

## Alcohol: Pregnancy

### The extent of alcohol consumption during pregnancy

- Most European women consume alcohol, with up to 11% of women having in excess of 40g.
- Although many women give up alcohol when pregnant, rates of drinking during pregnancy are high, ranging from 25% to 50% or more depending on the country. A small proportion, but not insignificant, continue to drink at high levels when pregnant.
- Forty-five percent of all women surveyed reported consuming alcohol during the 3 months before finding out they were pregnant, and 21% continued drinking after pregnancy recognition (Floyd et al 1999). 15% drank above guideline levels during the first trimester of pregnancy (Colvin et al 2007). Ebrahim et al (1999) found that from 1 to 3.5% used alcohol frequently (defined as at least five drinks per occasion or at least seven drinks per week) and from 0.7% to 2.9% binged (defined as five or more drinks per occasion). He found that risk factors for binge drinking were being unmarried, employed, and a habitual smoker. Binge drinking, however is less common among pregnant women compared with non-pregnant ones (2.9% vs. 11.2%).
- Sixty percent of women who reported alcohol consumption also reported that they did not know they were pregnant until after the fourth week of gestation. At 6 weeks gestational age, almost one-third of drinking women did not know they were pregnant.
- In addition to prenatal alcohol use, pregnant women may use other substances that may harm the foetus (2.3% take illicit drugs, 21.5% smoke cigarettes. Viewing the problem from another perspective, Shah et al (1998) found that among 373 female admissions to detoxification center, 7% of the women had a positive pregnancy test. Thus, a significant number of pregnant, substance-using women are unaware of their pregnancy and unsuspecting of the potential adverse consequences of alcohol and drug use for their foetus.
- Finally alcohol or drug abuse by the mother is often associated with adverse post partum outcomes like child abuse (Wilson et al 1996).

In Europe, despite abundant alcohol consumption, the issue of maternal drinking during pregnancy has largely been ignored and few data here are comparable.

As many pregnancies are unplanned many fetuses may inadvertently be exposed to alcohol before pregnancy is confirmed.

### ***Alcohol adverse effects on pregnancy, foetal, neonatal and early childhood outcomes***

Alcohol crosses the placenta and nearly equal concentrations in the mother and foetus can be attained. Alcohol is a teratogen, shows reproductive toxicity, and the effects of alcohol exposure on fetal development occur throughout pregnancy (including before the pregnancy is confirmed), with the developing foetus being most vulnerable to structural damage during the first three to six weeks of gestation (O'Leary 2004). However, adverse effects are not confined to the early stages (Jaddoe 2007). Effects also vary depending on the dose of alcohol and the pattern of consumption and on maternal and foetal characteristics. Genetics also has a role in determining the effects of alcohol on the developing foetus, some genotypes conferring increased risk of harm and others providing protection (Jacobson et al 2006).

Each year in the EU approx. 60 000 babies are born below normal birth weight due to alcohol

To date a "no-effect", "no-risk" or "safe" drinking level for pregnant women to avoid harm to their unborn children has yet to be established.

The most serious of the adverse pregnancy outcomes occur when pregnant women consume high levels of alcohol frequently increasing the risk of miscarriage, stillbirth and premature birth (O'Leary 2004). However, even at low average volumes of consumption, and particularly during the first trimester of pregnancy, can increase the risk of spontaneous abortion, low birth weight (20% greater risk, Aliyu et al 2008), prematurity and intra-uterine growth retardation (Abel 1997; Windham et al 1997; Albertsen et al 2004). The consequences of pre-natal alcohol related harm extend across the lifespan.

Exposure of the foetus to alcohol may result in a spectrum of adverse effects, referred to collectively as foetal alcohol spectrum disorders (FASD). FASD is not a diagnostic category, but an umbrella term used to describe a wide range of potentially lifelong effects that include physical, mental, behavior, and learning disabilities (Streissguth and O'Malley, 2000). Multiple diagnostic categories [Foetal Alcohol Syndrome (FAS), Alcohol-Related Birth Defects (ARBD) and Alcohol-Related Neurodevelopment Disorders (ARND)] are all subsumed under the term.

