

Drinking alcohol during pregnancy

A literature review

A report commissioned by the Health Promotion Agency

November 2014

ACKNOWLEDGEMENTS

The Health Promotion Agency (HPA) commissioned Research New Zealand to undertake this literature review to inform its work on alcohol and pregnancy and to provide a resource for others working on this topic area. HPA would like to thank the principal author, Louise Alliston, for her dedication in undertaking this review of the literature on a complex and challenging area.

The HPA commission was managed by Sarah Wright, Policy Advisor, and Rosie Pears, Principal Policy Advisor, HPA.

COPYRIGHT

The copyright owner of this publication is HPA. HPA permits the reproduction of material from this publication without prior notification, provided that fair representation is made of the material and HPA is acknowledged as the source.

DISCLAIMER

This research has been carried out by an independent party under contract to HPA. The views, observations and analysis expressed in this report are those of the authors and are not to be attributed to HPA.

Provider: Research New Zealand

ISBN: 978-1-927303-30-6 (Online)

Citation: Research New Zealand. (2014). *Drinking alcohol during pregnancy: A literature review*. Wellington: Health Promotion Agency.

This document is available at www.hpa.org.nz and www.alcohol.org.nz

Any enquiries about this report should be directed to HPA at the following address:

Health Promotion Agency
Level 4, ASB House
101 The Terrace
PO Box 2142
Wellington 6140
Email: enquiries@hpa.org.nz

November 2014



**Drinking alcohol during pregnancy:
A literature review**

November 2014



Drinking alcohol during pregnancy

A literature review

PREPARED FOR Health Promotion Agency
PREPARED BY Louise Alliston
CONTACT DETAILS Emanuel Kalafatelis
Research New Zealand
Phone 04 499 3088
www.researchnz.com
PROJECT NUMBER #4620



Contents

1.0	Executive summary	5
2.0	Introduction	15
3.0	Methodology	16
3.1	Scope	16
3.2	Search strategy	17
3.3	Search results	22
	PART A: Drinking alcohol during pregnancy	23
4.0	Drinking in New Zealand	24
4.1	Drinking patterns in the general population	24
4.2	Drinking alcohol during pregnancy	25
5.0	Predictors of drinking alcohol during pregnancy	27
5.1	Predictors of drinking alcohol during pregnancy by country	29
5.2	Potential predictors of drinking alcohol during pregnancy	34
6.0	Drinking alcohol during the different stages of pregnancy	36
6.1	The influence of pre-pregnancy drinking patterns on alcohol consumption during pregnancy	37
6.2	Drinking alcohol before and after pregnancy recognition	38
6.3	Drinking alcohol during the different trimesters of pregnancy	41
7.0	Psychological predictors of drinking alcohol during pregnancy	44
8.0	Concurrent smoking and drinking during pregnancy	47
9.0	Socio-demographic factors and drinking alcohol during pregnancy	49
9.1	Education	50
9.2	Age	50
9.3	Partners	51
9.4	Maternal occupation	53
9.5	Economic contraction	53
	PART B: Developing communication strategies that address the use of alcohol in pregnancy	54



10.0	Women’s knowledge of, and attitudes towards, drinking alcohol during pregnancy	55
10.1	The general public	56
10.2	Pregnant women	56
10.3	Women of childbearing age	60
10.4	Awareness of official guidelines	66
11.0	Developing communication campaigns and strategies	67
11.1	Campaign planning	68
11.2	Developing the message/s	71
12.0	The role of health care providers	77
12.1	What messages about alcohol use during pregnancy do women receive from health care providers?	78
12.2	Resources for health care providers	80
13.0	Evaluation of communication strategies: case studies	83
13.1	Challenges in evaluating communication strategies	83
13.2	Campaign case studies	84
14.0	Innovative approaches	97
15.0	Messages for health warning labels	100
15.1	Effectiveness of health warning labels	101
15.2	Content of the health warning label	102
16.0	Future research directions	105
	Appendix 1: Current and recent campaigns and resources	107
	Appendix 2: References	116



1.0 Executive summary

The Health Promotion Agency (HPA) commissioned this literature review to find out:

- ◆ what is known about alcohol use during pregnancy among different groups of women
- ◆ what works to influence decisions to stop drinking during pregnancy, and
- ◆ what messages are best received and how.

The literature review explores research on the predictors of drinking alcohol during pregnancy and women's knowledge of, and attitudes towards, drinking during pregnancy. The review also describes research on the development of primary prevention communication strategies, and highlights evaluated primary prevention communication strategies that have promoted awareness about the risks associated with alcohol consumption during pregnancy and/or have encouraged women not to drink when pregnant or planning to become pregnant.

Fetal alcohol spectrum disorder (FASD)

Prenatal exposure to alcohol can result in one or more of a spectrum of disabilities (physical, psychological, behavioural), which are described by the umbrella term of fetal alcohol spectrum disorder (FASD). Fetal alcohol syndrome (FAS) occurs at the most severe end of the FASD spectrum¹. Some of the more severe outcomes can include growth deficits, facial malformations, and brain and central nervous system disorders (Elliott, Coleman, Suebwongpat & Norris, 2008; Nguyen, Coppens & Riley, 2011). No rigorous data describes the prevalence or severity of FASD in New Zealand. However, Connor and Casswell (2012) use prevalence data from the United States² to provide a "conservative" estimate of 600 children being born with FASD in New Zealand each year.

FASD is preventable if no alcohol is consumed during pregnancy. Abstinence from alcohol use during pregnancy is widely recommended by health authorities, including the U.S. Surgeon-General³, the Centers for Disease Control and Prevention (CDC)⁴, the New Zealand Ministry of Health⁵, and the Health Promotion Agency⁶.

Drinking alcohol during pregnancy in New Zealand

The prevalence of drinking alcohol during pregnancy varies between countries and between studies, reflecting differences in drinking culture and social attitudes toward drinking, as well as differences in study methodologies. Most women in New Zealand stop consuming alcohol, or reduce their alcohol consumption, once they realise they are pregnant (Ministry of Health, 2007;

¹ <http://www.cdc.gov/ncbddd/fasd/facts.html>

² U.S. levels of drinking are lower than those found in New Zealand.

³ <http://www.surgeongeneral.gov/news/2005/02/sq02222005.html>

⁴ <http://www.cdc.gov/ncbddd/fasd/alcohol-use.html>

⁵ <http://www.health.govt.nz/your-health/healthy-living/addictions/alcohol-and-drugs/alcohol/alcohol-pregnancy-and-babies>

⁶ <http://www.alcohol.org.nz/alcohol-you/your-drinking-okay/low-risk-alcohol-drinking-advice>



Ministry of Health, 2009; Morton, et al., 2010). A significant minority of these women are high-risk drinkers during pregnancy (Ho & Jacquemard, 2009; Schluter, Tautolo, Taylor & Paterson, 2013).

European women in New Zealand are more likely to report consuming alcohol while pregnant compared with women in the total population, while Pacific and Asian women are less likely to report consuming alcohol while pregnant. Drinking patterns within these groups can differ; for example, fewer Tongan and Samoan women drink alcohol during pregnancy than women from other Pacific groups (Ministry of Health, 2009).

Predictors of drinking alcohol during pregnancy

A systematic review and a number of country-specific studies have examined predictors of drinking during pregnancy. The most consistently identified predictors are identified in the following table.

Table 1: Predictors of drinking during pregnancy

Consistently identified predictors of drinking alcohol during pregnancy	
Frequent and/or high alcohol consumption pre-pregnancy	Skagerstróm, Chang & Nilsen (2011)*; Anderson, et al. (2013); Thanh & Jonsson (2010); Skagerstróm, Alehagen, Håggström-Nordin, Årestedt & Nilsen (2013); Ethen, et al. (2009).
Alcohol problems	Skagerstróm, et al. (2011)*.
Being abused or exposed to violence	Skagerstróm, et al. (2011)*.
Social or psychological factors (e.g. anxiety or depression)	Skagerstróm, et al. (2011)*; Walker, Al-Sahab, Islam & Tamim (2011); Thanh & Jonsson (2010); Skagerstróm, et al. (2013).
Older age	Skagerstróm, et al. (2011)*; Maloney, Hutchinson, Burns, Mattick & Black (2011); Hutchinson, Moore, Breen, Burns & Mattick (2013); Callinan & Ferris (2014); Thanh & Jonsson (2010); Skagerstróm, et al. (2013); Murphy, Mullally, Cleary, Fahey & Barry (2013); Ethen, et al. (2009); Parackal, Parackal, Ferguson & Harraway (2006); Parackal, Parackal & Harraway (2013); Niclasen (2014).
Higher socio-economic status	Skagerstróm, et al. (2011)*; Hutchinson, et al. (2013).
Smoking	Skagerstróm, et al. (2011)*; Hutchinson, et al. (2013); Walker, et al. (2011); Thanh & Jonsson (2010); Skagerstróm, et al. (2013); Murphy, et al. (2013); Ethen, et al. (2009).

*Systematic review.



Predictors identified less consistently include having a higher level of education (Ethen, et al., 2009; Hutchinson, et al., 2013; Niclasen, 2014) and having previously given birth (Skagerström, et al., 2011).

Research suggests that a partner *encouraging* reduction or abstinence would not influence most expectant mothers' drinking behaviour during pregnancy (although partners may play an important role in *supporting* a woman's decision to stop or reduce drinking during pregnancy) (Peadon, et al., 2011; Prevention Working Group of FASD Stakeholders for Ontario, 2009). It appears that both women and men may respond to their own individual standards and expectations when making decisions about drinking during a pregnancy (Mellingen, Torsheim & Thuen, 2013).

Drinking alcohol during the different stages of pregnancy

Recent research suggests that, when asked generally about drinking alcohol during pregnancy, some women may interpret this as meaning post-pregnancy recognition, giving a less accurate picture of the drinking that occurs pre-pregnancy recognition (Callinan & Ferris, 2014).

A much higher rate of drinking is reported in the period before pregnancy is recognised. International and New Zealand research suggests that around 50% of women could be drinking alcohol pre-pregnancy recognition, decreasing to around 13 to 20% drinking post-pregnancy recognition (Callinan & Ferris, 2014; Parackal, et al., 2006; Tough, Tofflemire, Clarke & Newburn-Cook, 2006). In New Zealand, around 40% of pregnancies are unplanned (Morton, et al., 2010), and confirmation of pregnancy appears to occur later in pregnancy for those with unplanned pregnancies than for those with planned pregnancies (Mallard, Connor & Houghton, 2013).

Indicative research has identified the following predictors for the period of pregnancy before a pregnancy is confirmed and for the period after pregnancy has been confirmed (individual predictors have often only been identified in one or two studies and further research will help to confirm these).

- ◆ *Predictors of drinking pre-pregnancy recognition*
International research identifies unplanned pregnancy, higher income, using tobacco, being Caucasian, and not having used assisted reproductive technology as predictors of drinking pre-pregnancy recognition (Callinan & Room, 2012; Tough, et al., 2006). New Zealand research identifies women aged 16 to 24 years and women who are European, Māori or Pacific as being more likely to drink in the pre-pregnancy recognition period (Parackal, et al., 2006; 2013).
- ◆ *Predictors of binge drinking in the pre-recognition period*
International research identifies unplanned pregnancy, using tobacco, having low self-esteem, being younger, not having previously given birth, and being well educated and in a good job, or being a skilled worker as predictors of binge drinking pre-pregnancy recognition (Tough, et al., 2006). New Zealand research identifies risky drinkers before pregnancy, those aged 16 to 24 years (Parackal, et al., 2006; 2013), Māori and Pacific women (compared with European women), smokers, and drug users (Mallard, et al., 2013) as being more likely to binge drink in the pre-pregnancy recognition period.



