7 (47)	38.2 (91)
Patient/client is from a socio-economic or social class that you believe puts them at "no" or "low" risk for tobacco use.	3.8 (9)	8.0 (19)	23.1 (55)	17.2 (41)	47.9 (114)
It is your first meeting with client/patient and you are still getting to know them.	3.8 (9)	6.7 (16)	19.7 (47)	21.4 (51)	48.3 (115)
There is no clear procedure in your clinical environment for managing women who report they are using tobacco during their pregnancy.	7.6 (18)	9.7 (23)	17.2 (41)	21.0 (50)	44.5 (106)

Table 9. *Description of circumstances in which health professionals suggest they would find it difficult to inquire about other drug use. Data are presented as percentage of total sample that responded.*

Indicate how likely you are to ask or discuss smoking tobacco in the following circumstances.

OTHER DRUG USE INCLUDING CANNABIS, OPIOIDS AND METHAMPETHAMINE	**Never % (*N*)**	**Unlikely % (*N*)**	**Likely % (*N*)**	**Very Likely % (*N*)**	**Always % (*N*)**
Patient/client is from a culture or ethnicity you feel would be at "no" or "low" risk of using other drugs such as methamphetamine, heroin or cannabis.	7.7 (18)	20.4 (48)	23.4 (55)	13.6 (32)	34.9 (82)
A family member such as a husband or parent is present during the interview and you are concerned about privacy issues.	7.2 (17)	31.1 (73)	22.6 (53)	12.3 (29)	26.8 (63)
Patient/client is from a socio-economic or social class that you believe puts them at "no" or "low" risk for other illicit drug use.	5.1 (12)	22.1 (52)	22.1 (52)	16.2 (38)	34.5 (81)
It is your first meeting with client/patient and you are still getting to know them.	4.3 (10)	21.7 (51)	22.1 (52)	15.7 (37)	36.2 (85)
There is no clear procedure in your clinical environment for managing women who report they are using other psychoactive substances such as methamphetamine, (P, speed, crystal meths) or opioids (Homebake, MSTI, heroin) during their pregnancy.	6.4 (15)	20.9 (49)	21.4 (50)	17.9 (42)	33.3 (78)
There are signs of psychological or social issues that may be related to alcohol or drug use such as a history of domestic violence, mental health problems.	4.7 (11)	13.2 (31)	19.6 (46)	20.9 (49)	41.7 (98)

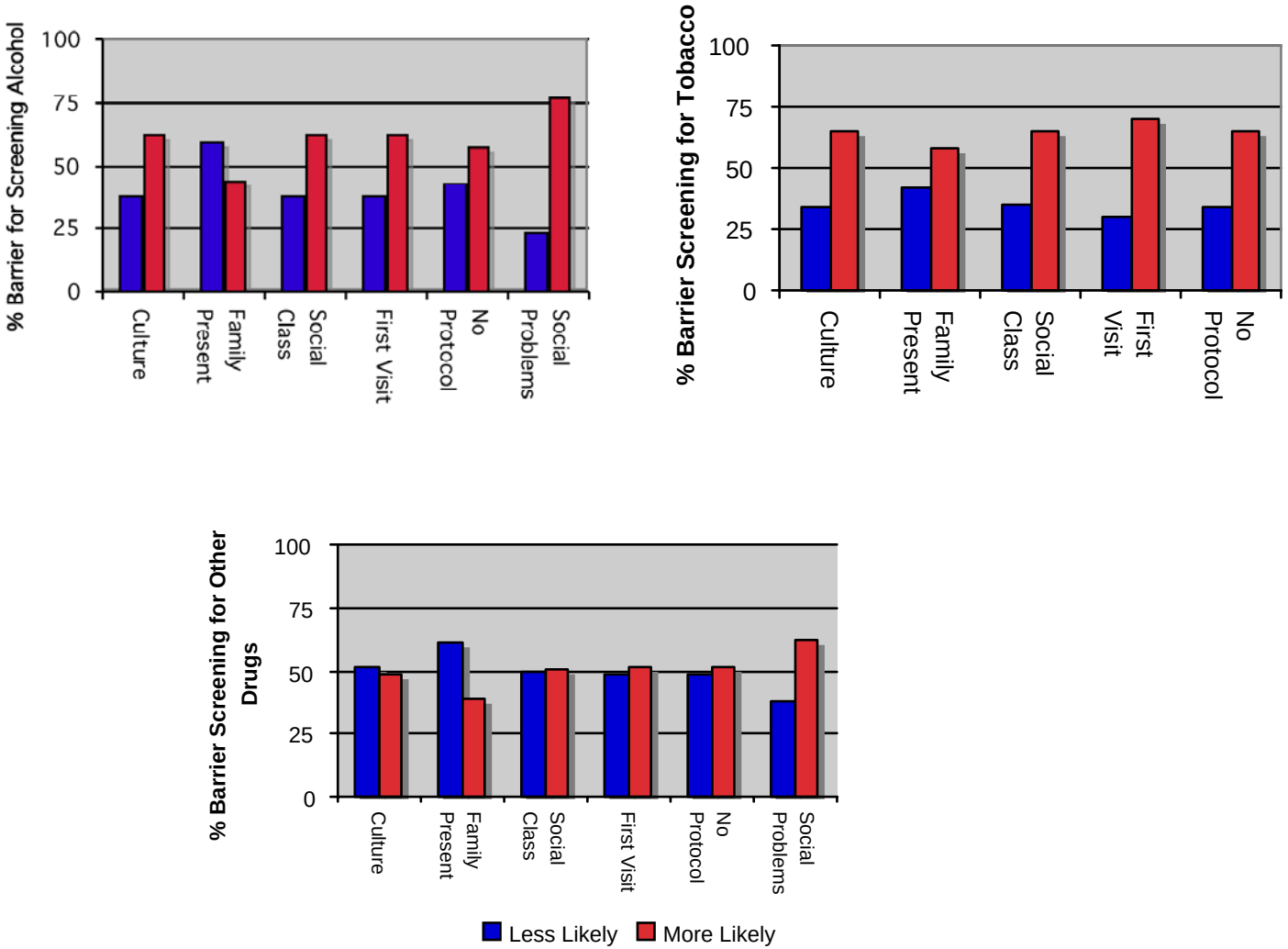

Figure 4. Health professionals' perceived barriers to screening for alcohol, tobacco and other drugs. Data are presented as percentage of total responses and represent two dichotomous categories that were collapsed from the categories presented in Tables 7-9.

5.9. Knowledge and Opinions About Alcohol Use During Pregnancy

One of the concerns with the research literature reporting the effects of alcohol use during pregnancy is the sometimes, controversial evidence regarding the range and seriousness of neurological, behavioural and developmental effects that have been associated with alcohol use during pregnancy. These range from serious, irreversible mental retardation (FAS) to less obvious neurological abnormalities, developmental delay and behaviour problems. Unfortunately, it is still not clear as to the pattern, frequency or amount of alcohol use that is likely to result in either the diagnosis of FAS or more subtle patterns of neurological and developmental problems associated with FASD. As a definite level at which alcohol consumption could be considered universally safe has not yet been established many medical and public healthcare organizations and government agencies (American Academy of Pediatrics & American College of Obstetricians and Gynecologists, 1997) have suggested that abstinence should be encouraged in women who are pregnant or attempting to become pregnant. This section of the study looked at the opinions and knowledge health professionals had about abstinence during pregnancy and the levels of drinking that might be considered to be heavy drinking.

Table 10 shows the respondents opinions about using alcohol during pregnancy, the amount and frequency of alcohol that they considered safe to consume during pregnancy and the amount they considered would constitute binge drinking for a woman of childbearing age. The majority of respondents (85.7%) in this study thought that women should abstain from using alcohol during pregnancy. Only 14.3% thought that occasional consumption described as 1 drink per day or less was safe during pregnancy. Despite the opinion by this group that occasional use of alcohol during pregnancy was safe, there was no consensus about whether it was safe to consume alcohol in all three trimesters or in just the first, second or third trimesters (Table 10). However, 11 out of the 34 respondents who considered some alcohol consumption was safe during pregnancy, also, reported they felt drinking, *"1 drink per day or less"*, would be safe in all three trimesters.

Regardless of the opinion by the majority of respondents that women should abstain from consumption of any alcohol during pregnancy (85.7%) or during the time they are trying to become pregnant, the results of the question about, *"How many drinks per week would constitute heavy drinking for a pregnant woman or woman planning a pregnancy"*, suggest that health professionals thought a woman could consume on average as many as 4 drinks per week before her consumption would be considered "heavy

drinking". However, opinions ranged from as little as one drink per week to as many as 10 or more, before consumption would be considered "heavy" drinking (Figure 7).

Table 10. *Health professionals' opinion about the use of alcohol during pregnancy. Data are presented as percentage of total sample that responded.*

Frequency and Timing of Alcohol Use	**Percent (*N*)**
% Total Health professionals who believed pregnant women or women planning a pregnancy should completely *abstain* from alcohol use.	85.7 (204)
% Total Health professionals who thought the occasional consumption of alcohol (1 drink per day or less) was safe during the following trimesters:	14.3 (34)
First trimester only	1.3 (3)
Second & third trimesters only	5.9 (14)
Third trimester only	2.5 (6)
All three trimesters	4.7 (11)
How many drinks *per week* would constitute heavy drinking for a pregnant woman or woman planning a pregnancy?	
Mean (SD)	4.37 (2.81)
Median (Range)	4.00 (0 – 10)
% 1 to 3 drinks per week	42.4 (98)
% 4 to 6 drinks per week	30.3 (70)
% 7 to 10+ drinks per week	27.33 (63)
How many drinks *per occasion* would constitute binge drinking in a woman of childbearing age?	
Mean (SD)	4.20 (1.77)
Median (Range)	4.00 (0 - 10)
% 1 to 3 drinks per drinking occasion	31.9 (74)
% 4 to 6 drinks per drinking occasion	60.8 (141)
% 7 to 10+ drinks per drinking occasion	7.3 (17)

Health professionals who spent more than 25% of their work-week managing women who required maternity care were compared to health professionals who spent less than 25% of their work week managing woman who required maternity care to determine whether they differed in their opinions around abstinence. Those participants who spent more time providing maternity care were more likely to believe women should abstain from alcohol during pregnancy (86.2%) than those participants who spent less than 25% of

their time providing maternity care (81.6%), this difference, however, was not statistically significant.

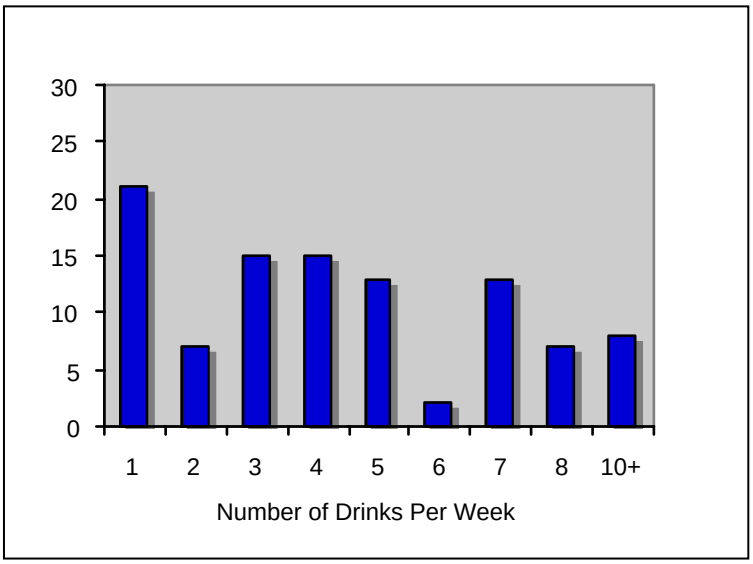

Figure 5. Proportion of clinicians who reported the number of drinks per week they considered "heavy" drinking during pregnancy.

One of the methodological problems of studies examining the effects of alcohol consumption on the development of the exposed child is defining what may be considered "binge" drinking defined as the number of drinks consumed in one occasion of drinking. In this study we asked how many drinks per occasion would be considered "binge" drinking in a woman of childbearing age. On average health professionals believed that 4 or more standard drinks per occasion would constitute "binge" drinking in a woman of childbearing age. Over 60% of participants in the present study reported that a woman would need to drink between 4 to 6 drinks in a single occasion before it would be considered "binge" drinking (Figure 8).