Rates of FAS range from 0.5 to 3 cases per 1,000 live births. The incidence of ARBD and ARND may be as high as 5 per 1,000 births (Stratton et al 1996). However, the true prenatal exposure to alcohol (based on biomarkers in neonatal matrices) is unknown in Europe, from the Mediterranean area to the Nordic countries. Values higher than those described in national surveys based on self-reported interviews can be hypothesized. FASD is underdiagnosed in Europe due to the failure to ask about alcohol, the lack of knowledge about its diagnosis and management and the fear of stigmatizing child and family. In this regard, it is not known if some neurodevelopmental disorders (deficit of attention and hyperactivity disorders) or school problems (low performance) during pediatric age could be related to prenatal exposure to alcohol.

FAS, ARBD, and ARND are the leading preventable set of birth defects and neurodevelopmental delay and abnormalities.

A recent study (García-Algar et al 2008) which highlighted a 45% ( $\geq 2$  nmol/g FAEE in meconium) ethanol consumption during pregnancy in a low socioeconomic status cohort from a Mediterranean city, may serve as an eye-opener for Europeans that gestational ethanol exposure is endemic not only in areas outside of Europe.

**Foetal alcohol spectrum disorders (FASD)**

-FAS has been described in children exposed chronically or intermittently to high levels of alcohol in utero (Astley & Clarren 2000). These children have characteristic facial abnormalities (and often a range of other birth defects), impaired growth and abnormal function or structure of the central nervous system. The diagnosis may not be evident at birth because not all are adversely affected, or affected to the same degree. FAS expression depends on other factors (O'Leary 2004): the timing of alcohol intake in relation to the stage of foetal development; the pattern and quantity of alcohol consumption (dose and frequency); and socio-behavioural risk factors (maternal age/duration of drinking, low socio-economic status, race, genetic differences, polydrug use).

-A number of alcohol-related birth defects (ARBD) and alcohol-related neurodevelopmental disorders (ARND) that become apparent later in childhood have also been described (Hoyme et al 2005; Astley & Clarren 2000), consisting of:

- significant developmental, behavioural and cognitive problems,
- intellectual deficits including reductions in general functioning and academic skills, deficits in verbal learning, spatial memory and reasoning, reaction time, balance, and other cognitive and motor skills (Mattson et al 2001; Chen et al 2003),
- a dose-dependent decrease in visual acuity in infants (Carter et al 2005);
- a dose-dependent reduction in size of the frontal cortex at intakes of two to six standard drinks per day (Wass et al 2001).
- increased risk of alcohol dependence in adolescence (Alati et al 2006) and at 21 years of age (Baer et al 2003).
- and 3.2 times as likely to have delinquent behaviour scores at age 6 to 7 years.

Some deficits, like problems with social functioning, appear to worsen as these individuals reach adolescence and adulthood, possibly leading to an increased rate of mental health disorders (Jacobson & Jacobson, 2002). Finally, the alcohol effects might be also exacerbated by concomitant smoking or drug using (Aliyu et al 2008).

The total costs of caring for children affected by FASD has been estimated to be \$74.6 million to \$1.6 billion based on an incidence of 0.33 and 1.99 cases per 1000 live births respectively (Stade et al 2009).

\* *Methodological problems when researching include:*

- *no systematic reviews on the effect of alcohol exposure in pregnancy and outcomes in childhood and adolescence*
- *difficulties inherent with under-reporting of alcohol intake*
- *use of variable definitions for low, moderate and high levels of maternal alcohol intake*
- *failure or inability to identify and adjust for potential confounding factors*
- *short duration of follow-up or evaluation of only limited outcomes in exposed children*
- *difficulties in comparing studies from different countries and settings*
- *the focus on high-risk population groups which may not be applicable to others*
- *publication bias*

EU and WHO alcohol policy have prioritized the protection of the unborn child and request that member states invest in the prevention of foetal alcohol exposure in order to reduce the incidence of FASD and related health costs.

- The protection of young people, children and the unborn child aiming to reduce exposure to alcohol during pregnancy, thereby reducing the number of children born with Foetal Alcohol Disorders.– ***EU strategy to support Member States in reducing alcohol-related harm, 2006.***
- In the absence of demonstrated safe limits, abstinence from alcohol during pregnancy is recommended and should be encouraged. Core areas and instruments for national action listed in the ***Framework for alcohol policy in the WHO European Region, 2006.***
- Special emphasis on an integrated approach to protect at risk populations, young people and those affected by harmful drinking of others; ***Resolution WHA61.4 - Strategies to reduce the harmful use of alcohol, 2008.***

Public awareness-raising interventions advocating abstinence during pregnancy are of key importance.