- ◆ *Predictors of drinking post-pregnancy recognition*
International research identifies women aged 30 to 39 years, being Caucasian and using tobacco as predictors of drinking post-pregnancy recognition (Tough, et al., 2006). New Zealand research identifies increasing frequency of alcohol consumption before pregnancy as a predictor of drinking post-pregnancy recognition (Mallard, et al., 2013).
- ◆ *Predictors of binge drinking post-recognition*
International research identifies unplanned pregnancy, using tobacco, having previously given birth, being an unskilled worker, being unemployed for more than one year, and having a "mental/neurotic" disorder as predictors of drinking post-pregnancy recognition (Strandberg-Larsen, Nielsen, Andersen, Olsen & Grønbaek, 2008).

Indicative international research suggests that women drinking at *high-risk* levels after the first trimester are more likely to be younger than women drinking after the first trimester at *less risky* levels. They are also more likely to have lower levels of education, be a single-parent, and smoke cigarettes or use recreational drugs.

Women's knowledge of and attitudes towards drinking alcohol during pregnancy

A number of studies have asked the general public, pregnant women, women of childbearing age, and mothers what they know about alcohol and pregnancy, their attitudes towards drinking alcohol during pregnancy, and the influences on their decision whether or not to drink.

The majority of women know that stopping alcohol use is an important maternal behaviour associated with increasing the chances of having a healthy baby, although many women have limited knowledge about the *specific* effects of alcohol on the unborn child (Jones & Telenta, 2012; Peadon, et al., 2010; Parackal, et al., 2006; 2013; Raymond, Beer, Glazebrook & Sayal, 2009). Women also have differing opinions about the potential risks of low levels of alcohol consumption during pregnancy, different types of alcohol, and consumption in the different trimesters of pregnancy (Elek, et al., 2013; Hammer & Inglin, 2014; Parackal, Parackal, Harraway & Ferguson, 2009; Parackal, et al., 2006; 2013; Prevention Working Group of FASD Stakeholders for Ontario, 2009; Thomsen, 2013).

Women's awareness of the effects of alcohol in pregnancy comes from health providers, health facilities, brochures, pamphlets, booklets and newspaper/magazines, television, the internet, and family and friends (Elek, et al., 2013; Loxton, et al., 2013; Parackal, et al., 2006; 2013). Pregnant women report receiving inconsistent and unclear information from health care providers on the safety of drinking during pregnancy (Elek, et al., 2013; McBride, Carruthers & Hutchinson, 2012).

Research suggests that *attitude* to alcohol consumption during pregnancy is a more important influencer of behaviour than *knowledge*. Women describe an internal process of weighing up the often conflicting information available to them, as well as their own personal experiences and those of friends and family who may have consumed alcohol while pregnant (Hammer & Inglin, 2014; Loxton, et al., 2013; Peadon, et al., 2010; Raymond, et al., 2009). Key reasons for abstaining from alcohol during pregnancy are likely to be the health of the baby and social pressure (Elek, et al., 2013; Raymond, et al., 2009).



Family and friends of women can be either a positive or negative influence on whether women drink during pregnancy. Pregnant women often socialise in environments with strong social norms that encourage drinking and some women report an expectation by family and friends that they will drink during social occasions (Jones & Telenta, 2012; Loxton, et al., 2013). Also, those in early pregnancy do not always want to reveal their pregnancy when they are offered alcohol (Elek, et al., 2013; Jones & Telenta, 2012). Conversely, some women who continue to drink during pregnancy may receive negative comments about their drinking from partners, family and friends (Loxton, et al., 2013; McBride, et al., 2012).

A number of countries have produced guidelines on drinking during and when planning a pregnancy, to inform health care providers and pregnant women about the risks of alcohol consumption during this period. It is not clear to what extent pregnant women are aware of these guidelines.

Developing communication campaigns and strategies

Primary prevention communication strategies used to disseminate messages about drinking alcohol in pregnancy *before* a woman becomes pregnant are mainly universal strategies, such as media campaigns, social marketing approaches⁷, educational materials and warning labels on alcoholic drinks (Nguyen, et al., 2011; Young, et al., 2009). These messages usually aim to raise awareness about the risks of drinking during pregnancy, where people can go for further information and support, and build community awareness and involvement in the issue (Thurmeier, Deshpande, Lavack, Agrey & Cismaru, 2011).

During pregnancy, primary prevention approaches include those described above, but can also encompass brief interventions that include clinical advice and counselling, and alcohol screening in doctors' practices (Nguyen, et al., 2011).

Primary prevention communication strategies may target pregnant women, women of childbearing age, and/or those in a position to influence these women (their partners, family and friends, health and social service providers, and/or the general public) (Young, et al., 2009). They usually address existing knowledge, beliefs, and attitudes, and can act as a support to clinical strategies, such as brief interventions and other work that may take place within the maternity care or broader health system.

Messages are usually broadly delivered through television, radio, billboard campaigns, posters, the distribution of leaflets and, increasingly, through social media. Burgoyne, Willet and Armstrong (2006) note that media and other communication campaigns are most appropriate for large low-risk populations, whereas those at higher risk may need comprehensive support to make health behaviour changes.

⁷ Social marketing has been described as "tools and technologies adapted mainly from commercial marketing and applied to issues for the social good" (p.20), aiming to inform *and* persuade and to influence changes in behaviour in individuals, environments, and social structures (Donovan & Henley, 2010). Social marketing approaches usually include media campaigns but also aim to create and promote a favourable environment in the wider community that makes adopting the new behaviour desirable (Poole, et al., 2011). Media campaigns may be used as part of a social marketing approach but may also be developed as a stand-alone strategy.



While a large number of communication campaigns addressing alcohol use during pregnancy have been undertaken, campaigns and messages are not often based on theory or on formative research that can help to identify the target audience and target behaviours, and the factors that may influence the targeted audience's behaviour. Evaluations tend to be of poor to fair quality and often do not draw any meaningful conclusions (France, et al., 2013). However, some best practice approaches to campaign planning have been identified (Burgoyne, 2006; Thurmeier, et al., 2011), including the following:

- ◆ Campaigns should be carefully planned, with objectives that are specific, measurable, attainable, realistic and time-specific.
- ◆ Campaigns should be one component of a broader strategy and should involve a wide range of partners. This can increase the staff time and funding available, broaden the scale and reach of a project, and help to build community support. Including the population of interest in the planning process helps to ensure the issue is addressed in an appropriate manner.
- ◆ Campaigns should be carefully designed for a specific group or groups. Campaigns are likely to be most effective with a large, well-defined group of individuals at lower risk.
- ◆ Campaigns should consider current levels of awareness in the community being targeted, and message development should focus on areas where the level of awareness is not high.
- ◆ Campaigns should have good exposure and reach to increase the likelihood that messages will be heard and remembered. There may be benefits to developing new resources for specific populations and messages, but both new and existing resources should be tested with the population that is being targeted.

There is limited evidence on the specific elements that contribute to the effectiveness of a campaign message. However, a number of useful questions have been identified that can be used to structure campaign messages: “What?” (important information, such as “It is safest not to drink alcohol during pregnancy”); “So what?” (relevant reasons for change, such as potential birth defects in the baby); “Then what?” (define an easy action, such as talking to a health care provider) (Burgoyne, 2006).

Both messages and images can be powerful, and should be chosen with care and be tested with the population of interest. Several researchers note the need to avoid instilling too much fear in women about the consequences of drinking in the unrecognised period of pregnancy. When developing campaigns, those involved must determine the most effective balance between describing the “threat” and promoting coping mechanisms and the self-confidence of the targeted audience, so that they can undertake the health behaviour being promoted (Burgoyne, 2006; Clarren, Salmon & Jonsson, 2011; Poole, 2011; Thurmeier, et al., 2011).

Images should be chosen only after the population of interest and key messages are identified. They should be relevant to the targeted population and support the key messages of the campaign. There are often differences of opinion over the use of supportive versus stronger



images (Burgoyne, 2006; Clarren, et al., 2011), and many campaigns do not show images of alcohol associated with pregnant women, babies and children (Burgoyne, 2006).

The role of health care providers

Health care providers can be a key source of information on alcohol for pregnant women and can act as “endorsers or spokespersons” for prevention messages (Deshpande, et al., 2005; France, et al., 2013).

Women report wanting to know more about the reasons and evidence for current advice (Elek, et al., 2013; McBride, et al., 2012). Yet many health care providers do not have a clear understanding of the risks of drinking during pregnancy (Anderson, et al., 2010; Wouldes, 2009). In addition, research suggests the following:

- ◆ Women may not recall receiving advice on drinking during pregnancy from health care providers, particularly if it is only delivered verbally (Jones, Telenta, Shorten & Johnson, 2011; Loxton, et al., 2013).
- ◆ If there is a lack of formal training for service providers, information may be gained in an unstructured way, with learning often self-directed (Jones, et al., 2011; Loxton, et al., 2013).
- ◆ While health care providers may feel able to discuss alcohol use with women they perceive to be *high risk*, they face issues with other women such as being unsure how to respond, a lack of referral pathways, or more personal reasons, such as feeling a woman's drinking is not their business (Loxton, et al., 2013; Wouldes, 2009).

Women often see the risks of smoking during pregnancy differently from the risks of drinking alcohol during pregnancy, with smoking considered generally unacceptable and with more consistent messages received from health care providers (probably as a consequence of more smokefree training and resources being available for health care providers) (Loxton, et al., 2013; Stuart, 2009; Wouldes, 2009).

One team of researchers reviewed previous research and concluded that it would be helpful to have relevant resources (such as referral resources and clinical practice guidelines) available in one place online to support health care providers, including written information that can be given to expectant parents to ensure that limited time does not prevent messages about alcohol use in pregnancy being delivered (Deshpande, et al., 2005).

Messages for health warning labels

Only a small number of countries have mandatory health warning labels about drinking in pregnancy⁸. Some other countries, including New Zealand and Australia, have voluntary industry labelling, warning about the risks of drinking alcohol in pregnancy

⁸ <http://www.icap.org/table/HealthwarningLabels>



Research in this area is limited. There is some evidence that health warning labels impact on knowledge and perception, and can raise public awareness (including about drinking in pregnancy) and change intentions, but there is limited evidence that warning labels change drinking behaviour (Babor, et al., 2010; Elliott, et al., 2008; International Center for Alcohol Policies, 2013). Warning labels are likely to be most effective when used as one element within a wider primary prevention communication strategy that reinforces the messages shown on the warning labels, and provides more detail on the risks of drinking alcohol during pregnancy and where women can access further information and support (AER Foundation, 2011; Thomas, Gonneau, Poole & Cook, 2014).

Warning labels may also be useful in keeping the message about not drinking in pregnancy visible over time, and particularly when no other major communication strategies are underway (Deshpande, et al., 2005).

There is little conclusive information available to guide decisions about message development, or on how to best link alcohol warning labels to other strategies. Indicative research suggests that specific warning messages, which highlight a causal link between alcohol consumption and a specific harm, are more effective than generic warnings (AER Foundation, 2011).

Indicative New Zealand research shows that women at greater risk of risky drinking in pregnancy (young women and Māori and Pacific women) are most likely to be positive about the use of warning labels on alcohol containers. However, international research suggests they may also be the most likely to “discount or disbelieve the information” (Parackal, Parackal & Harraway, 2010).

Future research directions

This review has provided an overview of the state of current research on who drinks alcohol during pregnancy, women’s knowledge and attitudes about drinking during pregnancy and the development of primary prevention communication strategies that may be effective in reaching these women, their families, friends, and communities. The review allows strengths and gaps in the evidence base and possible future research directions to be identified. It also contributes to an understanding of potential target audiences and messages for primary prevention communication strategies.

The predictors of alcohol consumption during pregnancy

There has been a significant amount of interest by researchers in identifying the predictors of alcohol consumption. This has resulted in a clearer understanding of the groups of women who are most likely to continue to drink during pregnancy. However, much of what is known about the influences on New Zealand women drinking during pregnancy is based on research conducted nearly ten years ago.