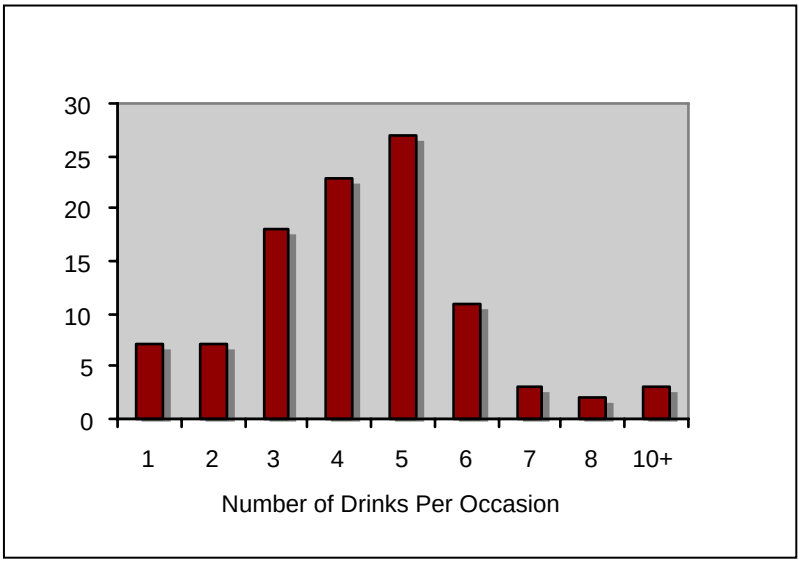

Figure 6. The number of drinks per drinking occasion that health professionals considered "heavy" or "binge" drinking in a woman of childbearing age.

5.10. Health Professionals Opinion Regarding Fetal Alcohol Spectrum Disorder (FASD)

In addition to the research that has demonstrated an association between heavy drinking and FAS, there is also a number of studies that have shown that moderate drinking may lead to a range of outcomes. FASD is an umbrella term for a range of neurological and behaviour problems that have been found to be associated with alcohol consumption. The following section will describe the opinions of health professionals around FASD.

It can be seen from the results reported in Table 11 that the majority of healthcare providers (96.2%) thought that FASD occurs in all socio-economic groups in society. However, respondents were less clear as to whether FASD occurred at similar rates among all cultures and ethnic groups. Respondents were equally divided between the opinion that it occurred at an equal rate (40.2%) in all cultures and the opinion it did not (39.3%) with an additional 20.5% percent undecided. The majority of respondents (88.3%) also thought that an early diagnosis of FASD may improve the treatment plans and outcomes for the exposed child, and that FASD was preventable (92.9%).

Of particular interest to this research is the opinion by over 51.7% of the participants that health professionals were not sufficiently aware of FASD and the opinion by 63.9% of respondents that a diagnosis of a FASD may lead to a child or family being

stigmatized. This suggests that many children who may be affected by alcohol exposure may not be identified or diagnosed due to a lack of awareness of the effects of fetal alcohol exposure, and/or a desire not to make a diagnosis for fear of labeling a child or family.

Table 11. *Health professionals' opinion regarding Fetal Alcohol Spectrum Disorder (FASD). Data are presented as percentage of total sample that responded.*

	Agree	Disagree	Don't Know
FASD occurs in all socio-economic groups of society	96.2 (230)	2.5 (6)	0.8 (2)
FASD occurs at similar rates among all cultures and ethnic groups	40.2 (96)	39.3 (94)	20.5 (49)
Making an early diagnosis of FASD may improve treatment plans for the affected child	88.3 (211)	5.0 (12)	6.7 (16)
It is possible to prevent FASD	92.9 (222)	3.3 (8)	3.8 (9)
Health professionals are sufficiently aware of FASD	31.5 (75)	51.7 (123)	16.8 (40)
The diagnosis of a FASD may lead to a child or family being stigmatised	63.9 (154)	21.2 (51)	14.2 (34)
Fetal Alcohol Syndrome (FAS) is part of a spectrum of disorders than can be diagnosed	76.6 (183)	9.6 (23)	13.8 (33)
FAS is easy to identify during infancy	27.0 (63)	54.4 (129)	18.6 (44)

5.11. Knowledge of Diagnostic Criteria for FAS

Only 23.7% of the respondents were able to correctly identify all four major criteria that are required to make a diagnosis of FAS (Table 12). Facial abnormalities (77.4%) were identified as the most common criteria required to make a diagnosis of FAS followed by documentation of maternal alcohol use during pregnancy (81.2%). The two criteria that health professionals were least likely to associate with a diagnosis of FAS were prenatal or postnatal height or weight below the 10^{th} percentile and documentation of central nervous system abnormalities. Of the total sample of respondents only 42.3% correctly identified restricted growth below the 10^{th} percentile as being one of the main criteria, and only 47.3% correctly identified documented central nervous system abnormalities.

Table 12. *Health professionals' knowledge of diagnostic criteria for Fetal Alcohol Syndrome (FAS). Data are presented as percentage of total sample that responded.*

Diagnostic criteria for Fetal Alcohol Syndrome includes the following:

	Yes	No	Don't Know
Confirmed prenatal or postnatal height or weight below the 10th percentile	42.3 (101)	9.2 (22)	48.5 (116)
Three facial abnormalities (smooth philtrum, thin vermillion border, and small palpebral fissures)	77.4 (185)	1.3 (3)	21.3 (51)
Documentation of central nervous system abnormalities	47.3 (113)	5.4 (13)	47.3 (113)
Documentation of maternal alcohol use during pregnancy	81.2 (194)	5.9 (14)	13.0 (31)

Figure 10 compares the proportion of health professionals who spent most of their work week managing the maternity care of women with those who spent most of their work week managing women of childbearing age or less than 25% of their work week providing perinatal care. The former group were made up predominantly of midwives and a small percentage of obstetricians, and the latter GPs, practice nurses, those working in family planning and sexual healthcare workers. Although a slightly higher percentage of health professionals whose predominant role was maternity care (pre- and postnatally) (25.9%) were more likely to identify all of the 4 main criteria for a diagnosis of FAS than those who spent most of their week treating women of childbearing age (20.8%). The difference in their knowledge of these criteria was not statistically significant. Overall only 24.9% of the total respondents correctly identified the 4 main criteria for a diagnosis of FAS.

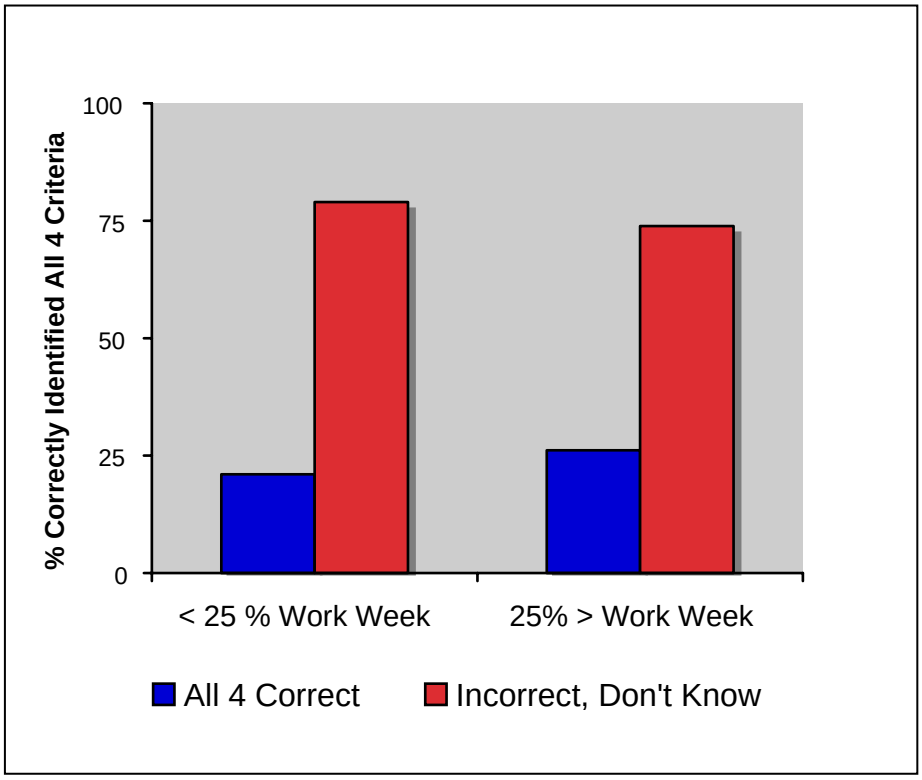

Figure 7. Comparison of health professionals who spend less than 25% of their typical work week managing pre- and postnatal care with those who spend more than 25% of their typical work involved in maternity care. Data are presented as % who correctly identified 4 criteria for diagnosis of FAS and those who responded incorrectly or "don't know".

5.12. Terminology Used to Describe Effects of Alcohol Exposure

One of the findings of our qualitative study suggested that clinicians and women may be getting "mixed messages" about the effects of alcohol use during pregnancy. One of the ways confusion within the healthcare profession may have occurred is through the variety of terms that have emerged from the literature to define the range of neurological and developmental effects of in utero alcohol exposure. This section and the results reported in Table 13 shows the variety of terms that are being used by the healthcare professional and proportion of respondents who were familiar with these terms. The terms most used in discussing alcohol use with their patients was fetal alcohol syndrome (66.4%) and fetal alcohol effects (63.3%). Although fetal alcohol spectrum disorder (FASD) has gained favour in social marketing around alcohol use during pregnancy and in the research literature, it is not a term that is readily used by health professionals to discuss the effects of alcohol use during pregnancy. Only 17.2% of the participants who responded reported they would use this term.

Table 13. *Health professionals' knowledge and use of terms associated with FAS and FASD. Data are presented as percentage of total sample that responded.*

When you discuss alcohol use with your patients, do you use any of the following terminology in your discussion?

	Yes	No	Don't Know
Fetal alcohol syndrome (FAS)	66.4 (158)	27.7 (66)	5.9 (14)
Alcohol related birth defects (ARBD)	49.6 (118)	41.6 (99)	8.8 (21)
Alcohol related neurodevelopmental disorder (ARND)	21.0 (50)	66.0 (157)	13.0 (31)
Fetal alcohol effects (FAE)	63.3 (150)	28.3 (67)	8.4 (20)
Prenatal alcohol effects (PAE)	35.3 (84)	51.3 (122)	13.4 (32)
Fetal alcohol spectrum disorder (FASD)	17.2 (41)	68.5 (163)	14.3 (34)

5.13. Health Professionals' Knowledge of Alcohol, Tobacco, Cannabis, Opiates and Methamphetamine Use During Pregnancy

General knowledge about the effects of alcohol use during pregnancy

Table 14 shows the proportion of health professionals who believed that alcohol use during pregnancy was associated with a number of adverse outcomes. The majority of respondents believed that alcohol consumption during pregnancy was associated with a number of serious developmental problems. For instance, over 90% were of the opinion that alcohol could cause delayed mental development, lowered IQ and behavioural problems in children exposed antenatally. Less clear was the association between alcohol exposure and psychiatric disorders in childhood, attention deficit hyperactivity disorder (ADHD), or sudden infant death syndrome (SIDS).

Knowledge of the effects of alcohol consumption on the developing fetus and child were generally consistent with the current available evidence, which is graphically represented in Figure 10. Despite available evidence that alcohol use during pregnancy has been associated with an increased risk of psychiatric problems later in childhood, only 65% considered psychiatric problems to be associated with alcohol. In contrast, over 61%

thought that alcohol use during pregnancy was associated with SIDS. Yet, there is little evidence to suggest that alcohol use during pregnancy is associated with SIDS.

Table 14. *Health professionals' knowledge about the effects of alcohol use during pregnancy. Data are presented as percentage of total sample that responded.*

Do you consider any of the following problems to be associated with using alcohol during pregnancy?