### **Pregnancy offers a unique opportunity for intervention**

Pregnancy is a time of natural declines in substance use and offers an important opportunity to intervene and to reduce women alcohol, cigarette, and drug use.

- First, for many women, pregnancy appears to be a time of increased motivation to reduce or eliminate unhealthy behaviours.
  - The desire to have a healthy baby and to avoid risks to one's own health may be motivating factors for the pregnant woman.
  - Concern from others for one's pregnancy may be more easily accepted and less likely to arouse resistance than concern for one's own general welfare (Ondersma et al 2009).
- Second, there may be increased opportunities to identify pregnant women who continue to drink.
- Third, the elevated health care costs associated with perinatal care of alcohol related problems may encourage health care providers to work with the pregnant woman.

### **Preventing alcohol consumption during pregnancy**

Information on pregnant women's knowledge about the dangers of alcohol use during pregnancy is needed when developing prevention programs. Despite warning messages about the dangers of prenatal drinking, about 28% of these women continued to drink during pregnancy. Neither ethnicity nor level of drinking was associated with perceived safety of drinking during pregnancy. Wine drinkers were more likely to believe that wine was safer to drink than other beverages during pregnancy. Hankin et al (1996) found that women in that sample thought there was a 26% chance that the baby would be okay even if the mother "drank a lot while pregnant". Women that heed warnings, abstain particularly in the latter stages of their pregnancies.

### **Identifying alcohol consumption during pregnancy?**

#### *The problem of late entry to prenatal Care*

Case identification early in pregnancy is difficult, because pregnant, heavy drinkers are at increased risk for delaying prenatal care until after the first trimester (Stratton et al 1996) for a variety of reasons, which include fear of forced treatment, involuntary

commitment, or criminal sanctions, high levels of alcohol use, stigmatization, lack of insurance, inability to pay for out-of-pocket expenses, transportation problems, lack of or restrictions on insurance, or lack of childcare or other necessary services at the clinics (DeVillie and Kopelman, 1998). If seeking care is delayed until later in the pregnancy, irreversible foetal damage may occur before anyone has an opportunity to warn them about the risks. More or less, only half of women receive early and consistent prenatal care (Klein and Zahnd, 1997).

It has been shown that past drinking habits are highly predictive of subsequent prenatal consumption so it is important to have some measure of prior alcohol use patterns among childbearing age women (Chang et al 2006). So it is beneficial to identify and, if necessary, modify a woman's alcohol use as early as possible in pregnancy or, ideally, before conception (Barry et al 2009).

#### *Do providers recognize risk drinkers?*

In general physicians are less likely to identify alcohol problems among female patients than among male patients (Wilson et al 2002) and although the screening of all pregnant women for past and present substance use has been advocated, many health care providers are reluctant to do so (Miner et al 1996). Thirty-five percent (Gehshan, 1995) of the addicted women in substance abuse treatment programs reported not having been asked about alcohol or drug use during their most recent pregnancies. Even among women who were asked about substance use, 13% of users denied such use. In other studies it has been found that primary care providers failed to discuss alcohol use with 55.4% of pregnant women. If prenatal care providers are reluctant to ask about alcohol use, the administration of standardized alcohol use screening instruments may be the solution to this problem.

#### *Screening Instruments for Pregnant Women*

Clinicians working in prenatal settings face particular challenges such as lack of specific tools and underreporting of prenatal alcohol consumption due to embarrassment, fear or beliefs that small amounts are not worth reporting. Several brief screening instruments (TWEAK and T-ACE) successfully identify alcohol abuse among pregnant women (Russel et al 1996; Chang et al 1998), although staff are often reluctant to use them (inadequate training) or to follow up on positive cases so many alcohol abusers are undetected (Miner et al 1996). Consistent use of screening instruments is likely to result in significantly improved identification of pregnant women at risk (Chang et al 1998).

Screening for alcohol use with validated tools is recommended to provide pregnant and preconceptional women with up-to-date comprehensive, and effective medical care (Floyd et al 2006).