Future research could help to clarify how relevant the predictors identified in international studies are to a New Zealand context, which groups are most likely to continue drinking after pregnancy recognition and which groups are most likely to be drinking at *risky* levels before and after pregnancy recognition.



Developing communication strategies and messages, and identifying target audiences

Although much effort has gone into the creation of prevention campaigns and other strategies internationally, there is only limited information available that describes their development (including message development) and limited evidence to assess their effectiveness. Only one New Zealand campaign was identified that fell within the scope of this review (see Appendix 1), and this does not appear to have been formally evaluated.

Best practice approaches to the development of communication strategies, and campaign planning and development, have been identified, and provide some guidance. Future strategies should draw on these best practice approaches where appropriate, with robust evaluation undertaken and published to inform future campaigns. Recent innovative communication strategies demonstrate the potential for information technology to reach wider or more diverse audiences.

One challenge is achieving an effective balance between describing the risks of drinking during pregnancy (the “threat”) and encouraging the targeted audience to feel confident that they can make changes in their own drinking or help others to avoid drinking alcohol during pregnancy. The *No Alcohol in Pregnancy is the Safest Choice* campaign, described in this review, provides an interesting overview of how campaign developers can test different motivators with focus groups, and particularly the balance between threat appeals and positive messaging (such as displays of social support for pregnant women).

As understanding of the predictors of alcohol consumption in pregnancy increases, there is more potential to identify target audiences for primary prevention communication strategies. Research to date suggests two key potential audiences for prevention campaigns:

- ◆ Younger women who are risky drinkers before pregnancy and continue these patterns of drinking until their pregnancy is confirmed. For some, this may be because their pregnancy is unintended and they are unaware they are pregnant for a significant part of the first trimester.
- ◆ Older women, who are aware that drinking during pregnancy is not recommended, but based on their own experiences of previous pregnancies, and the experiences and attitudes of their friends and families, continue to drink socially, although often reducing consumption to low/moderate levels.

New Zealand research suggests that (when looking at all age groups) Māori and Pacific women are at higher risk of binge drinking during the early pregnancy period than European women, along with smokers and drug users. A better understanding of the various influences on these women would help to inform campaign development.

Targeting attitude and behaviour change through communication campaigns may be appropriate for women who can change their behaviour once they become aware of the possible negative outcomes from drinking during pregnancy – that is, if they are motivated to change and have the ability to make the change. However, women who are alcohol dependent, experiencing a range of social disadvantages, or living in high-stress situations are unlikely to be able to make this change



on their own. Any campaign messages may need to reference a range of services where women can receive individual assistance, after ensuring that these services have the capacity to respond.

Campaign messaging is more likely to be successful if it presents information that many women of childbearing age do not already know, and if it targets a change in attitude about drinking alcohol during pregnancy. It may also need to consider the social pressures to drink that pregnant women face and how to build a community of support for a pregnant woman's decision not to drink.

Smoking is consistently identified as a predictor of drinking alcohol during all stages of pregnancy. However, it appears that the risks of smoking during pregnancy are seen differently by women from the risks of drinking during pregnancy, with smoking considered generally unacceptable (even by those who continue smoking). There may be benefits to linking messages about the risks of drinking during pregnancy with other positive health behaviours during pregnancy, such as quitting smoking.

Women report receiving inconsistent advice from health care providers. Campaign messages should align with advice being delivered by health care providers and more detail on the evidence behind the recommendations should be made available for those who want it. If not already available, additional professional development and resources should be provided for health care providers to ensure their advice is consistent with messages delivered by any campaign and that they have appropriate information to leave with pregnant women.



2.0 Introduction

The Health Promotion Agency (HPA) commissioned this literature review to find out:

- ◆ what is known about alcohol use during pregnancy among different groups of women
- ◆ what works to influence decisions to stop drinking, and
- ◆ what messages are best received and how.

The literature review explores research on the predictors of drinking alcohol during pregnancy, and women's knowledge of, and attitudes towards, drinking during pregnancy. The review also describes research on the development of primary prevention communication strategies, and highlights evaluated primary prevention communication strategies that have promoted awareness about the risks associated with alcohol consumption during pregnancy and/or have encouraged women not to drink when pregnant or planning to become pregnant.

The review also includes information on primary prevention communication campaigns targeting pregnant women who *smoke*, which have been undertaken and evaluated in New Zealand, and provide useful insights for this project.

This review aims to provide a clear overview of the state of current research, to enable the identification of strengths and gaps in the current evidence base.

Part A of the review identifies research on the risk factors for drinking during pregnancy.

Part B identifies research on women's knowledge of, and attitudes towards, drinking during pregnancy, and on the development of primary prevention communication strategies. It also describes evaluated primary prevention communication strategies communication strategies that address the use of alcohol in pregnancy.

Appendix 1 describes current and recent campaigns.

Appendix 2 provides references for the research described in this review.



3.0 Methodology

3.1 Scope

This evidence-based literature review will inform and refine HPA's information needs, research questions and activities for its work on alcohol and pregnancy. It is also a resource for others to use in their work to prevent harm from alcohol use during pregnancy. This review will assist HPA to create effective messages for different audiences, in order to:

- ◆ promote awareness among the public about the risks associated with alcohol consumption during pregnancy
- ◆ encourage women not to drink when pregnant or planning to become pregnant.

The literature review focused on identifying, analysing and reporting on international and national literature and research as it relates to alcohol use during pregnancy, specifically:

- ◆ a brief overview about what is known about drinking and pregnancy among different groups of people (by age, gender and ethnicity), including predictors of drinking during pregnancy, determinants of cessation/reduction during pregnancy, and perceptions of drinking during pregnancy
- ◆ primary prevention communication strategies in New Zealand and overseas, which have been evaluated, have promoted awareness among the public about the risks associated with alcohol consumption during pregnancy, and/or have encouraged women not to drink when pregnant or planning to become pregnant (current communication strategies that have not yet been evaluated may also be described where their approach is of particular interest to this review)
- ◆ other primary prevention communication strategies targeting pregnant women, which have been undertaken and evaluated in New Zealand, and provide useful insights for this project.

Of particular interest was:

- ◆ identifying what has worked well when communicating and engaging with women and other target audiences on the subject of the consumption of alcohol during pregnancy (i.e. key messages, channels and messengers)
- ◆ identifying what has NOT worked well.

In discussion with HPA, a number of areas were identified as out of scope for this review.

- ◆ Alcohol and breastfeeding.



- ◆ Educational and campaign materials for health care providers; for example, general practitioners, midwives, nurses (unless providing detail on the development of messages).
- ◆ Point of sale educational materials (unless providing detail on the development of messages).
- ◆ Brief interventions by health care providers.

The focus of the review is on relevant material published since 2009 (the last five years) in English. However, older research is included where it facilitates comparison and assessment. The focus is also on research that will contribute to the development of appropriate policies and interventions for a New Zealand context.

3.2 Search strategy

The search strategy was guided by the project scope agreed upon by HPA and Research New Zealand.

The search for evidence-based literature was wide-ranging and employed internet search engines, bibliographic databases, and the websites of relevant research and government organisations. Various combinations of the following keywords/search terms (including wildcard operators to capture keyword variants⁹) were used to identify relevant material:

- ◆ alcoholic beverages / alcohol / liquor
- ◆ alcohol drinking / binge drinking / alcohol use / alcohol consumption / alcohol abuse / problem drinking / hazardous drinking / harmful drinking
- ◆ pregnancy / pregnant women / pregnancy complications / prenatal care / fetal alcohol spectrum disorders
- ◆ health behaviour / health knowledge, attitudes, practice / attitude to health
- ◆ health promotion / health education / harm reduction / preventive health services / public health / social medicine / health communication / alcohol education / community-based initiatives / interventions / labelling
- ◆ qualifiers: age factors / risk factors / reproductive history / ethnicity / socioeconomic factors / [country qualifiers where appropriate]

⁹ For example on some search engines, pregnan* will return results that match words including pregnancy and pregnant.



Literature search

The literature search took the following approach.

1. Literature searches were conducted by the information managers and librarians of HPA and Research New Zealand. Databases searched included (but were not limited to):

- ◆ HPA library catalogue
- ◆ Ebsco SocIndex
- ◆ Proquest Public Health
- ◆ Gale Onefile
- ◆ Australia & NZ Reference Centre
- ◆ Masterfile Premier
- ◆ Index New Zealand
- ◆ Te Puna National Bibliographic Database
- ◆ Cochrane Library database
- ◆ Directory of Open Access Journals
- ◆ Google Scholar
- ◆ Oxford Journals
- ◆ PubMed
- ◆ Science Direct
- ◆ SpringerLink
- ◆ Wiley Online Library.

2. A search of the websites of research organisations, academic research units and government departments included (but was not limited to):

a. New Zealand

- ◆ Alcohol and Drug Association New Zealand <http://www.adanz.org.nz/>
- ◆ Alcohol Healthwatch <http://www.ahw.org.nz/>



- ◆ Centre for Social and Health Outcomes Research and Evaluation / Whāriki Research Centre <http://www.shore.ac.nz/>
- ◆ Christchurch Health and Development Study <http://www.otago.ac.nz/christchurch/research/healthdevelopment/>
- ◆ Dunedin Multidisciplinary Health and Development Research Unit <http://dunedinstudy.otago.ac.nz/>
- ◆ Fetal Alcohol Network NZ <http://www.fan.org.nz/>
- ◆ Foundation for Alcohol and Drug Education <http://www.fade.org.nz/>
- ◆ Health Research Council <http://www.hrc.govt.nz/>
- ◆ Health Promotion Agency <http://www.hpa.org.nz/>
- ◆ Ministry of Health <http://www.moh.govt.nz>

b. Australia

- ◆ ACT Health <http://www.search.act.gov.au/>
- ◆ Alcohol and Drug Services, Department of Health and Human Services, Tasmania http://www.dhhs.tas.gov.au/mentalhealth/alcohol_and_drug
- ◆ Alcohol and other Drugs Council of Australia (ADCA) <http://www.adca.org.au/>
- ◆ Alcohol, Pregnancy and FASD <http://alcoholpregnancy.telethonkids.org.au/>
- ◆ Australian Drug Foundation (ADF) <http://www.adf.org.au/>
- ◆ Australian Drug Information Network <http://www.adin.com.au/>
- ◆ Australian Indigenous HealthInfoNet <http://www.healthinfonet.ecu.edu.au/>
- ◆ Australian Institute of Health and Welfare <http://www.aihw.gov.au/>
- ◆ Australian National Council on Drugs <http://www.ancd.org.au/>
- ◆ Centre for Alcohol Policy Research <http://www.capr.edu.au/>
- ◆ Department of Health Australia alcohol pages <http://www.alcohol.gov.au/>
- ◆ Department of Health, Northern Territory <http://www.health.nt.gov.au/>
- ◆ Department of Health, Victoria alcohol pages <http://www.health.vic.gov.au/aod/index.htm>



- ◆ DrinkWise Australia <http://www.drinkwise.org.au/>
- ◆ Foundation for Alcohol Research and Education (FARE) <http://www.fare.org.au/>
- ◆ National Drug and Alcohol Research Centre <https://ndarc.med.unsw.edu.au/>
- ◆ National Drug Research Institute, Australia <http://ndri.curtin.edu.au/>
- ◆ National Health and Medical Research Council <http://www.nhmrc.gov.au/>
- ◆ NSW Health <http://www.health.nsw.gov.au/>
- ◆ SA Health <http://www.sahealth.sa.gov.au/>
- ◆ Turning Point <http://www.turningpoint.org.au/>

c. United Kingdom and Ireland

- ◆ Alcohol Action, Ireland <http://alcoholireland.ie/>
- ◆ Alcohol Research UK <http://alcoholresearchuk.org/>
- ◆ Balance (North East of England's Alcohol Office) <http://www.balancenortheast.co.uk/>
- ◆ Department of Health <https://www.gov.uk/>
- ◆ Drug and Alcohol Findings <http://findings.org.uk/>
- ◆ DrugScope <http://www.drugscope.org.uk/>
- ◆ FASaware UK <http://www.fasaware.co.uk/>
- ◆ Health and Social Care Information Centre <http://www.hscic.gov.uk/>
- ◆ Institute of Alcohol Studies <http://www.ias.org.uk/>
- ◆ National Organisation for Foetal Alcohol Syndrome UK (NOFAS-UK) <http://www.nofas-uk.org/>
- ◆ Start 4 Life <http://www.nhs.uk/start4life/Pages/healthy-pregnancy-baby-advice.aspx>

d. United States

- ◆ Alcohol Behavior Research Center (ABRC) <http://depts.washington.edu/abrc/>
- ◆ Alcohol Research group (ARG) <http://www.arg.org/>