	Yes	**No**	**Don't Know**
Neonatal withdrawal	73.6 (176)	8.4 (20)	17.6 (42)
Delayed mental development	95.9 (231)	1.7 (4)	1.7 (4)
Delayed motor development	90.4 (216)	1.7 (4)	7.9 (19)
Disturbed and delayed emotional development	92.9 (222)	0.8 (2)	6.3 (15)
Birth defects/malformations	82.4 (197)	5.9 (14)	11.7 (28)
Psychiatric disorders	64.9 (155)	5.0 (12)	30.1 (72)
Lowered IQ/mental retardation	90.8 (217)	2.5 (6)	6.7 (16)
Behavioural problems	95.8 (228)	0.0 (0)	4.2 (10)
Low birth weight	87.4 (209)	2.9 (7)	9.2 (22)
Attention Deficit Hyperactivity Disorder	73.6 (176)	4.2 (10)	22.2 (53)
Increased risk of Sudden Infant Death Syndrome	61.9 (148)	7.1 (17)	30.5 (73)

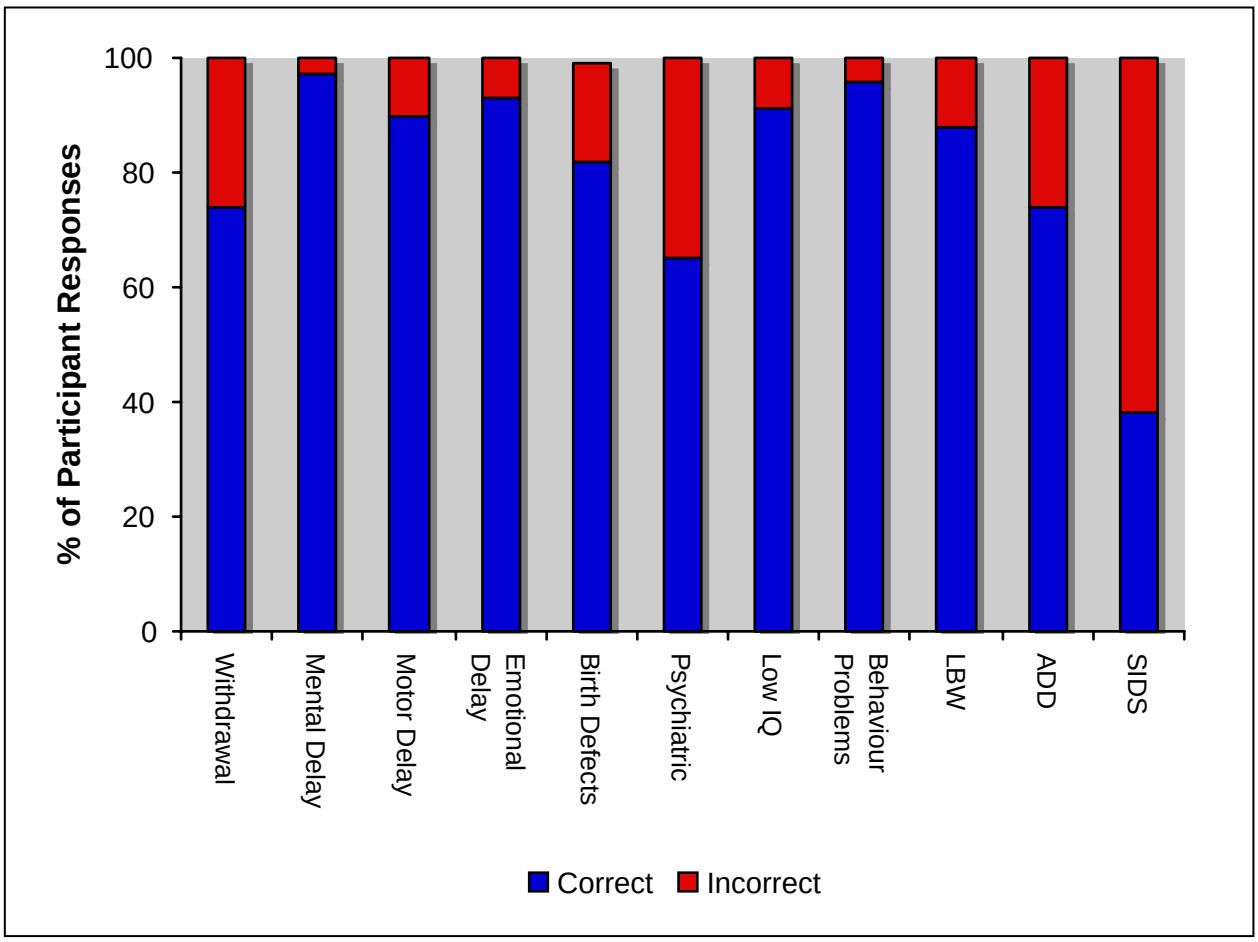

Figure 8. Health professionals' knowledge of the effects of alcohol use during pregnancy. Data are presented as the proportion of participants whose opinions were consistent with current evidence of an association between alcohol and individual outcomes.

Comparison of participants' knowledge of alcohol, tobacco and other drugs

Tables 15-18 report the knowledge health professionals had about the potential problems that have been associated with the use of tobacco, cannabis, opiates and methamphetamine use during pregnancy. When the knowledge about alcohol consumption, smoking tobacco and cannabis, and using opiates and methamphetamine were compared there were some consistent findings that emerged. First, health professionals reported that they considered the use of alcohol, opiates and methamphetamine to be equally serious. Responses to whether participants considered these drugs to be associated with a variety of negative outcomes were largely "yes", in favour of an association or to a lesser extent "don't know". Overall, fewer than 20% were likely to respond "no" to any of the health and developmental outcomes listed in Tables 14, 16-18.

Second, health care professionals were more ambivalent about the effects of smoking cannabis and cigarettes during pregnancy. It is clear from Table 15 that there were only two health outcomes that health professionals consistently associated with smoking tobacco during pregnancy, low birth weight and an increased risk of sudden infant death syndrome (SIDS). Over 97% of respondents considered "low birth weight" to be associated with smoking during pregnancy and over 95% associated smoking tobacco with SIDS. However, the association between other developmental outcomes such as delayed mental, motor or emotional development, behavioural problems and lowered IQ were less clear. Responses tended to be more equally distributed between "yes" they thought it was associated "no" they did not or "don't know".

Third, the most consistent finding across all drugs was the association between low birth weight and alcohol, tobacco, cannabis, opiates and methamphetamine use during pregnancy. Smoking cigarettes (97.1%) was the most frequently associated with low birth weight, followed by alcohol consumption (87.4%), opiate (81.1%), cannabis (75.3%) and methamphetamine use (72.5%). Consistent, also, were the associations between alcohol, tobacco and other illicit drugs and neonatal withdrawal, and SIDS. Opiate use (94.1%) during pregnancy was the substance that the highest proportion of health professionals associated with neonatal withdrawal followed by methamphetamine (85.8%), alcohol (73.6%), cannabis (71.7%) and smoking (45.2%). Tobacco use was associated with SIDS (95.4%) by the highest proportion of respondents followed by cannabis (68.6%), opiates (66%), alcohol (61.9%) and methamphetamine (60.1%).

Finally, the most uncertainty about the association between health and developmental outcomes and drug use during pregnancy was expressed about the use of cannabis. There was no clear indication whether participants associated cannabis use during pregnancy with any of the following: delayed motor development, disturbed and delayed emotional development, birth defects, psychiatric disorders, lowered IQ/mental retardation or attention deficit hyperactivity disorder.

Table 15. *Health professionals' knowledge about the effects of tobacco use during pregnancy. Data are presented as percentage of total sample that responded.*

Do you consider any of the following problems to be associated with cigarette smoking?

	Yes	**No**	**Don't Know**
Neonatal withdrawal	45.2 (108)	33.5 (80)	21.3 (51)
Delayed mental development	37.2 (89)	35.1 (84)	27.6 (66)
Delayed motor development	31.4 (75)	36.8 (88)	31.8 (76)
Disturbed and delayed emotional development	24.3 (58)	35.6 (85)	40.2 (96)
Birth defects/malformations	28.5 (68)	39.7 (95)	31.4 (75)
Psychiatric disorders	11.7 (28)	46.4 (111)	41.4 (99)
Lowered IQ/mental retardation	31.4 (75)	36.4 (87)	31.8 (76)
Behavioural problems	25.9 (62)	35.1 (84)	38.9 (93)
Low birth weight	97.1 (232)	0.8 (2)	2.1 (5)
Attention Deficit Hyperactivity Disorder	19.2 (46)	36.8 (88)	43.9 (105)
Increased risk of Sudden Infant Death Syndrome	95.4 (228)	0.8 (2)	3.8 (9)

Table 16. *Health professionals' knowledge of the effects of cannabis use during pregnancy. Data are presented as percentage of total sample that responded. Data are presented as percentage of total sample that responded.*

Do you consider any of the following problems to be associated with cannabis use?

	Yes	**No**	**Don't Know**
Neonatal withdrawal	71.1 (170)	7.1 (17)	21.8 (52)
Delayed mental development	64.0 (153)	6.7 (16)	29.3 (70)
Delayed motor development	44.1 (105)	12.2 (29)	43.7 (104)
Disturbed and delayed emotional development	51.5 (123)	9.6 (23)	38.9 (93)
Birth defects/malformations	27.3 (65)	21.0 (50)	51.7 (123)
Psychiatric disorders	42.3 (101)	12.1 (29)	45.6 (109)
Lowered IQ/mental retardation	49.8 (119)	8.4 (20)	41.8 (100)
Behavioural problems	60.3 (144)	5.4 (13)	34.3 (82)
Low birth weight	75.3 (180)	2.9 (7)	21.8 (52)
Attention Deficit Hyperactivity Disorder	37.7 (90)	13.0 (31)	49.4 (118)
Increased risk of Sudden Infant Death Syndrome	68.6 (164)	4.2 (10)	27.2 (65)

Table 17. *Health professionals' knowledge of the developmental effects of opiates (methadone, heroin, converted pain medication such as Homebake or MSTI) during pregnancy. Data are presented as percentage of total sample that responded.*

Do you consider any of the following problems to be associated with opiate use (methadone, heroin, converted pain medication such as Homebake, MSTI) during pregnancy?

	Yes	**No**	**Don't Know**
Neonatal withdrawal	94.1 (224)	0.8 (2)	5.0 (12)
Delayed mental development	75.1 (178)	4.6 (11)	20.3 (48)
Delayed motor development	68.5 (163)	5.9 (14)	25.6 (61)
Disturbed and delayed emotional development	69.7 (166)	5.0 (12)	25.2 (60)
Birth defects/malformations	47.1 (112)	13.0 (31)	39.9 (95)
Psychiatric disorders	51.7 (123)	8.4 (20)	39.1 (93)
Lowered IQ/mental retardation	55.9 (133)	7.1 (17)	37.0 (88)
Behavioural problems	72.7 (173)	3.8 (9)	23.5 (56)
Low birth weight	81.1 (193)	1.7 (4)	16.4 (39)
Attention Deficit Hyperactivity Disorder	53.6 (127)	8.4 (20)	38.0 (90)
Increased risk of Sudden Infant Death Syndrome	66.0 (157)	4.6 (11)	29.4 (70)

Table 18. *Health professionals' knowledge of the effects of methamphetamine use (street names P, Pure, crystal meths, speed) during pregnancy. Data are presented as percentage of total sample that responded.*

Do you consider any of the following problems to be associated with methamphetamine use (street names P, Pure, crystal meths, speed) during pregnancy?	**Yes % (*N*)**	**No % (*N*)**	**Don't Know % (*N*)**
Neonatal withdrawal	85.8 (206)	1.2 (3)	12.9 (31)
Delayed mental development	70.2 (167)	3.4 (8)	26.5 (63)
Delayed motor development	62.6 (149)	4.2 (10)	33.2 (79)
Disturbed and delayed emotional development	63.9 (152)	4.2 (10)	31.9 (76)
Birth defects/malformations	46.6 (111)	7.6 (18)	45.8 (109)
Psychiatric disorders	52.5 (125)	5.0 (12)	42.4 (101)
Lowered IQ/mental retardation	55.9 (133)	5.9 (14)	38.2 (91)
Behavioural problems	72.3 (172)	2.5 (6)	25.2 (60)
Low birth weight	72.5 (171)	1.3 (3)	26.3 (62)
Attention Deficit Hyperactivity Disorder	53.4 (127)	5.5 (13)	41.2 (98)
Increased risk of Sudden Infant Death Syndrome	60.1 (143)	2.5 (6)	37.4 (89)

5.14. Comparison of Health Professionals' Knowledge with Current Evidence

Figures 11 and 12 provide a graphic comparison of the health professionals' knowledge about the potential outcomes of alcohol, tobacco and other drug use during pregnancy and current evidence. Correct and incorrect responses were defined in two ways: (1) a response was considered *correct* if the healthcare professional responded "yes" there was an association between a particular substance and each outcome, and current research substantiated this outcome; a response was considered *incorrect*, if the response was "no" or "don't know"; (2) a response was, also, considered *correct* if the participant responded "no" there is no association or "don't know" if there is an association between a particular substance and the outcome and no current research existed to substantiate an association; a response was considered *incorrect*, if the response was "yes" there is an association.

Two important findings are clear from the graphic representation of these data. First, health professionals' knowledge around the effects of alcohol and tobacco are generally consistent with the availability of a large body of evidence that has investigated the health and developmental outcomes associated with smoking and consuming alcohol during pregnancy (Figure 12). In comparison, participants' knowledge around illicit drugs such as cannabis, opiates and methamphetamine were less consistent with the current research findings, most likely reflecting the paucity of research.

Second, health professionals attributed more serious health and development outcomes to illicit drugs despite the lack of current evidence (Figures 12 and 13). This was particularly true for opiates and methamphetamine. Notable was the finding that over one-third of the participants answered "yes" they considered *all* of the outcomes listed to be associated with cannabis, opiates and methamphetamine.