In addition to screening, it is important, albeit challenging, to quantify the amount consumed. Very little work has been conducted to develop screening instruments for quantify other drug use in this population.

#### *Early detection of in utero exposure*

In order to diagnose the disorder and institute early intervention, preferably before the development of secondary disabilities, early detection of *in utero* exposure is of utmost importance (Bearer, 2001).

Identification is the first step in treatment. As a result, health care providers who screen for substance use may employ a lower drinking threshold for alcohol treatment referral of pregnant women compared with other women. Thus, pregnant women may be targeted for early intervention at drinking levels that might not indicate treatment referral outside of pregnancy.

Fortunately, In recent years, fatty acid ethyl esters (FAEEs) found in neonatal matrices such as meconium and neonatal hair emerged as a reliable, direct biological markers for the assessment of gestational alcohol exposure (Bearer et al 2003, Chan et al 2004, Ostrea et al 2006).

In Europe, the "Meconium Project" is estimating (by meconium analysis, maternal structured interview and clinical observations) the prevalence of alcohol use by pregnant women and the effects of chronic alcohol exposure on the foetus and infant and will result in making the problem visible, better implementation of early diagnosis and community support for individuals with FASD.

### ***Treating pregnant women***

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Once it is determined that a pregnant woman is a moderate or heavy drinker, a variety of issues emerges: (1) What proportion of women are treated? (2) Are brief interventions effective? (3) What treatments work? (Adapted from Hankin et al 2000).

#### ***What proportion of women are treated?***

Substance use disorders treatment admission rates for pregnant patients are relatively low and vary considerably across studies, from a low of 10% to slightly more than half of referred or eligible pregnant patients (Messer et al. 1996). There are numerous barriers to seeking care. Many women feel the stigma of seeking alcohol treatment while pregnant, difficulties to enter residential treatment programs, because there are few specialized treatment facilities that are equipped to care for both pregnant women and their children, scarcity of treatment services for pregnant women that give rise to waiting periods to access treatment.

#### ***Are brief interventions effective?***

In several studies (Moyer et al 2002, Whitlock et al 2004 and Ballesteros et al 2004), men and women appeared to benefit equally from brief interventions. Subgroup analyses in the meta-analysis by Wilk et al (1997) showed trends for a greater likelihood of moderate drinking following interventions for females versus males, although this was not statistically significant. In the revision of two studies by Poikolainen (1999) in which two different exposures were taken into account (brief and extended interventions) and two outcome measures (alcohol consumption and serum glutamyltransferase), one significant homogeneous effect favoured extended brief interventions for alcohol consumption in female samples (-51 grams/week).

#### **Pregnant women**

Of three good-quality behavioural counselling interventions in primary care settings that targeted pregnant women making prenatal visits, two found no evidence for an effect on alcohol consumption (Handmaker et al 1999; Chang et al 1999) and one a possible effect which just failed to reach statistical significance (Reynolds et al. 1995). In the study of Chang et al (1999) women in both groups reduced their alcohol consumption; the amount of reduction across the two groups was similar. However, women in the brief intervention condition who were abstinent at the time of the initial assessment were more likely to remain abstinent during the course of the pregnancy than women in the assessment-only condition.

A study of low-income women using a cognitive behavioural brief intervention with the goal of decreasing alcohol consumption among risk drinkers before their next pregnancy found out lower rates of risk drinking in the experimental group.

Handmaker et al 2001 found in a review of 22 alcohol intervention studies that women could be alcohol screened and recruited successfully in prenatal care settings and that women were able to reduce their drinking during pregnancy if receiving brief interventions.

In the most recently published study by O'Connor & Walley 2007, women in the brief intervention were five times more likely to report abstinence and those who were heavier drinkers and received brief interventions had better newborn outcomes of higher birthweights and lengths and lower mortality rates.

#### Preconceptional women

The results of the Project Choices and the clinical trials (Floyd et al 2007) aimed at testing the feasibility and effect of a motivational intervention to reduce alcohol consumption or increase of the use of effective contraception, or both, among non pregnant women who were at risk for an alcohol exposed pregnancy (AEP), showed that the intervention group was found to have a significant decrease in the risk of AEP including a significant decrease in risky drinking (eight or more drinks per week or five or more standard drinks in a day) and a significant increase in effective contraceptive use.