- ◆ Centers for Disease Control and Prevention <http://www.cdc.gov>
- ◆ Community Guide <http://www.thecommunityguide.org>
- ◆ Fetal Alcohol and Drug Unit, University of Washington School of Medicine <http://depts.washington.edu/fadu/>
- ◆ Fetal Alcohol Spectrum Disorders Center for Excellence <http://fasdcenter.samhsa.gov/>
- ◆ International Center for Alcohol Policies <http://www.icap.org/>
- ◆ National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health and the U.S. Department of Health and Human Services <http://www.niaaa.nih.gov/>
- ◆ National Organization on Fetal Alcohol Syndrome <http://www.nofas.org/>

e. Canada

- ◆ Alberta Government FASD site <http://fasd.alberta.ca/>
- ◆ Alberta Health <http://www.health.alberta.ca/>
- ◆ Best Start, Ontario <http://www.beststart.org>
- ◆ Department of Health and Wellness, Nova Scotia <http://novascotia.ca/DHW/>
- ◆ FASD ONE (Fetal Alcohol Spectrum Disorder Ontario Network of Expertise) <http://www.fasdontario.ca/>
- ◆ FASworld Canada <http://www.fasworld.com/>
- ◆ Government of Saskatchewan – Health <http://www.health.gov.sk.ca/>
- ◆ Ministry of Health, British Columbia <http://www.gov.bc.ca/health/>
- ◆ New Brunswick Health <http://www2.gnb.ca/>
- ◆ Public Health Agency of Canada <http://www.phac-aspc.gc.ca/index-eng.php>
- ◆ Saskatchewan Prevention Institute <http://www.skprevention.ca/>

f. Other

- ◆ EuroCare European Alcohol Policy Alliance <http://www.eurocare.org/>
- ◆ European Commission <http://ec.europa.eu/>



- ◆ European FASD Alliance <http://www.eufasd.org/>
- ◆ European Foundation for Alcohol Research <http://www.erab.org/>
- ◆ International Center for Alcohol Policies <http://www.icap.org/>
- ◆ World Health Organization <http://www.who.int/en/>

3. The reference lists of items found in the initial literature search were checked to identify additional relevant references.

3.3 Search results

Major findings and conclusions are provided for each study included in this review, as well as brief details on the methodology employed. Readers should access the original report for full details on methodology and design. No formal evaluation of the methodologies or design of each of the studies was undertaken.

The emphasis is on authoritative research that can be applied with confidence to a New Zealand context and is supported by empirical evidence, uses rigorous methodologies and is likely to be commonly cited in peer-reviewed research. Key points from the research are described at the beginning of each section. Indicative research is also included – usually single pieces of quality research that provide important insights for a New Zealand context, but may not be able to be applied with confidence without further exploration or additional studies.



PART A: Drinking alcohol during pregnancy

In its *Global strategy to reduce the harmful use of alcohol*, the World Health Organization (2010) identifies pregnant women as a group that requires special attention as they are particularly at risk from the harmful effects of alcohol. Prenatal exposure to alcohol can result in one or more of a spectrum of disabilities (physical, psychological, behavioural), which are described by the umbrella term of fetal alcohol spectrum disorder (FASD). Fetal alcohol syndrome (FAS) occurs at the most severe end of the FASD spectrum¹⁰. Some of the more severe outcomes can include growth deficits, facial malformations, and brain and central nervous system disorders (Elliott, Coleman, Suebwongpat & Norris, 2008; Nguyen, Coppens & Riley, 2011).

FASD is costly for individuals, families and society, including additional costs of education, health and social services (Thanh, Jonsson, Dennett & Jacobs, 2011). No rigorous data describes the prevalence or severity of FASD in New Zealand. However, Connor and Casswell (2012) use prevalence data from the United States¹¹ to provide a “conservative” estimate of 600 children being born with FASD in New Zealand each year.

FASD is preventable if no alcohol is consumed during pregnancy. Abstinence from alcohol use during pregnancy is widely recommended by health authorities, including the U.S. Surgeon-General¹², the Centers for Disease Control and Prevention (CDC)¹³, the New Zealand Ministry of Health¹⁴, and the Health Promotion Agency¹⁵.

However, a proportion of pregnant women, and women who could become pregnant, continue to drink alcohol. One of the challenges in developing effective, targeted communication strategies to address drinking in pregnancy is to understand which women are most at risk. Part A describes quantitative research that investigates the predictors of drinking during pregnancy.

¹⁰ <http://www.cdc.gov/ncbddd/fasd/facts.html>

¹¹ U.S. levels of drinking are lower than those found in New Zealand.

¹² <http://www.surgeongeneral.gov/news/2005/02/sq02222005.html>

¹³ <http://www.cdc.gov/ncbddd/fasd/alcohol-use.html>

¹⁴ <http://www.health.govt.nz/your-health/healthy-living/addictions/alcohol-and-drugs/alcohol/alcohol-pregnancy-and-babies>

¹⁵ <http://www.alcohol.org.nz/alcohol-you/your-drinking-okay/low-risk-alcohol-drinking-advice>



4.0 Drinking in New Zealand

KEY POINTS

Drinking patterns

Eighty percent of New Zealand adults (15 years and over) report drinking alcohol. Twelve percent of women report hazardous drinking patterns, and 26% of young women aged 18 to 24 years who drink report hazardous drinking patterns.

Drinking patterns appear to differ by ethnicity, with female drinkers in the total population consuming alcohol more *frequently* than Māori or Pacific female drinkers, while Pacific females and, to a lesser extent, Māori females, drink more on a *typical occasion* than females in the total population.

Older women (except for Pacific women) consume alcohol more *frequently* than younger females, while young female drinkers have higher *typical occasion* quantities and more younger female drinkers consume five or more drinks at least once a week.

Drinking and pregnancy

Most women in New Zealand stop consuming alcohol, or reduce their alcohol consumption, once they realise they are pregnant. However, a significant minority are high-risk drinkers during pregnancy

European/Other women are more likely to report consuming alcohol while pregnant compared with women in the total population, while Pacific and Asian women are less likely to report consuming alcohol while pregnant. Research suggests women from different Pacific groups can have different drinking patterns, with fewer Tongan and Samoan women drinking alcohol during pregnancy than Cook Island Māori women, women from other Pacific groups, and non-Pacific women.

New Zealand research shows that women with planned pregnancies are more likely to stop drinking alcohol during the first three months of pregnancy compared with those experiencing unplanned pregnancies, and are more likely to abstain over the whole pregnancy period than those with unplanned pregnancies.

4.1 Drinking patterns in the general population

Statistics from the *2011/2012 New Zealand Health Survey* show that 80% of adults aged 15 years and over reported drinking alcohol in the previous 12 months and, of these, one in five (19%) reported hazardous drinking patterns (defined as a score of 8 or more on the 10-question Alcohol Use Disorders Identification Test¹⁶). Twelve percent of women reported hazardous drinking patterns (Ministry of Health, 2013).

People aged 18 to 24 years are more likely than other age groups to engage in hazardous drinking. This is particularly the case for men, although 26% of women aged 18 to 24 years, who had consumed alcohol in the previous 12 months, reported hazardous drinking patterns.

¹⁶ AUDIT is a 10-question screening tool for excessive drinking developed by the World Health Organization (http://whqlibdoc.who.int/hq/2001/WHO_MS_D MSB_01.6a.pdf?ua=1)



Describing New Zealand data from the *International Alcohol Control Survey 2011*, Huckle, Yeh, Lin and Jensen (2013) report that female drinkers in the total population consumed alcohol more frequently than Māori or Pacific female drinkers. However, Pacific females consumed more on a typical drinking occasion than Māori females or females in the total population, and Māori females consumed more on a typical occasion than females in the total population. Young female drinkers (aged 16 to 34 years) consumed higher typical occasion quantities than older female drinkers (aged 35 to 65 years) and were also more likely to consume five or more drinks at least once a week. However, older females consumed alcohol more frequently than younger females (except for young Pacific females, who consumed alcohol more often than older Pacific females).

4.2 Drinking alcohol during pregnancy

The prevalence of drinking during pregnancy varies among different studies and countries, reflecting differences in drinking culture and social attitudes toward drinking, as well as differences in study methodologies (Skagerström, Chang & Nilsen, 2011; Zelner & Koren, 2013).

The majority of women in New Zealand stop drinking alcohol once they become aware that they are pregnant or when planning a pregnancy. In 2004, results from the *New Zealand Health Behaviours Survey* (with 9,847 respondents) showed that 82.4% of female drinkers (aged 16-39 years) who were pregnant had stopped all alcohol consumption during their current pregnancy. Four out of five (79.2%) female drinkers who were *planning* a pregnancy had stopped all alcohol consumption (no significant differences were found between Māori and non-Māori females) (Ministry of Health, 2007).

The *2007/08 New Zealand Alcohol and Drug Use Survey* reported alcohol and drug use behaviours among over 6,500 New Zealanders aged 16 to 64 years. This survey found that more than one in four women (28.7%) who had been pregnant in the past three years reported that they had consumed alcohol while pregnant (Ministry of Health, 2009). There were no significant differences by age group or neighbourhood deprivation. European/Other women were significantly more likely to have reported consuming alcohol while pregnant compared with women in the total population who had been pregnant in the previous three years. Pacific and Asian women were significantly less likely to have reported consuming alcohol while pregnant, while there was no significant difference for Māori women. The survey did not distinguish between those women who drank during their entire pregnancy and those who abstained once they were aware they were pregnant.

A number of other New Zealand studies have investigated alcohol use during pregnancy. *Growing Up in New Zealand* is a longitudinal study of New Zealand children and their families, with the recruited cohort (of 6,822 mothers and their children) being a representative sample of New Zealand families. The study found that 40% of pregnancies were unplanned, with similar patterns of alcohol consumption prior to pregnancy for mothers with a planned pregnancy and mothers with an unplanned pregnancy (Morton, et al., 2010). Mothers with planned pregnancies were, on average, older (32 years) than those with unplanned pregnancies (28 years), and were more likely to have educational qualifications of any kind, and more likely to have a tertiary degree.

Of particular interest is that more mothers with planned pregnancies stopped drinking alcohol during the first three months of pregnancy (83%) compared with those experiencing unplanned



pregnancies (69%). The numbers of mothers with unplanned pregnancies who abstained from alcohol increased from the second trimester of pregnancy onwards (to 88.5%) with 85.4% of the planned group abstaining from the second trimester. Over the whole pregnancy, 75.6% of those with planned pregnancies and 65.9% of those with unplanned pregnancies abstained from alcohol. Most women in the study who drank alcohol at all during pregnancy reported drinking less than one drink per week.

In 2006, survey results from 100 women who had recently given birth at Taranaki Base Hospital (out of 117 deliveries over a one-month period) found that 80% had consumed alcohol before they were pregnant, with 66% reporting binge drinking (Ho & Jacquemard, 2009). Twenty-eight women of the original cohort of 100 women continued to consume alcohol during pregnancy. Fifty-two (65%) of those who drank alcohol prior to pregnancy stopped drinking once pregnant, while 21 (26%) of pre-pregnancy drinkers continued to drink during pregnancy but consumed less than they did before pregnancy. Seven women (8.7%) did not change their drinking habits during pregnancy. Although most women reduced their intake, a significant minority drank relatively heavily during pregnancy. Of the 28 women who continued drinking during pregnancy, five reported drinking three or more drinks on a typical day.