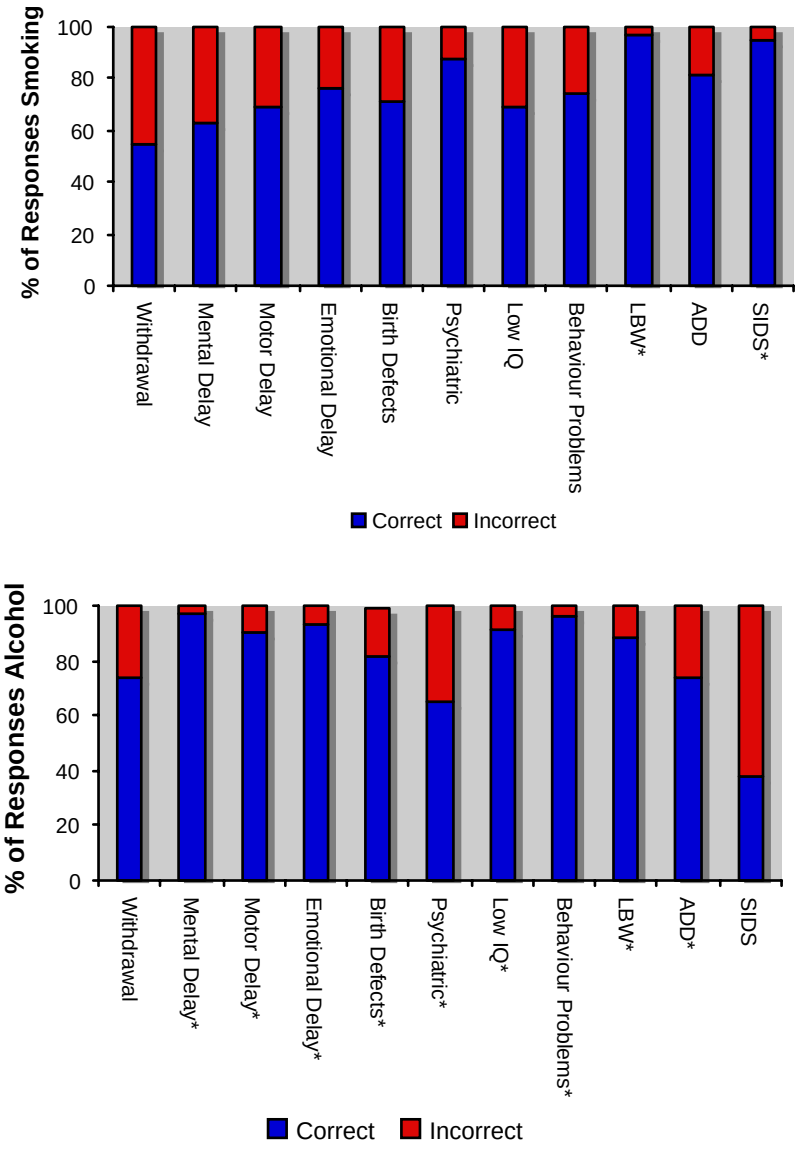

Figure 9. Comparison of health professionals' knowledge of the effects of alcohol and tobacco use during pregnancy. Data are presented as the proportion of participants whose knowledge was consistent with current evidence (denoted by an*) of an association between these substances and individual outcomes.

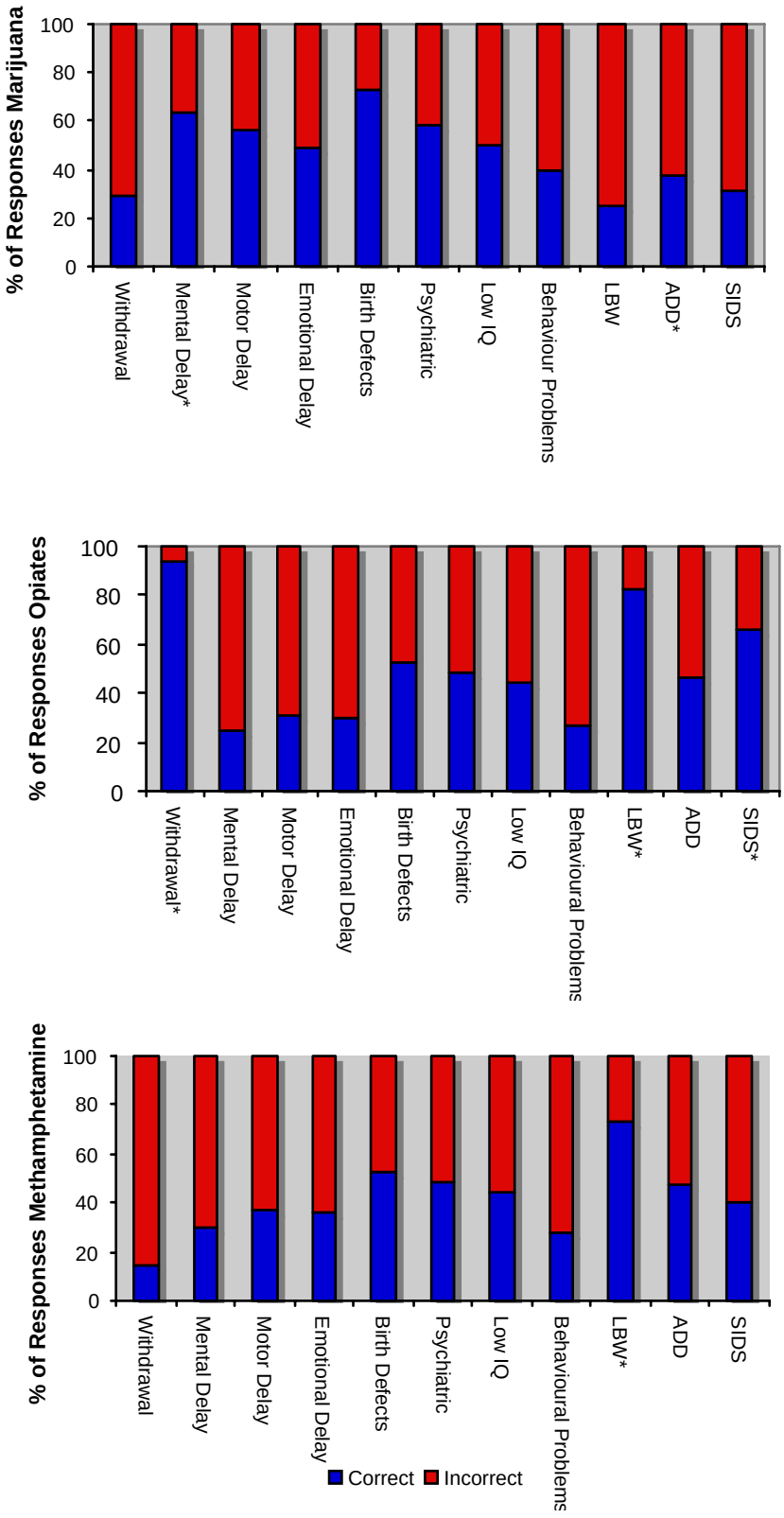

Figure 10. Comparison of health professionals' knowledge of the effects of cannabis, opiates and methamphetamine. Data are presented as the proportion of participants whose knowledge was consistent with current evidence (denoted by an*) of an association between these substances and individual outcomes.

5.15. Health Professionals' Knowledge, Competence and Need of Resources

Perceived Knowledge of Alcohol, Tobacco and Other Drugs

Table 19 shows the perception of health professionals' knowledge about the effects of alcohol, tobacco and other drug use during pregnancy. These data are graphically represented in Figure 13. It is apparent from these results that approximately 50% of health professionals felt that they did not have enough knowledge about the effects of alcohol use during pregnancy. However, a substantially larger percentage of participants felt they did not have enough knowledge about the effects of cannabis (74.4%), methamphetamine (80.7%), opiates (81.1%) or methadone (84.4%). Approximately 74% of the health professionals felt they knew enough about the effects of smoking during pregnancy, but there were still 24% that did not.

Table 19. *Health professionals' perceived knowledge of the effects of alcohol, tobacco and other drug use during pregnancy. Data are represented as percentage of total sample that responded.*

KNOWLEDGE ABOUT EFFECTS	Agree % (*N*)	Disagree % (*N*)	Don't Know % (*N*)
I feel I have enough knowledge about the effects of *alcohol* use during pregnancy.	46.4 (110)	48.5 (117)	4.2 (10)
I feel I have enough knowledge about the effects of *smoking cigarettes* during pregnancy.	73.9 (178)	24.1 (58)	0.8 (2)
I feel I have enough knowledge about the effects of *smoking cannabis (cannabis)* during pregnancy.	20.2 (48)	74.4 (177)	5.5 (13)
I feel I have enough knowledge about the effects of *methamphetamine (P, Pure speed, ecstasy)* during pregnancy.	14.3 (34)	80.7 (192)	5.0 (12)
I feel I have enough knowledge about the effects of *opiates* such as *heroin, Homebake, MSTI* during pregnancy.	13.0 (31)	81.1 (193)	5.9 (14)
I feel I have enough knowledge about the prescribing of *methadone* during pregnancy.	10.9 (26)	84.0 (200)	5.0 (12)

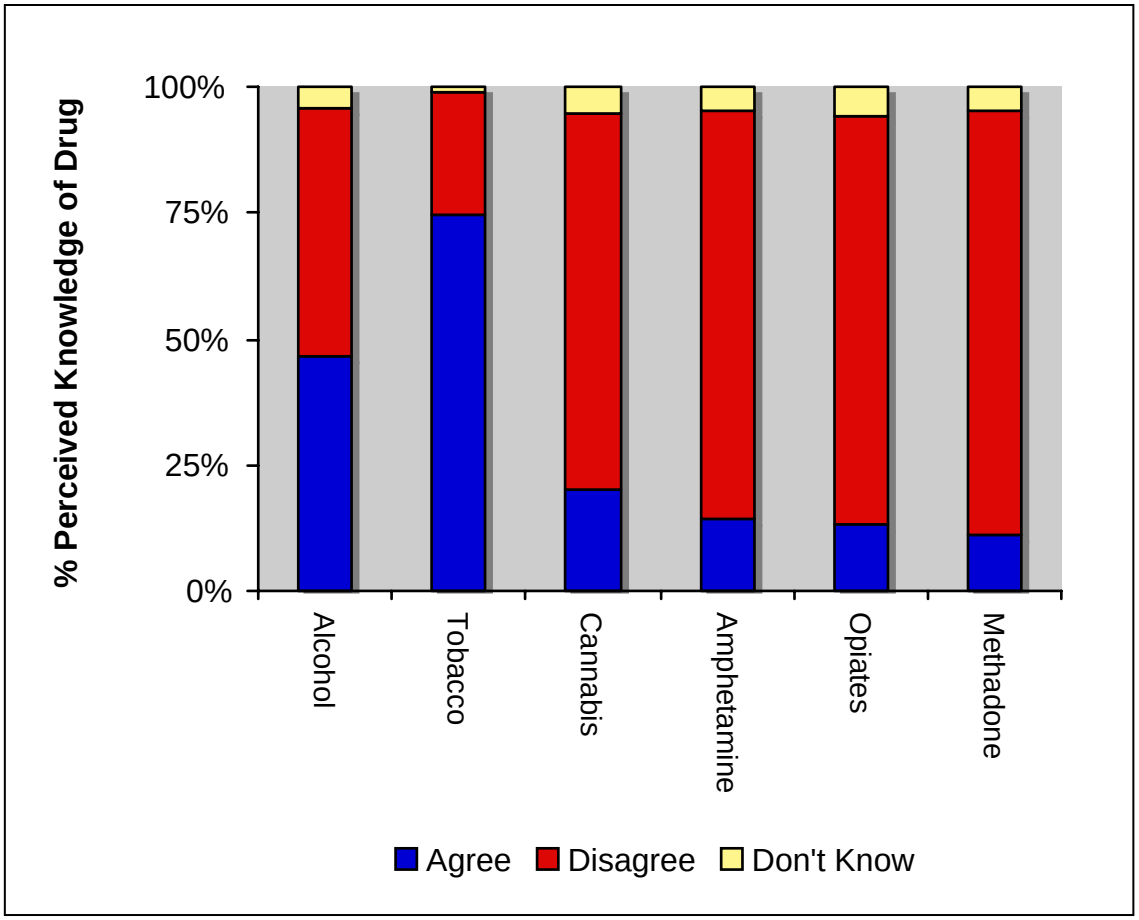

Figure 11. Health professionals perceived knowledge of the effects of alcohol, tobacco and other drug use during pregnancy. Data are presented as percent who agreed, disagreed or didn't know whether they had enough knowledge.

Perceived Competence of Giving Advice about Alcohol, Tobacco and Other Drugs

The perception of the health professionals' ability or competence to advise women about the use of alcohol, tobacco and other drug use is reported in Table 20. These results are also graphically represented in Figure 14. Although health professionals felt they were competent ("agreed") in their ability to provide advice about alcohol (79.0%) and smoking (90%.8%), they felt less competent ("disagreed") about giving advice about cannabis (46.4%), opiate (66.0%) or methamphetamine use (84.5%). In addition, when the participants in this study were asked if they felt competent giving advice about methadone treatment, over 84.5% reported they did not.