#### *What treatments work?*

The debate remains unresolved between those arguing that women with alcohol use disorders should be treated in prenatal care clinics (Carrington et al 1998) and those suggesting that traditional substance treatment programs are more appropriate. To date, most studies have examined the results of treatment within prenatal clinics.

Pharmacological interventions, like disulfiram, naltrexone and acamprosate, are contraindicated during pregnancy because their safety has not been demonstrated and disulfiram has been associated with limb reduction anomalies when used during pregnancy (Stade et al 2009).

A recent review suggests that psychological and educational interventions may result in increased abstinence from, or reducing the consumption of alcohol, among pregnant women (Stade et al 2009). However due to the inconsistency of results and the high risk of bias of some of the studies, the possibility to determine the type of intervention which would be most effective is limited. The reviewers also conclude that there is surprisingly very little evidence on the effect of such interventions on the health of the women and the babies.

The efficacy of Motivation Enhancement Therapy (MET) with pregnant substance-abusing women was moderated by baseline motivation. Those who endorsed a clear quit goal reduced their use more if assigned to MET condition (Ondersma et al 2009).

There is evidence that programs which use case management techniques can reduce alcohol use. Case management (provided at least monthly throughout pregnancy and for 1 year postpartum) and support group services were associated with decreased drug use, increased admission rates into formal substance treatment services, and improved birth outcomes as compared with women who received standard obstetric care (Laken et al 1997).

Home visits that assisted women in obtaining alcohol treatment and staying abstinent, and linking them with comprehensive community resources led to improved attendance at treatment, better treatment outcomes, and a greater likelihood of subsequent pregnancies being alcohol free (Grant et al 2005).

Positive results have been found in research with postpartum women (Grant et al 1996) heavy users of drugs or alcohol. After 2 years, 80% of the women had received some type of alcohol or drug treatment and 60% were abstinent from drugs for at least 6 months and use of long-term birth control increased to 62%.

Researchers suggest that comprehensive, holistic and tailored approaches may have the best outcomes with high risk women.

### ***Policy Implications***

Given the harm that alcohol poses to the foetus, on the whole this topic has received little policy attention.

Universal prevention approaches to limiting alcohol consumption (minimum legal age purchase regulations, increase in alcohol taxes, lowered blood alcohol content (BAC limits, etc.) are important in changing social and cultural norms, as well as in regulating activities and environments that promote excessive alcohol use among general population, including women of childbearing age. Although not directly focused on preventing FASD, they could have an indirect effect on FASD by decreasing alcohol consumption among women of reproductive age. Better methodological approaches to assess the effects of these strategies for women of childbearing age are needed.

### **Education and awareness raising campaigns**

Several universal interventions have focused on FASD prevention, relying on mass media, educational materials and media campaigns. One published study of a mass media (posters and tear-off cards) campaign found an overall increase in knowledge and awareness of the risks of alcohol use when pregnant (Glick et al 2002). Warning posters, with health and safety risks messages, can be posted at points-of-purchase to reach most consumers from moderate heavy potential drinkers. Warning posters work supplementing ongoing alcohol-education programs and reinforcing other policies, specially required health notices on alcohol beverages containers.

According to the study of Kaskutas & Graves 1994 the cumulative exposure (exposure to multiple sources) to health messages and awareness potentiates reduction in drinking during pregnancy.

### **Consumer labelling and warning messages<sup>1</sup>**

The high rates of drinking in European women, including pregnant women, and the high rates of unplanned pregnancy suggest that it is important that all women of child-bearing age are aware, before they consider pregnancy, of both this uncertainty and the potential risks of harm, so they can make informed decisions about drinking in pregnancy. Warning labels should highlight that not drinking alcohol is the safest option for pregnant women and women planning a pregnancy.

Research shows that 77% of EU citizens would support the introduction of labels on alcoholic beverages warning of the risks of drinking during pregnancy. Support was higher among non drinkers and among those who think public authorities have to intervene to protect individuals from alcohol-related harm (Eurobarometer 2007).

France has already introduced labels which advise women not to drink while pregnant<sup>2</sup>. Outside the EU, in the United States alcohol containers carry a government warning highlighting the risks related to pregnancy, driving, operating machinery and general health<sup>3</sup>.