The *Pacific Islands Families Study* is following a cohort of Pacific infants born at Middlemore Hospital, South Auckland in 2000, and their families (Schluter, Tautolo, Taylor & Paterson, 2013). At the baseline interview, six weeks postpartum, 1,376 mothers were asked to self-report their alcohol consumption during pregnancy. Mothers were interviewed again at one, two, four, six, and nine years postpartum.

The researchers report that alcohol consumption fell during pregnancy to 5.1% (from a pre-pregnancy level of 15.4%), increased by six weeks postpartum to 6.6%, reaching 40.3% nine years after the birth. Of those who were drinking before pregnancy, 31.7% drank during pregnancy and 68.3% abstained. Cook Island Māori, other Pacific groups and non-Pacific mothers had substantially higher prevalence estimates for alcohol consumption than Tongan and Samoan mothers.

Levels of maternal self-reported harmful drinking (AUDIT-C¹⁷ indications) fell during pregnancy, to 2.7%, increasing at six weeks postpartum to 3.4%, and reaching 16.8% at two-years postpartum. Again, Cook Island Māori, other Pacific, and non-Pacific groups had a significantly higher prevalence of self-reported harmful drinking than Tongan or Samoan parents.

Discussing the low numbers of women reporting consuming alcohol during pregnancy in the *Pacific Islands Families Study* (5.1%), compared with the 20.2% of Pacific women reporting drinking during pregnancy in the *2007/2008 New Zealand Alcohol and Drug Use Survey* (Ministry of Health, 2009), Schluter, et al. (2013) suggest that this may be the result of different wording used in the two studies. They point to variation between the two studies for other ethnic groups, with 21.2% of non-Pacific (largely European) mothers reporting alcohol consumption in their study compared with 31.6% European women in the *Alcohol and Drug Use Survey*.

¹⁷ “The AUDIT-C assessment tool (World Health Organization Alcohol Use Disorders Identification Test – Consumption) can be used to provide a quick assessment of how much and how often a woman is drinking alcohol. AUDIT-C is the first three questions of the longer AUDIT tool, which is a more comprehensive assessment of problem drinking” (Ministry of Health, 2010, p.17).



5.0 Predictors of drinking alcohol during pregnancy

KEY POINTS

A number of factors have been consistently identified in international research as predictors of alcohol use during pregnancy, including the following:

- Frequent and/or high alcohol consumption pre-pregnancy.
- Alcohol problems.
- Being abused or exposed to violence.
- Social or psychological factors, such as anxiety or depression.
- Older age.
- Higher socio-economic status.
- Smoking.

Other predictors have been identified less consistently:

- Having previously given birth.
- Higher level of education.

New Zealand research has also identified being aged either 16 to 24 years or 35 to 40 years of age as predictors of drinking alcohol during pregnancy, whereas binge drinking during pregnancy is more likely among women aged 16 to 24 years, those without any tertiary education, and among women who smoke during pregnancy.

A systematic review, published in 2011, investigated predictors of drinking alcohol during pregnancy across different countries (Skagerström, et al., 2011). Studies were included that collected data in antenatal settings during women's pregnancies and were population-based (rather than considering only high-risk drinkers). Fourteen studies published between 2002 and 2009 were analysed for the review (United States, 4; Europe, 4; Australia and New Zealand, 3; Japan, 2; and Uganda, 1). Eleven were cross-sectional studies and three were longitudinal studies. The populations included in these studies, and the methodologies used, varied.

The two most consistently identified predictors of alcohol use during pregnancy were:

- ◆ higher alcohol consumption before pregnancy, which predicted drinking during pregnancy in all studies that reported on this factor
- ◆ being abused or exposed to violence.

Other less consistent predictors of drinking during pregnancy were:



- ◆ higher social status, measured as income or social class. This was the *socio-demographic* factor that exhibited the most consistent results (there were inconsistent results for age as a predictor)
- ◆ having a positive result from screening for alcohol problems
- ◆ psychiatric symptoms, such as anxiety and depression (found to predict drinking in two of the three studies that reported on this)
- ◆ smoking (predicted drinking in five of the ten studies that reported on this).

Unemployment, marital status, and education level were investigated as possible predictors of drinking in many studies, but were only occasionally found to be predictive.



5.1 Predictors of drinking alcohol during pregnancy by country

A number of country-specific studies examining the predictors of drinking alcohol during pregnancy have been published, some of them since the systematic review described above. These are described in this section and the most consistently identified predictors are identified in the following table.

Table 2: Predictors of drinking during pregnancy

Consistently identified predictors of drinking alcohol during pregnancy	
Frequent and/or high alcohol consumption pre-pregnancy	Skagerstróm, Chang & Nilsen (2011)*; Anderson, et al. (2013); Thanh & Jonsson (2010); Skagerstróm, Alehagen, Håggström-Nordin, Årestedt & Nilsen (2013); Ethen, et al. (2009).
Alcohol problems	Skagerstróm, et al. (2011)*.
Being abused or exposed to violence	Skagerstróm, et al. (2011)*.
Social or psychological factors (e.g. anxiety or depression)	Skagerstróm, et al. (2011)*; Walker, Al-Sahab, Islam & Tamim (2011); Thanh & Jonsson (2010); Skagerstróm, et al. (2013).
Older age	Skagerstróm, et al. (2011)*; Maloney, Hutchinson, Burns, Mattick & Black (2011); Hutchinson, Moore, Breen, Burns & Mattick (2013); Callinan & Ferris (2014); Thanh & Jonsson (2010); Skagerstróm, et al. (2013); Murphy, Mullally, Cleary, Fahey & Barry (2013); Ethen, et al. (2009); Parackal, Parackal, Ferguson & Harraway (2006); Parackal, Parackal & Harraway (2013); Niclasen (2014).
Higher socio-economic status	Skagerstróm, et al. (2011)*; Hutchinson, et al. (2013).
Smoking	Skagerstróm, et al. (2011)*; Hutchinson, et al. (2013); Walker, et al. (2011); Thanh & Jonsson (2010); Skagerstróm, et al. (2013); Murphy, et al. (2013); Ethen, et al. (2009).

* Systematic review.

Predictors identified less consistently include having a higher level of education and having previously given birth. In addition to older age (35-40 years), the one New Zealand study described below (Parackal, et al., 2006) found other predictors of drinking during pregnancy to be being aged 16 to 24 years and being of either European, Māori or Pacific ethnicity (compared with Asian/other women).



Australia

Anderson, et al. (2013) note the difficulties in drawing conclusions from studies that investigate different or limited potential predictors of drinking alcohol during pregnancy. In their analysis of data for 1,969 women from an Australian longitudinal study, they investigated 36 potential variables, including socio-demographics, reproductive health, mental health, physical health, health behaviours (including pre-pregnancy alcohol consumption), alcohol guidelines, and health care factors.

Women, aged 22 to 37 years, were included in the analysis if they were pregnant in 2000, 2003, 2006, or 2009, and drank alcohol prior to pregnancy. Most had a tertiary education or higher and were in a relationship with a partner. Over three-quarters (82%) had continued to drink alcohol during pregnancy. Women were more likely to drink alcohol during pregnancy if they:

- ◆ had consumed alcohol on a weekly basis before pregnancy
- ◆ binge drank before pregnancy
- ◆ were pregnant while alcohol guidelines recommended low alcohol versus abstinence (although, even under the abstinence guidelines, 78% of women drank alcohol while pregnant).

Anderson, et al. (2013) found that drinking during pregnancy was less likely if women had a Health Care Card (a marker for lower income) or if they had ever had fertility problems.

Maloney, Hutchinson, Burns, Mattick and Black (2011) used data from the 2007 Australian *National Drug Strategy Household Survey* (19,818 self-completed surveys and 3,538 telephone interviews) to investigate predictors of alcohol use in pregnancy. Over the previous 12 months, 164 women (1.5%) reported being pregnant and breastfeeding at the same time, 614 (5.7%) reported being pregnant only, and 471 (4.3%) reported breastfeeding only. Despite investigating a range of psychosocial predictors, the researchers found that older age was the only factor significantly associated with alcohol use in pregnancy.

Callinan and Ferris (2014) also used cross-sectional data from the *National Drug Strategy Household Survey*, but for four survey periods (with between 20,000 and 30,000 participants involved in each wave of the survey), to investigate the rate of self-reported drinking during pregnancy in Australia between 2001 and 2010 and the roles of age, period (year of pregnancy) and cohort (maternal year of birth) of pregnant women.

They found a steady decrease in drinking during pregnancy from 44% in 2001 to 25% in 2007, with 20% drinking (after knowledge of pregnancy¹⁸) in 2010. Older age was identified as a significant predictor of self-reported alcohol consumption during pregnancy only in the 2010 survey (there was a non-significant positive trend between alcohol consumption and age in 2004 and 2007). Period (year of pregnancy) was the strongest predictor, with respondents in later surveys less likely to report consuming alcohol during pregnancy than those in earlier surveys.

¹⁸ The 2010 survey was adapted and asked two questions: respondents who had been pregnant and/or breastfed in the previous 12 months were asked if they had consumed alcohol while pregnant but *before they knew that they were pregnant*, and also if they consumed alcohol, *after they knew they were pregnant*.



While all age and cohort groups decreased alcohol consumption over time, younger groups and more recent cohorts did this at a faster rate than older groups and cohorts. The researchers suggest that if “...any of this change can be attributed to education or awareness campaigns, these campaigns are not reaching all age and cohort groups equally” (p.23).

As part of their analysis of data from the 2004 *Longitudinal Study of Australian Children*, Hutchinson, Moore, Breen, Burns and Mattick (2013) considered the predictors of drinking in pregnancy for two nationally representative cohorts: 5,107 parents of infants aged zero to one year and 4,983 parents of children aged four to five years. Over a third (37.6%) of mothers of infants and just over a quarter (27.6%) of mothers of older children reported alcohol use in pregnancy.

Most of the mothers who reported alcohol use during pregnancy described low-level/occasional use; 95.6% reported one drink per occasion, while 3.4% reported an average of two drinks per occasion and 0.9% reported three or more drinks per occasion. For mothers of infants, a small increase in alcohol use was identified in the second and third trimesters of pregnancy, compared with the first trimester, particularly for women who reported low-level consumption or occasional use (one to two days a week).

The predictors of drinking during pregnancy differed slightly between the two groups. For the infant cohort, higher maternal age, higher education (more than ten years), greater economic advantage (higher weekly household income), and fewer physical health problems in pregnancy were associated with alcohol use in pregnancy. For the cohort of older children, predictors of the mother drinking in pregnancy were increasing maternal age and smoking in pregnancy.

The researchers suggest a number of possible reasons for the difference in levels of drinking in pregnancy between the two groups, including a change in the guidelines in Australia in 2001 from an abstinence position to a message that suggested it was safe to drink small amounts of alcohol in pregnancy¹⁹, and also the possibility that women in the older child cohort under-reported consumption when asked to recall more distant events.

Canada

Data from a population-based maternity survey was used by Walker, et al. (2011) to investigate the prevalence and predictors of maternal alcohol consumption during pregnancy of 5,882 women living in Canada from 2005 to 2006 (whose child remained in their care 5 to 9 months following birth). Of those mothers who reported ever drinking during pregnancy (10.8%), most (95.8%) were drinking at low to moderate levels, with only 1.7% reporting that they were heavy drinkers (more than one drink per day).

Factors associated with an increased likelihood of drinking during pregnancy included being born in Canada, smoking during pregnancy, being indifferent to or unhappy about the pregnancy, and having a marital partner. Women with marital partners were twice as likely to drink during pregnancy as those without partners. However, as alcohol use by partners was not measured, the researchers could not assess the relationship between *partner alcohol use* and drinking during pregnancy.