Table 20. *Health professionals' perceived competence in giving advice about alcohol and other drug use. Data are presented as percentage of those who responded.*

PERCEIVED COMPETENCE OF GIVING ADVICE	Agree % (*N*)	Disagree % (*N*)	Don't Know % (*N*)
I feel competent giving women advice about *alcohol* use during pregnancy.	79.0 (188)	14.3 (34)	6.7 (16)
I feel competent giving women advice about *smoking cigarettes* during pregnancy.	90.8 (216)	8.4 (20)	0.8 (2)
I feel competent giving women advice about *smoking marijuana (cannabis)* during pregnancy.	47.9 (114)	46.6 (111)	5.5 (13)
I feel competent giving women advice about using *methamphetamine (P, Pure, speed, ecstasy)* during pregnancy.	27.3 (65)	66.4 (158)	6.3 (15)
I feel competent giving women advice about using *opiates* such as *heroin, MSTI, Homebake* during pregnancy.	27.3 (65)	66.0 (157)	6.3 (15)
I feel competent giving women advice about the prescription of *methadone* during pregnancy.	9.7 (23)	84.5 (201)	5.9 (14)

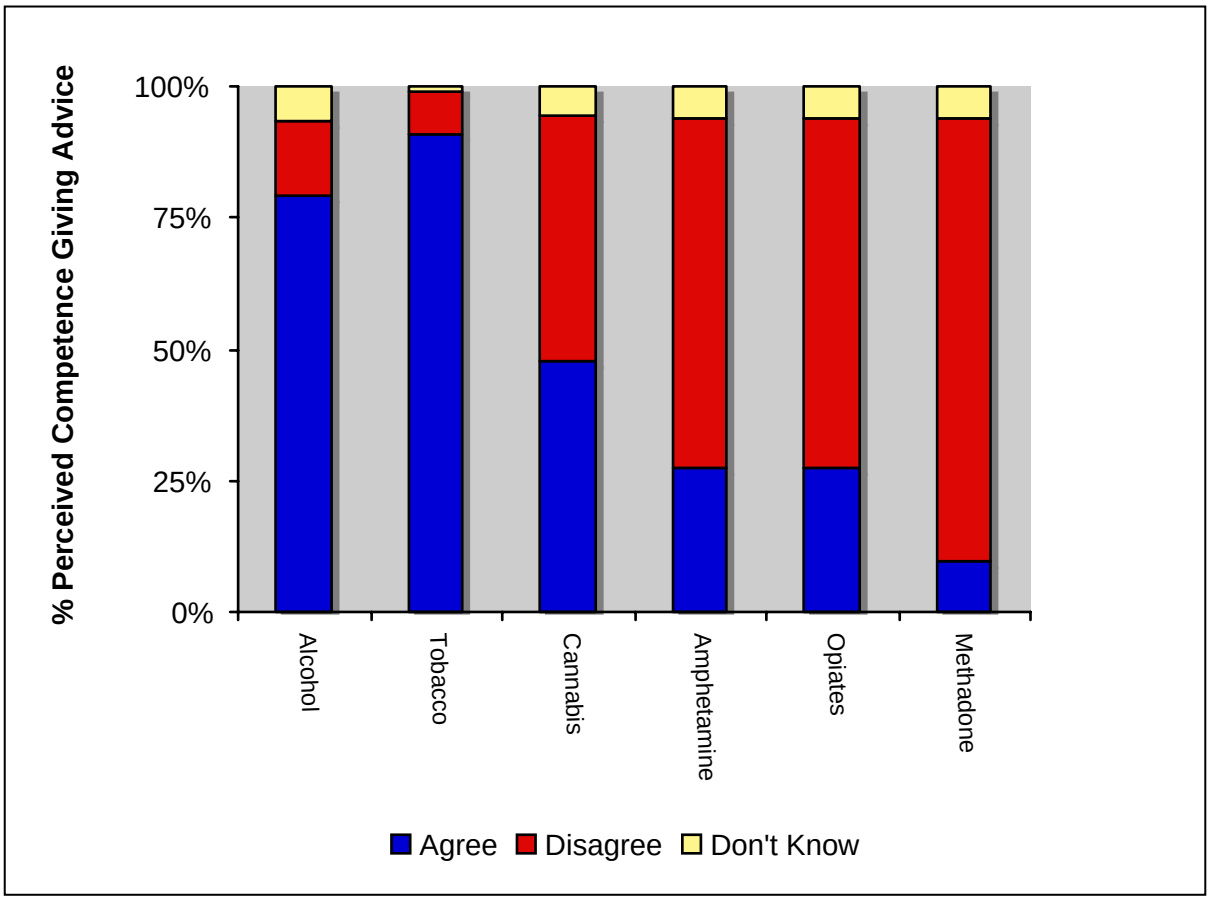

Figure 1. Percentage of health professionals' who felt competent about giving advice to their patients about alcohol, tobacco and other drugs during pregnancy. Data are presented as percent of participants who "agreed", "disagreed" or "didn't know" whether they felt competent giving advice.

Health professionals' perception of the availability of printed resources

Table 21 shows the health professionals' perception of the availability of adequate printed material that accurately reflects the risks of alcohol, tobacco and other drugs. These data are also represented graphically in Figure 15. Approximately 80% of the participants felt they had access ("agreed") to printed material that would accurately reflect the risks of alcohol and tobacco use during pregnancy. However, only a small proportion of respondents felt they had access to printed material that accurately reflected the risks of using cannabis (27.3%), methamphetamine (16.8%), opiates (17.2%), and methadone (16.4%).

Table 21. *Health professionals' perception of the availability of printed material about the effects of alcohol and other drug use that accurately reflects the risks. Data are represented as percentage of those who responded.*

ACCESS TO PRINTED RESOURCES	**Agree % (*N*)**	**Disagree % (*N*)**	**Don't Know % (*N*)**
I have access to printed material about *alcohol* use during pregnancy to give my client/patient that accurately reflects the risks.	77.3 (184)	20.6 (49)	2.1 (5)
I have access to printed material about *tobacco* use during pregnancy to give my client/patient that accurately reflects the risks.	80.3 (191)	18.9 (45)	0.8 (2)
I have access to printed material about *cannabis (marijuana)* use during pregnancy to give my client/patient that accurately reflects the risks.	27.3 (65)	65.1 (155)	7.6 (18)
I have access to printed material about *methamphetamine (P, Pure)* use during pregnancy to give my client/patient that accurately reflects the risks.	16.8 (40)	76.1 (181)	7.1 (17)
I have access to printed material about *opiates such as heroin, MSTI, Homebake* use during pregnancy to give my client/patient that accurately reflects the risks.	17.2 (41)	75.6 (180)	7.1 (17)
I have access to printed material about *methadone* use during pregnancy to give my client/patient that accurately reflects the risks.	16.4 (39)	75.6 (180)	8.0 (19)

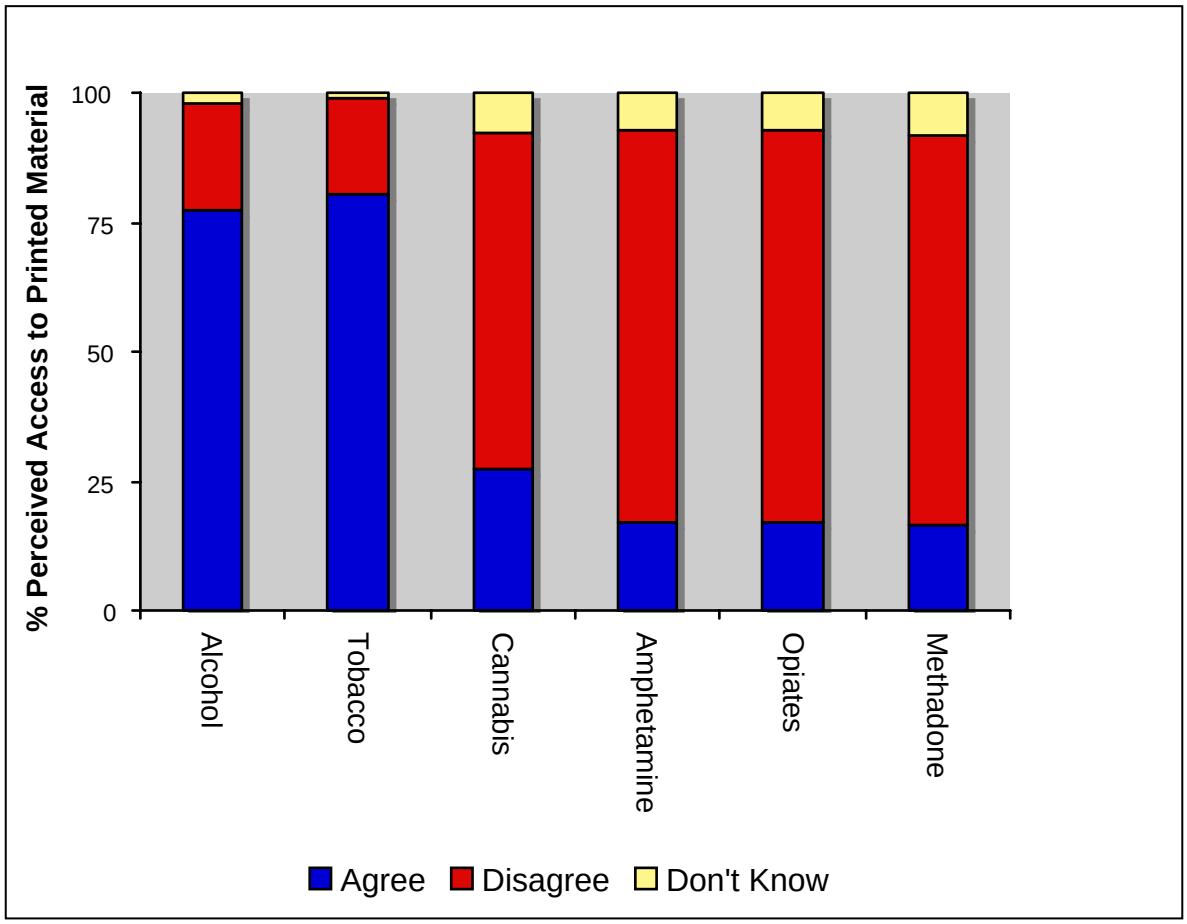

Figure 13. Health professionals' perception of their access to printed material that accurately reflects the risks of using alcohol, tobacco and other drugs during pregnancy. Data are presented as percentage of participants who agreed, disagreed or didn't know whether they had access to printed materials.

Health professionals need for training and a standardised screener

Of particular importance to educators are the findings presented in Table 22 and Figure 16. Only about one-third of the participants in this study felt they had enough training in assessing the risk of alcohol use during pregnancy, and only 13% felt they had enough training in assessing the risk of other drug use. Particularly notable was the finding that approximately 80% of the health professionals that participated in this study thought a short questionnaire would be useful in screening for alcohol and/or other drug use during pregnancy. A particular request by some practitioners was that this be made available in a computerised form.

Table 22. *Health professionals' opinion regarding their need for additional training in assessing the risk of alcohol and other drugs, and the usefulness of a short standardised questionnaire to aid in assessing risk.*

NEED OF SCREENING & TRAINING RESOURCES	Agree % (*N*)	Disagree % (*N*)	Don't Know % (*N*)
I have enough training in assessing the risk of alcohol use during pregnancy.	35.7 (85)	56.7 (135)	7.6 (18)
I have enough training in assessing the risk of other drugs such as methadone, heroin, MSTI, methamphetamine (P, Pure) during pregnancy.	13.0 (31)	80.7 (192)	6.3 (15)
I would find a short questionnaire useful in screening for alcohol and/or other drug use during pregnancy.	79.8 (190)	15.5 (37)	4.6 (11)

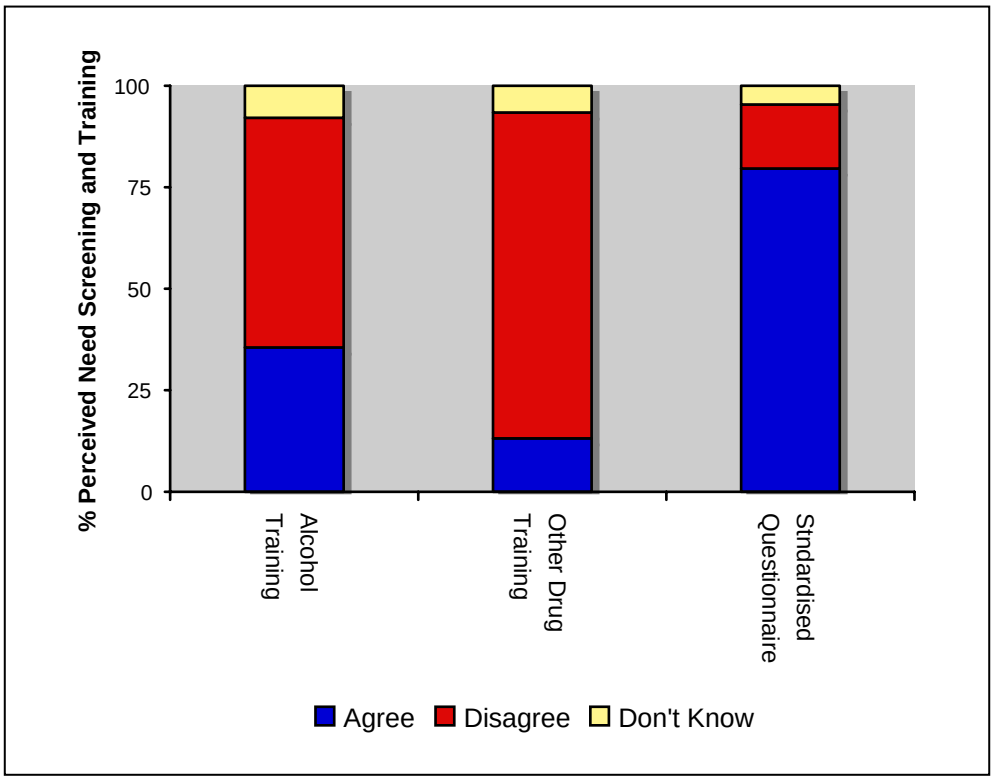

Figure 14. Health professionals perceived need for training in assessing the risk of alcohol and other drugs and the perceived need for a short standardised screener to assess the risk of alcohol and other drugs. Data are presented as percentage of participants who agreed, disagreed or didn't know whether they needed a standardised questionnaire and whether they already had enough training.