*French label*

<sup>1</sup> For more information on consumer labelling and warning messages please read the specific fact – sheet.

Evaluation of the impact of alcohol labelling in raising awareness and changing behaviour indicates that labels alone are unlikely to directly affect behaviour change however they can contribute to raising awareness and intention to change drinking patterns which is an important stage leading to behaviour change. Hankin et al 1996 found that after implementation of the label law in the US there was a significant decrease in drinking among nonrisk drinkers but no decrease in alcohol consumption was detected among heavier drinkers. The evaluation in France shows only limited impact of the introduction of the health warning. A significant increase was found in general awareness (87% vs 82%;  $p < 0.001$ ) and awareness of harm to the foetus after the first glass (30% vs 25%;  $p < 0.01$ ) (Guillemont & Léon 2008).

### Alcohol industry funded campaigns

There is evidence that social responsibility messages, whether stand-alone or when added to product advertisements, benefit the reputation of the sponsor more than public health and create a sense of good-will toward the company and the product. For example, tobacco industry prevention campaigns consistently cause young people to become more favourably inclined towards the tobacco industry.

In alcohol, despite the absence of specific laws and regulations, there are some recent experiences on voluntary agreement by the industry (corporate responsibility) in advising pregnant women to abstain from alcohol consumption. [Pernod Ricard Group](#) applied this measure on a voluntary basis to its products on sale throughout the European Union from the first half of 2007 but to date no evaluation has been published.

### Early identification and brief interventions

Clinicians in primary care and women's health care settings (i.e. obstetrician and gynaecologist offices, family planning or prenatal care clinics) are in a unique position to identify women who are at various risks, including an alcohol-exposed pregnancy, and intervening with them when appropriate (Tsai et al 2007). Broad-based implementation of screening and brief intervention by those professionals is one of the most promising strategies for preventing alcohol exposed pregnancies.

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<sup>2</sup> The French warning label may be either the text "La consommation de boissons alcoolisées pendant la grossesse, même en faible quantité, peut avoir des conséquences graves sur la santé de l'enfant" or a defined logo (as shown above). Source: [www.sante.gouv.fr/htm/dossiers/alcool/questions\\_reponses.pdf](http://www.sante.gouv.fr/htm/dossiers/alcool/questions_reponses.pdf) Translation: *Consumption of alcoholic drinks during pregnancy, even in small quantities, could have serious consequences for the health of the child.*

<sup>3</sup> Text of the US labels "GOVERNMENT WARNING: (1) According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects. (2) Consumption of alcohol impairs your ability to drive a car or operate machinery, and may cause health problems."

**Recommended advice (adapted from NHMRC (2009))**

-In the absence of demonstrated safe limits, abstinence from alcohol during pregnancy is recommended and should be encouraged.

- Not drinking alcohol is the safest option for pregnant women and women planning a pregnancy.
- The risk of harm to the foetus is highest when there is high, frequent, maternal alcohol intake.
- The risk of harm to the foetus is likely to be low if a woman has consumed only small amounts of alcohol before she knew she was pregnant or during pregnancy.
- The level of risk to the individual foetus is influenced by maternal and foetal characteristics and is hard to predict.

-Women who drank alcohol before they knew they were pregnant should be assessed on how much alcohol was consumed and at what stage in the pregnancy and warned of the importance to abstain but never inducing unnecessary anxiety.

-Women who find it difficult to decrease their alcohol intake will have to be referred to receive support and treatment in appropriate or specialist services.

-Babies exposed have to be monitored until adolescence to evaluate possible developmental deficits and receive appropriate support to counterbalance the negative alcohol effects.

***Recognition of women's at risk drinking behaviour before and during pregnancy has to be improved***

The evidence shows that there are missed opportunities for prevention, detection and treatment due to lack of training among those professionals.

Given the reluctance of most providers to ask pregnant women about their alcohol consumption, innovative strategies to increase provider recognition rates are needed. The effectiveness of different methods of educating providers, as well as the success of different types of trainers, might be compared. It must be emphasized that recognition of prenatal drinking itself is not enough. A key question is whether recognition leads to intervention by the health care provider. Training programs need to tell the provider how to help the patient, either by intervening directly or by referring patients to an alcoholism treatment program.