¹⁹ The guidelines were revised again in 2009 to return to an abstinence position.



In another Canadian study, Thanh and Jonsson (2010) used data for British Columbia and Ontario from the *Canadian Community Health Survey 2007/2008* to estimate the prevalence and determinants of drinking alcohol during pregnancy. All 3,004 women (aged 15-55 years) in the nationally representative sample had given birth in the last five years and all consumed alcohol at some stage in their lives. The prevalence of drinking alcohol during pregnancy was 5.4% in Ontario and 7.2% in British Columbia. The researchers extrapolated a figure for the whole of Canada of 5.8%. They identified the following predictors as being associated with an increased risk of drinking alcohol during pregnancy: being a regular drinker over the last 12 months; drinking during the last experience of breastfeeding; being a daily smoker at the time of the survey; having an ulcerative colitis (a bowel disorder) diagnosis; having a mood disorder diagnosis; and being aged 35 years or over. Conversely, the use of a general practitioner or family physician was associated with a significantly decreased risk of drinking alcohol during pregnancy.

United States

Ethen, et al. (2009) investigated predictors of alcohol consumption during pregnancy, using data for 4,088 U.S. mothers from the control group of the *National Birth Defects Prevention Study* (the control group included women who delivered babies without birth defects from 1997 to 2002). Alcohol consumption during pregnancy became more likely with increasing age, with 19% of women aged under 20 years of age reporting drinking some alcohol, rising to 37.2% for women aged 35 years and older. The opposite pattern was observed for binge drinking, with women aged 20 to 24 years reporting the highest level (10.3%), and women aged 35 and older reporting the lowest level (6.6%) of binge drinking.

The study also found that the use of any alcohol during pregnancy became more likely with increasing education and with increasing income. However, binge drinking during pregnancy was highest among women with 13 to 15 years of education (10.3%) and women with household incomes of \$30,000 to \$39,000 per year (9.7%). Pre-pregnancy binge drinking was identified by the researchers as a strong predictor of any drinking during pregnancy and of binge drinking during pregnancy. Other predictors of both any drinking and binge drinking during pregnancy were drinking (other than binge drinking) during the three months prior to pregnancy, being of non-Hispanic white race/ethnicity, cigarette smoking during pregnancy, and having an unintended pregnancy.

Scandinavia

A Swedish study, based on data for 1,594 pregnant women (18 weeks gestation or more) from across Sweden, found that the majority of the women (84%) had consumed alcohol in the year prior to pregnancy, with 14.4% reporting drinking at hazardous levels and four-fifths of hazardous drinkers continuing to drink until pregnancy recognition (Skagerström, et al., 2013). Approximately 6% consumed alcohol at least once *after pregnancy recognition*, although 92% of these women did not consume more than one standard drink at a time.

Factors predicting alcohol consumption during pregnancy were older age (for example, women aged 40 years or older were more than 11 times more likely to drink during pregnancy compared with women aged 24 years or younger), living in a large city, using tobacco during pregnancy, lower score for social support (from friends, family and husband/partner), stronger alcohol habit before pregnancy, and a higher score for pre-pregnancy social drinking motives (coping motives, social motives and enhancement motives).



A Danish study used data from the *Danish National Birth Cohort* to compare 63,464 women who did or did not drink alcohol in pregnancy (occurring between 1996 and 2002), analysed by level of consumption (Niclasen, 2014). Women provided information twice in pregnancy - at approximately 16 and 30 weeks and again when their child was six months old.

Significant differences were observed between the abstaining groups (all-time and pregnancy-abstaining) and those who drank alcohol during pregnancy. Those who continued to drink during pregnancy were more likely to be older, have a university degree, and have a pre-pregnancy BMI (body mass index) within the normal range. Abstainers were, among other things, more likely to have psychiatric problems, smoke tobacco and live alone.

Interestingly, Niclasen also considered the differences between those who generally abstained from alcohol and those who abstained after pregnancy recognition. Significant differences were found on education variables, whereby all-time abstainers included more than twice as many women with mandatory education only, and had significantly more psychological problems/psychiatric diagnoses compared with the pregnancy-abstaining group. Other differences included the all-time abstainers being significantly more likely to smoke.

The researcher also describes the differences between those in the *high* intake group (90 to 180 units over the full pregnancy) and the *very high* (over 180 units) intake group. The *very high* intake group included significantly older fathers and twice as many unmarried women, and more women with only a mandatory education, whereas in the *high* intake group more women had a university degree. The percentages of those reporting a range of psychological problems/psychiatric diagnoses were almost twice as large for the *very high* intake group compared with the *high* intake group (which resembled rates in the total sample). In addition, the *very high* intake group reported, on average, twice as many episodes of binge drinking, more than twice as high cumulated alcohol intake in pregnancy, significantly higher weekly average alcohol intake prior to pregnancy, and smoking twice as many cigarettes during pregnancy as the *high* intake group.

Ireland

In an analysis of 6,725 pregnant women (from a larger cohort study) registered with a Dublin maternity hospital in 2010 and 2011, 90% of women reported consuming alcohol in the three months before pregnancy, with 55% of drinkers reporting at least one episode of binge drinking. Five percent of women reported drinking at the point of their first booking visit at the hospital (usually when women were 12 to 14 weeks pregnant). One quarter of the women who had continued drinking reported binge drinking during pregnancy, while 8% reported drinking to excess (defined as over six units per week) (Murphy, et al., 2013). Factors associated with continuing to drink in *early* pregnancy were older maternal age (30 to 39 years), Irish nationality and smoking.

A broader study at the same hospital investigated data for 61,241 women over the period 2000 to 2007 (Mullally, Cleary, Barry, Fahey & Murphy, 2011). Eighty-one percent of women reported alcohol consumption before pregnancy and up until the pregnancy was confirmed, with 71% of these women reporting low consumption (zero to five units per week), 9.9% moderate consumption (6-20 units per week) and 0.2% high consumption (over 20 units per week). In their analysis, the researchers distinguish between the factors associated with moderate alcohol consumption (being in employment, Irish nationality, private health care, and smoking), and those associated with high consumption (aged under 25 years and illicit drug use).



New Zealand

A New Zealand cross-sectional survey in 2005 investigated the prevalence of women who drank alcohol in pregnancy, using telephone interviewing with a random sample of 1,256 women aged 16 to 40 years (Parackal, et al., 2006; 2013). Of the 552 women who either had a baby in the previous five years (2001 to 2005) or were currently pregnant, 53% reported consuming some alcohol during their pregnancy (35% drinking more than one standard drink and 17% drinking one standard drink or less on a typical drinking day in pregnancy). However, only 13% reported drinking after pregnancy recognition.

Over the whole pregnancy period, those aged 16 to 24 years or 35 to 40 years of age and those of either European, Māori or Pacific ethnicity were more likely to consume alcohol than Asian/other women. Binge drinking during pregnancy was more likely among women aged 16 to 24 years, those without any tertiary education, and women who smoked during pregnancy.

5.2 Potential predictors of drinking alcohol during pregnancy

Peadon, et al. (2011) investigated *potential* predictors of alcohol consumption in pregnancy using survey data for 1,103 Australian women aged 18 to 45 years (those currently pregnant were not eligible to participate). The majority of respondents (89.4%) had consumed alcohol in the last 12 months, and almost half the respondents drank alcohol every week. Of the 700 who had been pregnant previously, just over 34% drank alcohol during the pregnancy.

When asked what they would do if they were *planning* to become pregnant, just over 31% of all those surveyed said they would consume alcohol. Further, 23.7% said that if they *became pregnant*, they would consume alcohol. The researchers identify strong predictors of both alcohol consumption in past pregnancy and intentions in a future pregnancy as:

- ◆ alcohol use in the last pregnancy
- ◆ neutral or positive attitudes towards alcohol use in pregnancy.

Other predictors included:

- ◆ intention to smoke in a future pregnancy (current smoking status was not associated with alcohol use in pregnancy)
- ◆ women not knowing that alcohol use in pregnancy can affect the unborn child and, that alcohol exposure in pregnancy can lead to lifelong disabilities in the child (this was the only knowledge factor associated with alcohol use in pregnancy).



Groups at higher risk of alcohol consumption in pregnancy were:

- ◆ women with higher levels of education (university-level)
- ◆ women who had given birth previously
- ◆ women with more frequent and higher current alcohol consumption, e.g. drinking on five or more days per week and/or drinking seven or more drinks in a day.

Age was not a predictor of drinking during pregnancy in this study after adjustment for having given birth previously.



6.0 Drinking alcohol during the different stages of pregnancy

KEY POINTS

Drinking alcohol before and after pregnancy recognition

In New Zealand, around 40% of pregnancies are unplanned, and indicative research suggests that confirmation of pregnancy occurs later in pregnancy for those with unplanned pregnancies than for those with planned pregnancies.

Recent research suggests that, when asked about drinking during pregnancy, some women may interpret this as meaning post-pregnancy recognition, giving a less accurate picture of the drinking that occurs pre-pregnancy recognition.

A much higher rate of drinking is reported in the period before pregnancy is recognised. International and New Zealand research suggests that around 50% of women could be drinking alcohol pre-pregnancy recognition, decreasing to around 13-20% drinking post-pregnancy recognition.

Indicative research has identified the following predictors for the period of pregnancy before a pregnancy is confirmed and for the period after pregnancy has been confirmed (these have often only been identified in one or two studies and further research will help to confirm these predictors).

- *Predictors of drinking pre-pregnancy recognition*
International research identifies unplanned pregnancy, higher income, using tobacco, being Caucasian, and not having used assisted reproductive technology as predictors of drinking pre-pregnancy recognition. New Zealand research identifies women aged 16-24 years and women who are European, Māori or Pacific as being more likely to drink in the pre-pregnancy recognition period.
- *Predictors of binge drinking in the pre-recognition period*
International research identifies unplanned pregnancy, using tobacco, having low self-esteem, being younger, not having previously given birth, and being well educated and in a good job, or being a skilled worker as predictors of binge drinking pre-pregnancy recognition. New Zealand research identifies risky drinkers before pregnancy, those aged 16-24 years, Māori and Pacific women (compared with European women), smokers, and drug users as being more likely to binge drink in the pre-pregnancy recognition period
- *Predictors of drinking post-pregnancy recognition*
International research identifies women aged 30-39 years, being Caucasian and using tobacco worker as predictors of drinking post-pregnancy recognition. New Zealand research identifies increasing frequency of alcohol consumption before pregnancy as a predictor of drinking post-pregnancy recognition.
- *Predictors of binge drinking post-recognition*
International research identifies unplanned pregnancy, using tobacco, having previously given birth, being an unskilled worker, being unemployed for more than one year, and having a "mental/neurotic" disorder as predictors of drinking post-pregnancy recognition.



KEY POINTS

Indicative international research suggests that women drinking at high-risk levels after the first trimester are more likely to be younger than women drinking after the first trimester at less risky levels. They were also more likely to have lower levels of education, be a single-parent, and smoke cigarettes or use recreational drugs.

6.1 The influence of pre-pregnancy drinking patterns on alcohol consumption during pregnancy

Pre-pregnancy drinking patterns have been identified as one factor influencing the consumption of alcohol during pregnancy (Skagerström, et al., 2011; Anderson, et al., 2013; Thanh & Jonsson, 2010; Skagerström, et al., 2013; Ethen, et al. 2009). In a recent study, Anderson, et al. (2014) looked more closely at risky drinking patterns²⁰ before pregnancy and their relationship with drinking during pregnancy. Using Australian longitudinal data on 1,577 women (who had all consumed alcohol prior to pregnancy) they found that, prior to pregnancy, just 6% of women reported weekly drinking only (94% of these women consumed no more than two drinks on a drinking day), while 46% reported binge drinking and 48% reported both. Women in both the binge-drinking groups were more likely to have experienced financial stress, not been partnered, smoked, used drugs, been nulliparous²¹, experienced a violent relationship, and were less educated.