6. DISCUSSION

6.1. Screening for Alcohol, Tobacco and Other Drug Use

Routine screening for alcohol and other drug use by health professionals providing antenatal care, and those providing general healthcare in the community, can be an important preventive approach to lowering the associated risks of alcohol and other drug use. In addition, the frequent contact that occurs between the healthcare professional and a woman during pregnancy, can provide multiple opportunities to identify problems and engage "at risk" women in treatment. Reviews of preventive approaches and screening have shown that there are several short, simple screening instruments that can be administered quickly and easily (Chang, 2001; L. Elliott, Coleman, Suebwongpat, & Norris, 2008). These have been found to be effective in discriminating those women who are "at risk", thereby, providing an opportunity for the clinician and the patient to discuss prenatal alcohol or other drug exposure.

The present research used six questions to obtain information about whether health professionals routinely screened for alcohol, tobacco and other drug use, the timing of screening for those providing maternity care for their patients, the use and knowledge of standardised screening instruments and the perceived barriers to screening for alcohol, tobacco and other drug use. Finally, we inquired about the perceived need of a short questionnaire to determine the risk of alcohol and other drug use during pregnancy. The specific questions used to obtain this information were as follows:

1. Do you ask your clients/patients whether they are currently and/or have used the following: Tobacco, alcohol, cannabis, heroin (street names MSTI or Homebake), methadone or methamphetamine (street names, "P", Pure, Crystal Meths?
2. Indicate how likely you are to ask or discuss alcohol, tobacco and drug use in the following circumstances?
3. In which trimester do you first ask about alcohol, tobacco and other psychoactive drug use?
4. Do you use a standardised questionnaire to inquire about alcohol use?
5. Have you ever heard of or used any of the following standardised screeners for alcohol and/or drug use?

Routine screening and the barriers to screening

In the present study over 78% of the participants reported that they routinely screened for alcohol use among their clinical population. In comparison, a survey of obstetricians in Western Australia carried out between 2003 and 2004 found only 57% said they routinely screened for alcohol use during pregnancy (E. J. Elliott & Bower, 2008). In contrast, two studies in the U. S. reported 92% and 97% of health professionals participating in their surveys reported asking their pregnant patients about alcohol use (Abel & Kruger, 1998; Diekman et al., 2000). Forty-eight percent of the respondents obtained information about prenatal alcohol use themselves, 41% had non-physician staff obtain it and 19% had their patients fill out a self-administered questionnaire (Diekman et al., 2000). This higher rate of routine screening in the U. S. was likely the result of two professional bodies in the U.S. advocating alcohol screening. In 1994, the American College of Obstetricians and the American Academy of Pediatrics released a joint statement advising clinicians that pregnant women should be questioned at their first prenatal visit about past and present alcohol use (American Academy of Pediatrics & American College of Obstetricians and Gynecologists, 1997). Notable was the proportion of respondents in the Diekman et al. study who reported using an alcohol screening questionnaire in their practice that increased significantly with the adequacy of their training.

In the present research, routine screening of substance use was substantially higher for tobacco and alcohol than for other psychoactive drugs. These findings were consistent with our NZ qualitative study (Wouldes, 2008) and qualitative studies in the U.S. (Herzig et al., 2006; Taylor et al., 2007) that found health professionals reported they were more likely to ask about tobacco use than alcohol or other drug use. One likely explanation for this finding may be that prevention practices for smoking behaviour have a longer history than do prevention practices for alcohol and other drug use. Therefore, health professionals may perceive it to be part of the routine clinical interview and feel more comfortable discussing smoking.

Additional factors that might explain the variable frequency of routinely screening for alcohol and other drugs come from three qualitative studies (Gilbert et al., 2007; Taylor et al., 2007; Wouldes, 2008). Results from these studies have found that although healthcare providers generally support screening there may be a number of “barriers” or circumstances that would prevent them from routinely screening or discussing alcohol and drug use with their patients, these may include one or more of the following: a lack of rapport or established relationship with the patient, the patient was from a culture or ethnic

group that the health professionals perceived to be at "low" or "no" risk of alcohol or drug use, the patient was from a higher socio-economic status, there was a family member present during the clinical interview, and there was no clear procedure in the clinical environment for managing women who report they are using alcohol or other drugs. As the above findings were from qualitative studies there was no way of knowing whether they would reflect the practice of a wider group of health professionals.

In the present study we were able to quantify the above findings in a representative sample of New Zealand health professionals. For instance, we found over 60% of health professionals reported they were more likely to discuss alcohol and tobacco with their patient regardless of the context or circumstances. However, consistent with the earlier qualitative studies (Gilbert et al., 2007; Taylor et al., 2007; Wouldes, 2008), a number of study participants reported there were circumstances in which they were less likely to discuss alcohol and even tobacco. Approximately one-third of the respondents reported they would be less likely to inquire about or discuss alcohol and smoking if there was a lack of rapport between the clinician and the patient, the patient was from a culture or socio-economic status that the healthcare professional believed put them at "no" or "low" risk for alcohol use problems, and/or there was no clear procedure in the clinical environment for managing women who reported they were using alcohol or other drugs. The context in which a larger proportion of health professionals reported they would be less likely to discuss smoking or alcohol use was when a family member was present during the clinical interview.

When health professionals were queried about the likelihood of discussing other drugs with their patients, only 50% of participants reported they were more likely to ask about other recreational drug use under *most* circumstances. Two exceptions to this were the following: first, a higher percentage of health professionals reported they were *less* likely to ask about other drug use in the presence of other family members; and, second, was the finding that the circumstance in which a higher percentage of health professionals were *more* likely to ask about other drug use was when the client had social or psychological problems, such as a history of domestic violence or mental health problems. In these circumstances approximately 38% of the participants reported they would discuss other drug use in the presence of other family members. In contrast over 60% reported they would approach this subject with their patients if they had a history of psychological problems or social problems such as domestic violence.

Screening during pregnancy and use of a standardised screener

Of those health professionals who reported routinely screening for alcohol, tobacco and other drug use during pregnancy, approximately 90% reported they screened their patients during the first trimester, or at the first clinical visit. Yet, only 30% reported they currently used a standardised screener. Questions probing the content of these screeners revealed they were generally standard maternity interviews that only included one or two "yes" or "no" questions about whether the patient was using alcohol, tobacco or other drugs. No further questions that identified the frequency or impact of these drugs on their health and lifestyle were obtained. This finding was supported by the lack of knowledge study participants had of standardised screeners that are currently available which have been shown to be effective in determining the risk and impact of alcohol and other drug use.

These results are consistent with the qualitative studies that also found that health professionals generally relied on a standard antenatal history questionnaire to identify alcohol, tobacco or other drug use (Taylor et al., 2007; Wouldes, 2008). Research that has compared the ability of regular antenatal care interviews to detect hazardous drinking with the use of standardised screeners has generally found a large discrepancy between what the clinician documents with a standard maternity interview and the self-report of patients when standardised screeners were used. One study in Sweden found regular antenatal care did not identify most of the risk pregnancies that were identified by a more in-depth interview. They found that 15% of the sample in their study were drinking at levels during early pregnancy that have been associated with adverse outcomes for the developing child (Magnusson, Goransson, & Heilig, 2004). In one U. S. study a comparison of medical records with a standardised alcohol screening questionnaire found that clinicians identified only 10.8% of women who were identified by the T-ACE screener. In this randomised controlled trial, the medical records were more inclusive for medical risk factors than the patient's self-reports of alcohol use. In addition, these researchers found that clinicians were significantly more likely to correctly identify non-white participants as being at risk for prenatal alcohol use compared with their white counterparts (McNamara, Orav, Wilkins-Haug, & Chang, 2005).

6.2. Health Professionals Opinions and Knowledge

Abstinence versus moderate drinking

Over 85% of the health professionals in this study reported that they thought women who were pregnant or were planning to become pregnant should completely abstain from alcohol consumption. In comparison, an earlier study by Leversha and Marks (Leversha & Marks, 1995) that surveyed a representative sample of obstetricians, paediatricians and general practitioners found most respondents believed there should be a limit on alcohol consumption during pregnancy, but only 46% recommended abstinence. This change in the attitudes toward drinking during pregnancy may reflect the increasing evidence in the literature that any drinking during pregnancy may be harmful, but it could also reflect the population that was sampled. In the present sample two-thirds of the participants spent most of their work week involved in maternity care. Most of these were midwives and a small percentage were obstetricians. In the Leversha and Marks study, the sample was mainly paediatricians and general practitioners.

In comparison to our results, an earlier account of 421 NZ midwives' attitudes and opinions toward total abstinence during pregnancy found that most midwives did not advocate drinking at all during the first trimester (Mathew et al., 2001). However, the authors of this report found that midwives attitudes and opinions were associated with whether the midwives reported they would abstain from alcohol use during their own pregnancy and the trimester of the pregnancy. Midwives who reported they would abstain from drinking during pregnancy were significantly more likely to advocate total abstinence in all three trimesters. Of the total sample of 421 midwives, 22% reported they would drink some alcohol throughout their own pregnancy. Of this 22%, only a small proportion reported they would drink during the first trimester (12.5% or 11 respondents), this increased to 56% and 65% for the second and third trimesters, respectively. In comparison, those health professionals in the present study who believed a small amount of alcohol (one drink per day or less) was not harmful to the mother mostly reported they considered occasional consumption to be safe during the second and third trimesters (60% or 20 respondents) and a further 32% (11 respondents) thought that occasional consumption was safe throughout pregnancy. These results are also consistent with a large U.S. study of paediatricians. Of the 879 paediatricians who responded to a survey about the knowledge and care of children exposed to alcohol, only 16% considered occasional drinking safe. Of this group only 19% thought that occasional drinking was safe during the first trimester, 52% in the second and 98% in the third trimester.

A further factor that may influence whether health professionals recommend not drinking during pregnancy may be related to the prevalence of alcohol consumption and alcohol related disorders seen in the patient population. In a study carried out in Western Australia where there is a higher prevalence of alcohol problems in the Aboriginal population, 87% of the paediatricians surveyed indicated that they would advise women who were pregnant or contemplating pregnancy to "consider not drinking at all". However, only 37.9% reported this was the only advice they gave. A third of the paediatricians indicated they would also recommend not becoming intoxicated, one third would advise women to have less than seven standard drinks over a week and almost half advised women to have no more than two standard drinks on one day spread over a least two hours (E. J. Elliott, Payne, Haan, & Bower, 2006).

Although the present study did not include questions about participants, advice to their patients around limiting alcohol consumption, we did ask health professionals how many drinks per week, in their opinion, would constitute heavy drinking for a pregnant woman or a woman planning a pregnancy. Answers from health professionals varied greatly ranging from as little as one drink per week to as many as 10 drinks per week with nearly 75% of respondents suggesting that 6 or more drinks per week would be considered heavy drinking. Therefore, it is likely that if a patient were to request information about the quantity that would be safe to consume, it is likely that the majority of health professionals in the present study would suggest women drink fewer than 7 drinks. This is consistent with the findings from the Western Australian study that found that one third of paediatricians would advise women to have less than 7 standard drinks over a week.

Health professionals' opinion regarding FASD

Only 32% of the participants in the current study thought that health professionals were sufficiently aware of FASD. In addition, nearly two-thirds (64%) were of the opinion that a diagnosis of FASD may lead to a child or family being stigmatised. However, these clinicians also overwhelmingly agreed that an early diagnosis of FASD may improve treatment plans for the affected child (88%) and that it was possible to prevent FASD (93%). Although the questions in the present study inquired about the spectrum of disorders associated with alcohol consumption, these findings were consistent with the Western Australia survey of paediatricians carried out between 2003 and 2004 that asked specifically about FAS (E. J. Elliott et al., 2006). Over 79% of the paediatricians in that study agreed that making an early diagnosis of FAS may improve treatment plans for the

child and 89% believed that FAS could be prevented, however, 70% of the paediatricians in this study also thought a diagnosis might be stigmatising.