***Interventions to reduce barriers to seeking care have to be designed***

Innovative methods of reducing the barriers to care seeking should be evaluated. Programs that use trained paraprofessionals to encourage pregnant women to seek and continue prenatal care might be compared with programs that use physicians. Efforts to bring services to local neighbourhoods by using mobile health units or visiting nurses might be examined.

**Social welfare-based programmes**

Programs of structured home visits (including practical assistance, basic advice and advocacy for access to services) to support mothers are effective and cost-effective in reducing maternal alcohol use and improving infant health. In the program evaluated by Olds et al 1999 follow-up associated the program with reduced rates of alcohol use in the mothers during pregnancy, leading to reductions in alcohol-related cognitive impairment in the children as pre-schoolers and reduction in their early initiation of alcohol use.

***Specific interventions with at risk populations have to be developed***

A FASD prevention programme has to include the community mobilization for outreach, identification and service provision to women at known risk for producing children with FASD, because they have already borne an alcohol-affected child.

Because FASD can be an intergenerational phenomenon, there is a need for preventive efforts aimed at addressing familial predispositions for alcohol abuse among children of alcoholics, especially with women of child-bearing age.

### **Options**

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- **Strengthened general alcohol policy measures (taxes, controls on availability, advertising etc)**

Alcohol policy measures (taxes, controls on availability, advertising) for limiting alcohol consumption have to be broadly promoted because although not directly focused on preventing alcohol-exposed children, they will have an effect on reducing alcohol use during pregnancy and indirectly reducing FASD.

- **Compulsory warning labels**

Providing consumers with information allows them to make informed choices and is the right of all consumers. Clear, simple messages such as those used in tobacco e.g., "Smoking kills" and "Smoking when pregnant harms your baby" have shown a high level of recall and are likely to work best when run in parallel with a broad public health strategy and have shown reduction in both the number of cigarettes smoked and cessation leading to significant health gains for the population. Introduction of effective, well-designed messages on alcohol labels could contribute to a reduction in the number of alcohol-exposed children and in FASD.

- **Alcohol screening and Brief Interventions of pregnant women have to be widely disseminated.**

Broad based implementation of screening and brief interventions by professionals is one of the most promising strategies for preventing alcohol exposed pregnancies but the evidence shows that there are missed opportunities for prevention, detection and treatment due to lack of training among those professionals.

Innovative strategies to increase provider recognition rates are needed and training programs need to tell the provider how to screen and how to help the patient, either by intervening directly or by referring patients to specialist treatment programs.

- **Multilevel FASD prevention approaches have to be endorsed.**

FASD is 100% preventable but to be effective, programmes have to be integrative and implemented at multiple levels.

They have to include general education and awareness raising campaigns, the introduction of consumer labelling and warning messages, the promotion of alcohol industry funded campaigns, the wide dissemination of early identification and brief interventions and the development of specific interventions with at risk populations including the community mobilization for outreach, identification and service provision to women known to be at risk of producing children with FASD.

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**Further research directions**

Areas where further research is needed are:

-Association between low to moderate alcohol consumption and foetal harm.

-Improved surveillance and monitoring

-Development of in-utero approaches derived from basic research to prevent or minimize alcohol induced prenatal injury.

- Valid methods to identify prenatal alcohol

Moreover, appropriate screening tools are available but underused. Additional studies (community and clinic samples, etc.) are needed to refine the instruments and their methods of administration.

-Determination of more effective ways to identify FASD across life span, especially in infants and children.

-Most effective and cost-benefit interventions to modify drinking behaviour during pregnancy

It is also critical to determine the most effective interventions by examining a wide range of outcomes (decrease in prenatal drinking, delaying conception of another child, reduction of comorbidities, to infant outcomes, etc). Determining the cost and benefits of treatment interventions (short- and long-term costs) will be of great importance.

-Development of strategies to assist children born with FASD

Children exposed to alcohol and in critical need of interventions that can reduce the effect of their cognitive and behavioural deficits. It has been found that children who receive appropriate supportive services fare better with respect to secondary disabilities and life functioning (Streissguth and O'Malley 2000). Multiple approaches are needed including social support, special education, behavioural and cognitive therapy and medications.

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