Nearly half of the women in the three groups (46%) continued their drinking patterns into pregnancy, while 40% reduced these drinking behaviours, and only a relatively small number (14%) completely ceased alcohol consumption. There was no difference between the groups on the likelihood of *stopping all drinking* during pregnancy. However, women who reported *both* binge and weekly drinking were more likely to *reduce* their drinking once pregnant compared with those who only did one or the other. The researchers suggest that *“this may be due to the fact that they had more opportunity to reduce as there were two behaviours they could change rather than just one”* (p.5). Anderson, et al. (2014) conclude that the numbers of women continuing to drink during pregnancy, including binge drinking, suggests that more needs to be done to address these behaviours.

²⁰ Risky drinking patterns were identified as: weekly drinking only (at least once a week, with no binge drinking); binge drinking only; or both weekly and binge drinking (drinking at least once a week and binge drinking).

²¹ Had no previous births.



6.2 Drinking alcohol before and after pregnancy recognition

A woman may be unaware she is pregnant in the early weeks of pregnancy, particularly if the pregnancy is unplanned. As noted earlier, around 40% of New Zealand pregnancies are unplanned.

Tough, Tofflemire, Clarke and Newburn-Cook (2006) suggest that, when asking women about drinking during pregnancy, the concept of the beginning of pregnancy is often not well-defined. Some women may interpret this as meaning from the time they knew they were pregnant, while others may report alcohol consumption from the time of conception. This can result in a lack of clarity about the levels of alcohol consumption during the earliest phase of pregnancy when many women may not realise they are pregnant.

Studies in Canada, Australia, Denmark, and New Zealand have investigated patterns of alcohol consumption in pregnancy before and after pregnancy recognition.

Canada

In their Canadian study, Tough, et al. (2006) conducted telephone interviews with 1,042 (mainly Caucasian) women who had recently delivered a baby in urban Alberta. Information on quantity and frequency of alcohol consumption was obtained for three separate time periods: six months prior to pregnancy; the pre-pregnancy recognition period (up until pregnancy confirmed); and the post-pregnancy recognition period.

Eighty percent of women reported consuming alcohol consumption *prior* to pregnancy (of these women, 60% reported low-risk drinking and 40% binge drinking). Nearly all (99%) knew that alcohol was not recommended during pregnancy. Once pregnant, 50% reported drinking alcohol *pre-pregnancy recognition* and 18% *post-pregnancy recognition*. Of these women, 32% reported binge drinking before becoming pregnant, and 11% reported binge drinking pre-pregnancy recognition. None of the participants reported binge drinking after pregnancy recognition. Other findings included the following:

- ◆ Patterns of alcohol consumption (mean number of drinks per drinking day and week) for those who continued to drink in the pre-pregnancy recognition period did not differ significantly from the pre-conception period, but dropped significantly after pregnancy recognition.
- ◆ Women planning for pregnancy were less likely to consume alcohol during the period of pre-pregnancy recognition (47%) than those not planning for pregnancy (53%). They also consumed less alcohol in the six months prior to pregnancy than those not planning for pregnancy.
- ◆ Women who consumed any alcohol during the pre-pregnancy recognition period were more likely to have an unplanned pregnancy, have a higher income (more than \$100,000), use tobacco, be Caucasian, and not have used assisted reproductive technology. Binge drinking in the pre-recognition period was more likely among women not planning a pregnancy, women who used tobacco and women with low self-esteem.



- ◆ Women who continued to drink alcohol *post-pregnancy recognition* were more likely to be aged 30 to 39 years, be Caucasian and use tobacco.

Nearly all the women in this study were aware of the risks of drinking during pregnancy and most stopped drinking alcohol once they realised they were pregnant. However, prior to pregnancy recognition, just over 13% had engaged in high-risk drinking and just over 36% in low-risk drinking.

Australia

In Australia, the *National Drug Strategy Household Survey* includes questions about alcohol and pregnancy (Callinan & Ferris, 2014). Surveys undertaken from 2001 to 2007 asked respondents if they had consumed alcohol while pregnant. The 2010 survey was adapted and asked two questions: respondents who had been pregnant and/or breastfed in the previous 12 months were asked if they had consumed alcohol while pregnant but *before* they knew that they were pregnant, and also if they consumed alcohol, *after* they knew they were pregnant.

Showing similarities with the Canadian study described above (Tough, et al., 2006), in the 2010 survey 49% of women reported drinking during pregnancy *before* they knew they were pregnant, while fewer women (20%) reported drinking during pregnancy *after* pregnancy recognition. Callinan and Ferris note that the data on drinking *after* pregnancy recognition was more consistent with trends from the previous surveys than the data on drinking before knowledge of pregnancy. “[W]e have assumed that ‘drinking after knowledge of pregnancy’ is the implicit interpretation of the question asked of respondents in the previous three surveys” (p.20).

In a more detailed analysis of the 2010 results, Callinan and Room (2012), note that, while more women with a higher income drink alcohol after knowledge of pregnancy than those with lower incomes, age is likely to be an important contributor to this trend. “Over 90 per cent of those aged 25 or under who were drinking before their knowledge of pregnancy stopped drinking when they became aware of their pregnancy, while only approximately half of those aged 36 or over did” (p.7).

New Zealand

A New Zealand survey, undertaken in 2005, found that, of those who were currently pregnant or had been pregnant in the past five years (552 women), just over half (53%) reported some alcohol consumption during pregnancy. However, 37% stopped drinking alcohol on recognising pregnancy, with 13% drinking after pregnancy recognition (Parackal, et al., 2006; Parackal, et al., 2013).

Women in the younger age group (16 to 24 years), and women who were European, Māori or Pacific had higher odds of drinking prior to realising pregnancy than women who reported their ethnicity as Asian/other category. Of those who had been pregnant in the last five years or were currently pregnant, nearly 20% had binge on at least one occasion during pregnancy, most (17%) before they realised they were pregnant.

More than half of the pregnant women in this study consumed alcohol in early pregnancy (on a typical drinking day) that “exceeded recommendations for responsible drinking”. Those women



who were risky drinkers (e.g. binge drinkers²²) and those aged 16 to 24 years were more likely to drink and binge drink in early pregnancy, than non-risky drinkers and women of other age groups; for example, risky drinkers were 3.5 times more likely to drink during this period of pregnancy. Parackal, et al. (2013) conclude that "... half of New Zealand women of childbearing age are at risk for drinking in the early stages of pregnancy, at levels that pose a risk for the manifestation of fetal alcohol spectrum disorders" (p.523).

A more recent New Zealand study by Mallard, Connor and Houghton (2013) also investigated patterns of alcohol consumption before and after pregnancy recognition. The researchers used data from a retrospective survey of 723 women who had given birth and were in 12 maternity wards located across New Zealand. Eighty-two percent of the women in the study consumed alcohol prior to pregnancy, with 20% typically consuming more than four standard drinks per occasion (heavy episodic drinking). Thirty-four percent continued to drink during pregnancy, although this reduced to 24% after pregnancy recognition. Continuing to drink after pregnancy recognition was positively associated with frequency of alcohol consumption before pregnancy.

Forty-four percent of the pregnancies analysed in this study were unplanned and confirmation of pregnancy occurred later in pregnancy for those with unplanned pregnancies (7.3 weeks) than for those with planned pregnancies (5.3 weeks) and also occurred later for heavy episodic drinkers (6.9 weeks) than participants not reporting heavy episodic drinking (6 weeks). The researchers estimated that 12% of the pregnancies were exposed to heavy episodic drinking during the early gestation period, with Māori women at nearly five times greater risk and Pacific women at 3.4 times higher risk than European women. Also at risk were smokers and drug users.

Scandinavia

A Danish study looked at the characteristics of women who binge drink before and after they become aware of their pregnancy, using data for 85,334 women enrolled in the *Danish National Birth Cohort* study (Strandberg-Larsen, Nielsen, Andersen, Olsen & Grønbaek, 2008). Around one-quarter of the women (24.1%) reported binge drinking at least once during pregnancy, and 5.8% reported four or more episodes of binge drinking. The majority of binge drinking episodes took place before the pregnancy was recognised, and binge drinking in this period was more common in unplanned pregnancies (27.6%) than in planned pregnancies (20.9%).

The researchers identified that predictors for binge drinking, in both the unrecognised and recognised part of pregnancy, were weekly alcohol consumption before pregnancy, single status and smoking. However, *different social characteristics* were associated with binge drinking pre- and post-pregnancy recognition:

- ◆ Women binge drinking in the pre-recognised part of pregnancy were more likely to be aged 25 to 29 years, be nulliparous²³, and be well educated, in good jobs, or classed as skilled workers.

²² Defined as five or more standard drinks on a typical drinking occasion for those under 18 years and seven or more standard drinks on a typical drinking occasion for those aged 18 years and over.

²³ Had no previous births.



- ◆ Women binge drinking after recognition of pregnancy were more likely to have an unplanned pregnancy, be multiparous²⁴ be unskilled workers, have been unemployed for more than one year, or have a “mental/neurotic” disorder.

6.3 Drinking alcohol during the different trimesters of pregnancy

Studies in the United States and Australia have investigated patterns of alcohol consumption over the different trimesters of pregnancy.

United States

In addition to identifying predictors of alcohol consumption in their U.S. study, Ethen, et al. (2009) also analysed the prevalence, patterns and predictors of alcohol consumption prior to and during various intervals of pregnancy, with women reporting alcohol consumption for the third, second, and first month before conception; the first, second, and third month of pregnancy; and the second and third trimesters of pregnancy. Just over 30% of women reported consuming some alcohol during pregnancy. Other findings included the following:

- ◆ During the first trimester (first three months of pregnancy), 25.2% of women reported drinking any alcohol, and 8.1% reported binge drinking (four or more alcoholic drinks on at least one occasion).
- ◆ During the first trimester, 22.5% of women reported drinking any alcohol in the first month, decreasing to 8.5% in the second month and to 5.5% in the third month of pregnancy.
- ◆ In the second trimester, 7.4% reported any alcohol consumption, and this increased only slightly in the third trimester to 7.9%.
- ◆ The prevalence of binge drinking decreased through the pregnancy, from 7.4% in the first month to 0.5% in the third trimester. For women who reported drinking during pregnancy, the quantity and frequency of alcohol use declined as the pregnancy progressed.

“The most common pattern of alcohol use reported was to drink during the 1st month, and then abstain during the rest of pregnancy (13.9%) ...; however, the second most common pattern was to drink during all the trimesters of pregnancy (2.7%). The third most common pattern was to abstain until the 3rd trimester, and then consume alcohol (2.5%)” (p.277).

The researchers provide a useful reminder that not all drinking will fall into these patterns. They note that, of the women who did *not* drink during the three months before pregnancy, 14.8% reported drinking during their pregnancy, with 2.5% reporting that they were binge drinking during this period.

²⁴ Have experienced one or more previous births.



Another study in the United States used a large data set from the *Pregnancy Risk Assessment Monitoring System (PRAMS)*²⁵ (311,428 records for the period 2002-2009) to investigate predictors of cessation of alcohol consumption, reduction in consumption, and no reduction in consumption in the third trimester of pregnancy (Kitsantas, Gaffney, Wu & Castello, 2014). Just under half the women in the study (49.4%) drank alcohol in a typical week in the three months before pregnancy. Of these women, around 87% were not drinking alcohol during the third trimester of pregnancy, an additional 6.6% had reduced their alcohol consumption, while around 6.4% reported no reduction in their alcohol consumption.

Older women and those with a higher education were more likely to reduce their alcohol consumption rather than stop drinking altogether. Women who were black, Hispanic, overweight, obese or had previously given birth, were more likely to quit or maintain their level of drinking than reduce their drinking.