Given that children with FASD do benefit from early diagnosis (Burd, Cotsonas-Hassler, Martsolf, & Kerbeshian, 2003; Stratton et al., 1996) and that health professionals providing obstetric and paediatric care agree, it would seem important to find ways to overcome the impression that a diagnosis may be stigmatising so that the best possible health and developmental outcomes for these children can be attained.

Health professionals knowledge of the criteria for diagnosis FAS

Although 77% of the respondents in the current study were able to identify facial abnormalities as a main feature for the diagnosis of FAS only 24% were able to identify all four of the major criteria required to make a diagnosis of FAS. This is consistent with a Western Australia study where 81% were able to identify facial anomalies as a major feature, but only 19% were able to identify all four criteria (Clarke, Tough, Hicks, & Clarren, 2005; E. J. Elliott et al., 2006; Nanson, Bolaria, Snyder, Morse, & Weiner, 1995). In contrast, 61-90% of health professionals in three North American studies were able to identify all four criteria for the diagnosis of FAS (Morse, Idelson, Sachs, Weiner, & Kaplan, 1992).

Health professionals' opinions and knowledge about alcohol and other drug use during pregnancy

The majority of participants in the present study identified a wide range of health and developmental problems they considered were associated with alcohol, tobacco and other drug use during pregnancy. The opinions these health professionals held about the effects of alcohol and tobacco were largely consistent with the current and abundant evidence about the use of alcohol and tobacco during pregnancy. In contrast, they were more likely to attribute a range of adverse outcomes to illicit drug use during pregnancy, despite a lack of sufficient evidence. Over one-third of the participants reported they considered all of the adverse outcomes listed in our questionnaire as potential effects from exposure to cannabis, opiates and methamphetamine.

The lack of agreement between the opinions of the health professionals in the present study and the current evidence around alcohol and other drug use during pregnancy was reflected in their lack of perceived knowledge of alcohol and drugs. A higher proportion of professionals reported they thought they needed more knowledge about cannabis (74%), methamphetamine (81%), opiates (81%) and methadone (84%). Only

24% and 49% of the participants thought they needed more knowledge about tobacco and alcohol, respectively. In addition, a higher proportion of health professionals reported they had less confidence in their ability to give advice about illicit drugs such as methamphetamine (66%) and opiates (66%) than alcohol (14%) and tobacco (8%).

6.3. Health Professionals' Practice

Health professionals' management of women who use alcohol and other drugs during pregnancy

Despite the findings that a large proportion of participants in this study thought they needed more knowledge, and did not feel confident about giving advice about illicit drug use; there was little difference in the way health professionals managed women who reported they were using alcohol or other illicit drugs. Over 80% reported they would ask more in-depth questions about the pattern and frequency of alcohol and other drug use. Notable was the finding that only 59% of the participants were more likely to continue to monitor alcohol use, whereas a higher proportion were more likely to continue to monitor other illicit drug use (67%) throughout a woman's pregnancy. This finding suggests that health professionals may perceive illicit drug use to be more serious than alcohol use or to be associated with other factors that may require monitoring such as co-morbid mental health, poor nutrition or domestic violence.

The interpretation that there may be other factors such as mental health or domestic violence that need to be monitored in women who report using illicit drugs was consistent with the finding that a higher proportion of health professionals were more likely to refer women to a specialty team to manage the pregnancy (78% vs 56%) or to offer a referral for illicit drug use (78% vs 62%) than for alcohol use.

In comparison, Herzig et al. (Herzig et al., 2006) found major differences between the management of alcohol, tobacco and other drugs. They suggested that the accurate assessment of alcohol in the participants of their qualitative study was compromised by the lack of consensus regarding its level of risk and by the social and cultural sanction of drinking. Providing advice depended on the provider's personal standards or categorisation of each patient as a conscientious worrier or underreporting alcohol abuser. Many of the healthcare providers disagreed with current recommendations of abstinence; nearly all expressed some tension between what they recommend to family, friends, and some worried patients, and their official stance with all other patients. With drug use, toxicology screening was inconsistent and arbitrarily applied. Advice messages were

inconsistent for cannabis use. For drug use generally, however, many providers apparently felt able to offer some resources or referrals and arranged for follow-ups.

A further quantitative study found that prenatal providers management of their pregnant patients was dependent on whether a woman reported moderate or heavy alcohol use (Diekman et al., 2000). Respondents in the Diekman et al. survey reported they were almost three times more likely to refer a patient for treatment if she reported heavy alcohol use than if she reported moderate alcohol use (61% compared with 21%). Obstetricians-gynecologists were more likely to discuss adverse effects or advise abstinence or reduction if a pregnant woman reports heavy alcohol use than if she reports moderate use. One half of the respondents indicated that they advised and educated all their pregnant patients about the consequences of drinking during pregnancy, whereas most of the rest do so only for current or suspected drinkers or for those with risk factors associated with drinking during pregnancy (e.g., smoking). Nine out of ten respondents reported that they always ask further questions about the extent of drinking when alcohol use is reported.

Elliott et al. (2006) found that only 4% of the paediatricians in their Australian study of paediatricians routinely provided information about the consequences of alcohol use in pregnancy. Thirty-eight percent sometimes provided information and 19% would provide information if certain risk factors such as smoking or drug use. The remaining 41% did not provide information.

6.4. Participants' Perceived Need of Training and Resources

The perceived need for training and other resources by health professionals in the present study were generally related to illicit drug use and assessing risk behaviours. Approximately 80% of the participants in our study reported that they would find a short questionnaire useful in screening for alcohol and/or other drug use during pregnancy. A need for training in assessing the risk of alcohol and other drug use during pregnancy was also identified by 57% and 81% of health professionals, respectively. The health professionals in this study also reported a need for printed materials that accurately reflected the risks associated with using cannabis, opiates, methamphetamine and methadone during pregnancy.

Consistent with these findings a U.S. study of obstetricians found that nearly 44% of the respondents in their study wanted further training and consultation in assessment and counselling women who report using alcohol during their pregnancy (Diekman et al., 2000). However, the most important piece of information they felt was lacking was

information on thresholds of alcohol use for adverse reproductive outcomes and referral sources for patients with alcohol problems. Eighty-three percent requested information about the drinking thresholds associated with selected adverse outcomes such as spontaneous abortions, birth defects and neurodevelopmental deficits. Two-thirds requested information on potential sources for referral for drug and alcohol treatment and counselling.

The need for a routine screening tool to assess alcohol consumption patterns was identified in an Australian study (Payne et al., 2005). Sixty-four percent of health professionals in the survey felt that a diagnostic checklist for FAS would be helpful, and 80% expressed a need for resources for themselves and their clients. As this study was carried out in Western Australia where there is a high Aborigine population at risk from alcohol use, respondents in this survey suggested some resources should be designed specifically for Indigenous populations.

6.5. Summary of Findings

The results of this study found that a substantial proportion of health professionals routinely asked women of childbearing age if they consumed alcohol and smoked tobacco. However, only a very small percentage were using a standardised screener to systematically evaluate the extent of alcohol or other drug use. Indeed only a handful of participants had ever heard of any of a number of screeners that are available and have been shown to have good psychometric properties (high specificity and high sensitivity).

In addition, a much lower proportion of health professionals discussed other drug use with their patients, than alcohol consumption and smoking. Those who reported they had asked about other drug use, qualified this response by explaining they used only one question -- *"do you use any other recreational drugs"*.

This variability in discussing alcohol, tobacco and other drug use was likely due to a number of perceived barriers. Over one-third of the participants in this study reported they would be less likely to discuss alcohol and to a lesser extent tobacco with women they perceived to be at "low" or "no" risk of alcohol or drug use. The factor the highest proportion of health professionals reported as being a barrier was when a family member was present during the clinical interview. The circumstance in which the highest percentage of respondents were "more likely" to discuss alcohol and other drug use was when the patient had social or psychological problems.

Most health professionals believed that women should abstain from drinking during pregnancy, but generally thought that women who were pregnant could consume on average 4 drinks per week before they would consider the woman was drinking heavily. However, nearly a third of the respondents, thought women could drink as many as 7 to 10 drinks before they were considered to be drinking heavily during their pregnancy. In addition, nearly two thirds of the participants suggested "binge" drinking for a woman was consuming from 4 to 6 drinks on one occasion.

Specific knowledge around the effects of alcohol and other drug use was varied, with only a small percentage of respondents being able to identify the four main criteria for Fetal Alcohol Syndrome. In addition, only about a third reported they thought health professionals were sufficiently aware of FASD and nearly two-thirds were of the opinion that a diagnosis of FASD may lead to a child or family being stigmatised. However, nearly all of these clinicians (88%) also believed that an early diagnosis could improve treatment plans for the affected child.

The majority of participants in the study identified a wide range of health and developmental problems associated with alcohol, tobacco and other drug use during pregnancy. Notable, was the finding that despite a lack of evidence most believed illicit drug use during pregnancy was associated with a range of serious outcomes. This finding along with the finding that health professionals were more likely to refer women to a specialty team to manage her pregnancy or to offer a referral for illicit drug use than for alcohol use suggests they consider illicit drug use to be more problematic for the mother and child than alcohol.

The perceived need for training and resources were mainly related to insufficient printed material that provided accurate information about the effects of alcohol and other drug use during pregnancy and the need for training to assess the risk of alcohol and other drug use. In addition, nearly 80% thought a short standardised questionnaire would be useful in their clinical practice.

7. IMPLICATIONS FOR HEALTH SERVICE PROVISION

The human toll and resource costs of substance use and substance abuse problems to individuals and their families are widespread and noticeable in a number of domains that include, physical and mental health, social relationships and economic security.
On a global scale the use of alcohol is ranked as the fifth leading risk factor for premature death and disability in the world (Ezzati et al., 2002; World Health Organization, 2002). In New Zealand, alcohol and tobacco are responsible for a considerable burden of ill-health and mortality (Connor, Broad, Rehm, Vander Hoorn, & Jackson, 2005; Crampton, Salmond, & Woodward, 2000; Ministerial Committee on Drug Policy, 2007).

Globally, illicit substances rank within the top 20 causes of mortality and disease burden (Ezzati et al., 2002). Cannabis is the most widely used illicit substance in New Zealand and world-wide. It has adverse effects on the respiratory and cardiovascular systems and increases the risk of major psychological problems (Fergusson, Lynskey, & Horwood, 1996). Findings from the WHO World Mental Health Surveys showed that cannabis use was higher in the U.S. and New Zealand (42%) than any other country (Degenhardt et al., 2008). Although males have been found to use more illicit drugs than females, sex-differences are decreasing and the period of risk for drug initiation appears to be lengthening longer into adulthood among more recent generations (Degenhardt et al., 2008).

The prevalence of opiate and methamphetamine use is relatively low in New Zealand compared to alcohol, tobacco and cannabis use, however, the associated social costs to society are serious. Use of opiates and methamphetamine are often associated with high rates of criminal behaviour by illicit drug users, and higher rates of serious health problems and mortality, such as HIV/AIDS, hepatitis B and C, drug overdose, drug use disorder and suicide (Ezzati et al., 2002).

Since every person is part of a family, substance use and abuse is likely to impact other family members as well. Particularly vulnerable are the children born to alcohol and drug using parents. These children are at risk through intergenerational (genetic) influences and through environmental risk factors that include societal laws, social norms, drug availability, economic deprivation, neighbourhood disorganization, family drug-related behaviour, family management practices, family conflict, low family bonding, early and persistent problem behaviours (Fergusson, Boden, & Horwood, 2008; Fergusson, Horwood, & Ridder, 2007; Uhl, 2004).

With this magnitude of impact on public health, mental health, and society and the emerging evidence of intergenerational transmission of substance dependence, it would seem imperative that alcohol, tobacco and other drug use in women of childbearing age be a health policy priority.

To date, most interventions to address the problem of maternal substance use and abuse in women of childbearing age or women who are pregnant have focused on preventing the problem in the first place. These include educational campaigns about the dangers of smoking and drinking during pregnancy, legislation requiring warning labels on cigarettes, education about the dangers of illicit drugs and efforts to curtail the use of drugs through restricting the availability. Regardless of these efforts, alcohol and drug use by women who are pregnant and women of childbearing age continues to be a significant public health problem. This is likely due to the complexity of substance use. Generally, substance abuse progresses in most people over a relatively typical trajectory that may begin in adolescence with experimentation, to use, to frequent use, to abuse and finally to dependence. Depending on the type of drug, it may take many years to move from experimentation to dependence. However, with many illicit drugs such as opiates and methamphetamine dependence occurs over a much shorter period of time and has a much higher potential for abuse and dependence. In addition, it is now clear that women seldom use only one drug or substance, but use two or more in combination (Muhajarine et al., 1997; Wouldes, 2001). Finally, women with alcohol and drug use disorders frequently have co-morbid mental health problems, a family history of alcohol and/or drug problems, and a history of child abuse and partner violence (Fergusson et al., 2008; Fergusson, Boden, & Horwood, 2009; Flynn & Chermack, 2008; Wouldes, 2001).

Therefore, prevention messages and public health interventions must consider different strategies that address where on the substance use trajectory a woman may be, the specific drug or combination of drugs she may be using, whether she may be suffering from depression or other mental health problems, whether she is planning a pregnancy, or is pregnant with a planned or unplanned pregnancy. Finally, prevention messages and interventions must consider the structural and cultural realities of women's lives.

A useful model for developing these strategies is one that was described by Munoz, Mrazek, and Haggerty (Munoz, Mrazek, & Haggerty, 1996) to develop services for mental health. This model arranges interventions along a continuum of risk from universal or primary preventive interventions to selective, indicated prevention and finally treatment.

Often, however, there is a good deal of overlap between these strategies. The recommendations based on the results of the present study will be discussed in the context of the following subgroups of interventions:

1. Universal or Primary Preventive
2. Selective Preventive
3. Indicated Preventive—these may include significant treatment approaches
4. Treatment or Tertiary—these approaches can also be seen as having a preventive approach in relation to prevention of complications from substance use or abuse and preventing intergenerational transmission of substance use problems.

7.1 Universal or Primary Preventive

These strategies are aimed at preventing the initial occurrence of the problem – in this case maternal alcohol or other drug use during pregnancy or avoiding pregnancy while using substances. These interventions are targeted at the general public or to a whole population group that has not been identified on the basis of increased risk. They can take place in any setting, but are primarily found in health care. The division between universal prevention of illness and universal health promotion is often unclear and it is often assumed that by promoting a particular health behaviour you will end up preventing illness. This may include informing the general public and women of childbearing age about the dangers of prenatal drug exposure and education to abstain from drug use during pregnancy or to avoid pregnancy if using drugs. In relation to alcohol, primary prevention should include but not be limited to a combination of approaches such as health warning messages on alcohol containers and where alcohol is sold, mass media that informs the general public and community focused education programmes. These approaches would provide a platform for healthcare professionals to initiate discussion and brief intervention screening with women of reproductive age who present to a primary healthcare service and ensure a consistency of key messages.

Specific to the current research, women of childbearing age and pregnant women should be universally screened and educated about the potential danger to the fetus and child from exposure to both licit and illicit substances, regardless of their life situation or ethnicity.

Screening for alcohol and other drug use

Results from the current study found that health professionals were more likely to ask about tobacco and alcohol use than other drug use. However, most did not obtain information about the extent, frequency or timing of alcohol and/or other drug use. For those who reported "routinely" asking about other drug use, the question was not drug specific and simply inquired about the use of "other recreational drugs" with no further assessment of frequency and timing. Only a small proportion of health professionals were aware of any of a number of standardised tools that are available for screening for alcohol and other drug use. Therefore, short standardised screeners should be made available to all health professionals and clinical practices, and these should be specific to the targeted audience. For instance, the T-WEAK and T-ACE has been found to be useful for women who are pregnant or planning a pregnancy, whereas the CRAFFT has been shown to be more effective in adolescent populations (Bertrand et al., 2004). These should be provided in different forms, printed copies, computerized versions that could be used on the clinician's computer, and/or screeners that can be used on websites available to women who maybe having trouble bringing up the subject of alcohol and drug use with her healthcare provider. This reluctance to speak with her healthcare provider may come about due to concerns around losing custody of her child or as a "perceived" stigma of drug use during pregnancy. It is therefore very important that disclosure of substance use does not result in any alienating or punitive measures.

A related issue is the education of the public about the scientific advances in the last 20 years. Specifically, public health messages and educational materials should include information that summarises the evidence that has shown that addiction is a chronic, relapsing medical and/or mental health problem not "bad behaviour". This may help to reduce the stigma around drug use during pregnancy, by portraying these individuals as suffering from a chronic illness rather than recidivist drug users.

Printed resources, education and educational materials

Results of our study found that health professionals do provide printed material to their patients, but they often felt there was a lack of educational material that accurately reflects the risks of alcohol and other psychoactive drug use during pregnancy, particularly for drugs such as cannabis, opiates and methamphetamine. The findings of the present study also indicated that health professionals' knowledge and opinions around alcohol and tobacco use during pregnancy were more consistent with the available evidence than their opinions and knowledge of other psychoactive drugs.

This lack of information is likely due to the inadequate scientific evidence currently available for illicit drugs. More is known about alcohol and tobacco than other drugs and in terms of drug effects, there is uncertainty as to whether or not illegal drugs have more deleterious effects than legal drugs. Mostly, we do not know the long-term developmental effects of prenatal drug exposure. At present, few studies have been carried out that can "isolate" the effects of a particular drug from the environmental and genetic influences.

In summary, the goal of universal or primary preventive strategies should be routine screening by health professionals who are engaged in the treatment of women of child bearing age and the provision of education about the known effects of alcohol and other drug use. Educational materials should be provided in the primary care settings through general practices, family planning clinics and sexual health clinics where women of childbearing age are most likely to present for general healthcare or for treatment due to behavioural risks associated with becoming pregnant. For those women who are planning a pregnancy or who are currently pregnant, similar education should be provided.

Education and educational materials should be tailored to specific audiences so that they are easily understandable and easily accessed and culturally appropriate. For the general population, media may include newspapers, radio, TV. However, other ways of communicating may be through the internet and websites frequented by young adults. Targeted audiences should include young men as well as young women, as the consumption of alcohol and the use and abuse of other psychoactive drugs can be influenced by family members and partners.

Public education should include messages about drug use and addiction as a mental health or medical problem. Drug or alcohol use should not automatically be associated with inadequate parenting or irresponsible behaviour. These attitudes can only lead to punitive measures toward women who are attempting to manage their addiction problems, and set up barriers to treatment that ultimately affect the best interests of the child. Education should also target early childcare providers, family courts, drug and alcohol treatment services and allied health professionals such as sexual health clinics and family planning.

Educational materials for health professionals should be updated frequently to reflect emerging evidence on the effects of drug and alcohol use. These materials should be easily accessible. Often busy health professionals do not have the time or expertise to read peer reviewed journal articles that are likely to provide the most accurate and recent evidence. Therefore, the literature on the effects of alcohol and drug use should be

reviewed periodically and key findings summarised and made easily accessible, through printed material, web-sites and educational seminars. Finally, undergraduate curricula for health professionals should include general education about the hazards of alcohol and drug use to maternal health and child development along with current evidence about the burden of disease associated with substance use. Primary prevention is part of a continuum of healthcare responses, Selective, Indicated and Tertiary or Treatment strategies are all preventive interventions that are ultimately reliant on the individual health professional routinely screening for alcohol and/or other drug use and determining the level of risk for the developing child as well as the mother. These interventions are likely to overlap depending on the clinical setting and available resources in geographically diverse areas. For instance, a number of services that are available in large urban hospitals are not likely to be available in small rural clinical settings. Therefore, the context of the clinical environment needs to be considered when policies to address drug and alcohol use in women of childbearing age are developed.

7.2 Selective Preventive

These interventions would serve women where there is a moderate risk to the health of the woman and/or to her developing child. They are likely to target women where the woman's alcohol and substance use is reported as hazardous. This may or may not be in combination with other contextual factors such as poverty, single parenthood, teen pregnancy or inadequate family support systems that may affect her health and the health and development of her child. Through screening, risk assessment and continued monitoring, skilled health professionals may feel competent to continue to manage the woman's health and or pregnancy, and provide additional services through their links with existing programmes. Specific to the current research findings, health professionals require the knowledge and resources to manage the care of women who report they are using alcohol and other drugs during their pregnancy.

Management of women who use alcohol and/or other drugs during pregnancy

Results of the present study found that 59% of the health professionals reported they would continue to monitor women who reported using alcohol during their pregnancy, whereas 67% would continue to monitor women who reported they used illicit drugs such as opiates and methamphetamine. However, a higher proportion of health professionals

were more likely to refer women to specialist services to manage the pregnancy if she was using illicit drugs (78%) than if she was using alcohol (56%).

For Selective Preventive approaches to be successful, adequate and culturally appropriate training in risk assessment should be provided along with sources for referrals and standardised questionnaires that can measure the extent, frequency and timing of alcohol and/or other drug use. However, a large proportion of the participants in the present study reported they did not feel that they had enough training in risk assessment of alcohol (57%) or other illicit drug use (81%) during pregnancy. Therefore, training that provides these skills and resources would be an integral part of this approach to intervention and the following Indicated Preventive and Tertiary or Treatment strategies.

7.3 Indicated Preventive

These interventions serve women who have reported a number of risk indicators that may include one or more of the following: teen pregnancy, multiple drug use, depression or other mental illness, or domestic violence. These women may have a documented history of substance use, domestic violence or have family histories of drug dependence and mental illness. Because of these risk factors these women may already have minimal but detectable signs or symptoms predictive of substance abuse disorders but do not meet diagnostic criteria for disorder at the current time. Intervening early has the potential to reduce the risk of harm to current and subsequent pregnancies. The development of clinical guidelines aimed at standardising practice and referral pathways appropriate in the New Zealand context could help to overcome some of the assessment and resource difficulties.

Depending on the extent of these problems they may need referral to special services such as Community Alcohol and Drug Services and maternal mental health services or both. For instance, they could link adolescents who are pregnant with services that could be delivered through current programmes in the community that address teen pregnancy and/or teen parenting and direct them to social services for housing or available benefits. Depending on the DHB these may be readily available in the healthcare setting or available in the community.

7.4 Tertiary Preventive or Treatment

Tertiary or Treatment strategies are intensive services that serve women who have established substance abuse disorders. Both *Indicated Prevention and Tertiary* services are most likely to come out of mental health, substance abuse and specialist antenatal programmes. They usually require health care professionals with a broad expertise in working with a mix of disorders and treatments (e.g., mental health problems, substance use, violence, trauma counselling, child protection). In addition, these services usually require staff trained to engage high-risk families and interventions to address specific risks such as maternal overdose and domestic violence. They are likely to be a combination of regional services such as Community Alcohol and Drug Services (CADS) and parenting programmes that focus on parents with drug and alcohol problems, as well as specialist antenatal teams such as the Alcohol, Drug and Pregnancy Team at National Women's Health at Auckland Hospital.

Antenatal services should offer a multidisciplinary approach to treatment that involves, obstetricians, neonatal paediatricians and lead maternity carers with specialist knowledge about the treatment of women who have used drugs and alcohol during their pregnancy, social workers with specialist information in drug and alcohol use and related social issues such as poverty, teen parenting, maternal depression and domestic violence.

These interventions can also be seen as being preventive as they can prevent the complications from substance use or abuse and prevent intergenerational transmission of substance use problems. They rely on a health professional's knowledge of the risks of using alcohol and other drugs during pregnancy, and the confidence to advise women about these risks.

Results from the present study found nearly half the health professionals felt they needed more knowledge about the effects of alcohol (49%), a significantly higher proportion felt they needed more knowledge about the effects of cannabis (74%), methamphetamine (81%), opiates (81%) and methadone (84%).

7.5 Conclusion

The results of this survey provide a clear indication that the education for healthcare professionals in relation to alcohol and other drug use before and during pregnancy is currently inadequate and requires a greater level of attention. This is especially concerning given that two thirds of the participants were health professionals whose predominant clinical practice involved maternity care. The survey also indicates a knowledge gap exists for a substantial proportion of healthcare professionals with regards current research on the developmental effects on children born exposed to alcohol and other drugs. This may be compounded by barriers the health professionals perceived or experienced in discussing alcohol and other drug use with women of childbearing age. However, the survey also demonstrated that health professionals recognised the benefits of improved education and showed a strong desire to increase their knowledge and improve their skills.

The improvement of knowledge around the effects of alcohol and other drugs on women of childbearing age can be achieved through undergraduate and vocational training, which in turn, is likely to improve the confidence of health professionals and reduce the perceived barriers to discussing alcohol use and ultimately to providing effective treatment. The development of clinical guidelines aimed at standardising practice and referral pathways appropriate to the New Zealand context and supported by consistent public health education messages would further enhance treatment. Finally, the context of the clinical environment needs to be considered when policies to address drug and alcohol use in women of childbearing age are developed as services are likely to be variable across the country.

The scale of substance abuse problems and associated harm in New Zealand remains at a high level and for women the risk is increasing. Addressing the gaps in current healthcare professionals' knowledge and skills is critical to the reduction of an avoidable harm and cost burden associated with alcohol and other drug use during pregnancy, and for improving current and future maternal and child health. It is, therefore, necessary for workforce education on this topic to become a public health priority.

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