Several stress-related factors increased the risk of not quitting or not reducing alcohol consumption during the last trimester of pregnancy: abuse during pregnancy; being homeless and having someone close who has a drug or alcohol problem. Smoking during pregnancy was associated with a greater risk of not quitting but only reducing alcohol consumption. In addition, women with prenatal health problems, such as gestational diabetes, pregnancy-induced hypertension and preeclampsia, were less likely to quit than reduce their alcohol consumption. The researchers hypothesise that alcohol may serve as a stress reliever.

A U.S. study investigated the characteristics of women who consumed alcohol in late pregnancy, using data for the state of Maryland from the *Pregnancy Risk Assessment Monitoring System (PRAMS)* survey (Cheng, Kettinger, Uduhiri & Hurt, 2011a; Cheng, Kettinger, D'Agati, Lockhart & Hurt, 2011b). The researchers analysed data from a random sample of 12,611 mothers who delivered live infants during the years 2001 to 2008.

Eight percent of the mothers reported that they had consumed alcohol during the last three months of pregnancy, while less than 1% reported binge drinking. Late-pregnancy alcohol consumption was more likely to be reported by mothers who were non-Hispanic white, aged 35 years or older, and college graduates. The researchers note that the same groups were the *least likely* to report being informed about the effect of alcohol on the fetus by a health provider or being screened for alcohol use during pregnancy by their prenatal care provider.

Australia

An Australian study (the *Griffith Study of Population Health: Environments for Healthy Living*) ran from 2007 to 2011 and provided data on pregnant women attending public hospitals in south-east Queensland and north-east New South Wales (Cameron, Davey, Kendall, Wilson & McClure, 2013). Alcohol consumption data was available for 2,731 women, and 1,206 (44.2%) of these women reported drinking alcohol at some time during their pregnancy, with 917 women (33.7%) reporting that they consumed alcohol after the first trimester of pregnancy. Sixty-eight women (2.5%) reported drinking at high-risk levels after the first trimester.

²⁵ *PRAMS* is a surveillance project of the Centers for Disease Control and Prevention (CDC) and state health departments. *PRAMS* collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy. The *PRAMS* sample is based on all women in the United States who had a live birth - <http://www.cdc.gov/prams/>



The researchers report on drinking in the first trimester and the rest of pregnancy and compare data for women at different levels of risk. Among their findings were the following:

- ◆ Women who reported drinking alcohol after the first trimester of pregnancy were significantly older than women who reported no alcohol consumption or consumption only in the first trimester. However, women drinking at high-risk levels were younger than women who did not report high-risk consumption or drank only in the first trimester
- ◆ Women who continued low-level consumption after the first trimester were more likely to be older and have a higher level of education and higher household income.
- ◆ Women who consumed alcohol at high-risk levels after the first trimester were more likely to have lower levels of education and be a single-parent. High-risk women were also more likely to smoke cigarettes or use recreational drugs.



7.0 Psychological predictors of drinking alcohol during pregnancy

KEY POINTS

The following psychological predictors have been associated with alcohol consumption during pregnancy:

- Negative affectivity - a tendency to frequently experience negative emotions and views (both light and binge drinking, but particularly a strong association with binge drinking).
- Unwanted pregnancies – women with unwanted pregnancies are significantly more likely to report binge drinking during the last three months of pregnancy compared with women with intended or mistimed pregnancies.

Indicative research also suggests the following psychological predictors *may* be associated with alcohol consumption during pregnancy:

- Total perceived severity of stressful events during early and mid-pregnancy; in particular, conflict with loved ones, crime-related stress, and pregnancy-specific stress.
- Pregnancy-specific anxiety (fear of bearing a disabled child, and concerns about pregnancy-related changes in appearance).
- Higher levels of openness to experience (curiosity, intellect and creativity) and lower levels of conscientiousness (responsibility, carefulness, and conforming to societal norms).
- Depressive symptoms.

Social and psychological factors, such as anxiety or depression, have been identified as predictors of alcohol consumption during pregnancy. A number of recent studies have looked in more detail at psychological predictors of drinking during pregnancy.

In a Norwegian study, Stene-Larsen, Torgersen, Strandberg-Larsen, Normann and Vollrath (2013) looked at the impact of maternal negative affectivity (a tendency to frequently experience negative emotions and views), on light alcohol use and binge drinking during pregnancy. Their study used data on 66,111 pregnant women and their partners from the nationwide *Mother and Child Cohort Study*. Almost all the women reported consuming alcohol in the three months *prior* to pregnancy, and 67% reported at least one episode of binge drinking. During the first trimester of pregnancy, 16% reported light drinking (0.5–2 units one to four times per month) and 12% reported binge drinking (five alcohol units or more). In the second trimester, 10% reported light use and only 0.5% reported binge drinking.

For each unit increase in maternal negative affectivity over the average, light alcohol use by women increased, by 27% in the first trimester and 28% in the second trimester. The odds for binge drinking were much higher – increasing by 55% in the first trimester and 114% in the second trimester for each unit increase of negative affectivity in the mother²⁶. Stene-Larsen, et al. (2013)

²⁶ See also a media release on this study at: <http://au.wiley.com/WileyCDA/PressRelease/pressReleaseld-109689.html>



note that the association between negative affectivity and binge drinking was much stronger than the association with light alcohol use, and that the association between negative affectivity and binge drinking increased in the second trimester. They conclude that pregnant women experiencing high levels of negative affectivity “... may feel overwhelmed and distressed by the extent of novel physical and psychological experiences they are confronted with in pregnancy. This heightened stress may contribute to an increased propensity to drink alcohol” (p.1392).

Beijers, et al. (2014b) looked specifically at the role of stressful events and continued alcohol consumption (and smoking) in pregnancy. Their analysis used data from a population-based prospective cohort study of 2,287 pregnant women recruited throughout the Netherlands. The researchers analysed the data for 124 women who continued alcohol consumption and 1,403 women who stopped drinking during pregnancy.

Current alcohol consumption status, alcohol consumption status before pregnancy, and perceived severity of stressful events were self-reported at 19 weeks gestation. Anxiety and depression were assessed at 14 weeks. Beijers, et al. (2014b) conclude that the total perceived severity of stressful events during early and mid-pregnancy was associated with continued alcohol consumption. In addition, the following individual categories of stressful events were associated with continued alcohol consumption: conflict with loved ones; crime-related events; pregnancy-specific events.

There was no association between anxiety or depressive symptoms and continued alcohol consumption. Additionally, the amount of alcohol consumption by those who continued to drink during pregnancy was not associated with the severity of stressful events. The researchers note that the association between conflict with loved ones and continued alcohol consumption has also been evident in previous research. They suggest that the support of a partner can help a pregnant woman better cope with stress during pregnancy.

In a study into the association of personality with continued smoking and alcohol consumption during early pregnancy, Beijers, Burger, Verbeek, Bockting and Ormel (2014a) used data from the study in the Netherlands, described above, to look at whether antenatal anxiety and depressive symptoms explained these associations. Personality traits were measured using five domains or traits:

- ◆ Neuroticism - tendency to experience negative effects.
- ◆ Extraversion - social, energetic, and adventurous.
- ◆ Openness to experience - curiosity, intellect and creativity.
- ◆ Conscientiousness - responsibility, carefulness, and conforming to societal norms (the researchers note that high scores of conscientiousness are consistently associated with health-promoting behaviour).
- ◆ Agreeableness - avoiding conflict, being sensitive to social cues, and being considerate.

In an analysis of data from a sample of 110 pregnant women who continued to drink alcohol and 1,230 pregnant women who stopped drinking, the researchers found associations between continued alcohol consumption during pregnancy and higher levels of openness to experience,



and lower levels of conscientiousness. There was only a borderline statistically significant relationship between depressive symptoms and continued alcohol consumption. However, the association between lower levels of conscientiousness and continued alcohol consumption was partly explained by both anxiety and depressive symptoms. Beijers, et al. (2014a) suggest that continuing to drink alcohol may help women cope with feelings of negative affect during pregnancy. They note that these findings for pregnant women differ from similar studies for the general population and suggest that this implies pregnancy may be a “unique period”.

In a U.S. study, Arch (2013) investigated the contribution of pregnancy anxiety to the risk of significant (risky) alcohol consumption during pregnancy in a national sample of 311 pregnant women, aged 18 to 47 years. Pregnancy-specific anxiety could arise from a range of factors including fears and worries about the pregnancy itself, such as fear of giving birth, fear of bearing a disabled child, and concerns about pregnancy-related changes in appearance.

Pregnancy anxiety was the single strongest predictor of alcohol drinking at risky levels during pregnancy (depression was another predictor), while both general anxiety and a wanted pregnancy were associated with reduced odds of risky drinking. Arch found that fear of bearing a handicapped child and pregnancy-related appearance concerns both predicted risky drinking, while fear of giving birth did not predict risky drinking. It is important to note that this was a small-scale study and the researcher could not rule out that drinking during pregnancy predicted pregnancy anxiety, although the relationship between drinking risk and pregnancy-related concerns about appearance helps to mitigate this possibility.

Terplan, Cheng and Chisolm (2014) note that half of all pregnancies in the United States are unintended. They investigated the relationship between pregnancy intention (intended/mistimed or unwanted²⁷) and change in perinatal alcohol use between three months prior to pregnancy and the last three months of pregnancy. They used data on a large national sample of 95,728 women, from the U.S. *Pregnancy Risk Assessment Monitoring System*, who had a recent live birth and who reported any alcohol drinking in the three months prior to pregnancy.

Most women (86.6%) had quit drinking by the last three months of pregnancy, 7% had reduced their drinking, and 6.4% reported drinking the same amount or more as before pregnancy. Binge drinking and heavy drinking were much less common in the last three months of pregnancy than prior to pregnancy, with 1.4% reporting binge drinking during the last three months.

A higher proportion of women who went on to have unintended pregnancies reported heavy and binge drinking in the three months prior to pregnancy. The researchers found no relationship between pregnancy intention and cessation or reduction in alcohol use in the last three months of pregnancy. However, women whose pregnancies were unwanted were significantly more likely to report binge drinking during the last three months of pregnancy compared with women experiencing intended/mistimed pregnancies.

²⁷ Not wanting to be pregnant then or at any time in the future.



8.0 Concurrent smoking and drinking during pregnancy

KEY POINTS

Smoking is consistently identified as a predictor of drinking alcohol during pregnancy, and has also been identified as a predictor of drinking and binge drinking pre-pregnancy recognition, and of drinking and binge drinking post-pregnancy recognition. Recent research has suggested that there is a synergistic effect from smoking and drinking during pregnancy that increases the odds of pre-term labour, low birth weight and growth restriction by more than the sum of the individual effects.

Indicative research suggests that factors that differentiate women at dual risk of drinking and smoking during pregnancy are lower educational levels and poor mental health. Other factors identified in individual studies include lower levels of employment, low levels of social support, experience of partner violence, stress about money, higher frequency of sexual intercourse, less use of contraception, and higher frequency of alcohol use.

Smoking is consistently identified as a predictor of drinking alcohol during pregnancy and has also been identified as a predictor of drinking and binge drinking pre-pregnancy recognition, and of drinking and binge drinking post-pregnancy recognition. Recent research has suggested that there is a synergistic effect from smoking *and* drinking during pregnancy that increases the odds of pre-term labour, low birth weight and growth restriction by more than the sum of the individual effects (Aliyu, et al., 2009; Odendaal, Steyn, Elliott & Burd, 2009, *cited in* Ingersoll, Hetteema, Cropsey & Jackson, 2011).

In a study based in Virginia in the United States, Ingersoll, et al. (2011) used data on 109 women at dual risk for alcohol-exposed pregnancy and smoking-exposed pregnancy, and 108 women at risk only for alcohol-exposed pregnancy, to identify predictors for women at dual risk. Factors that differentiated women at dual risk, compared with those at risk of alcohol-exposed pregnancy only, included lower educational level and employment, higher frequency of sexual intercourse, less use of contraception, having a mental disorder, and *higher frequency of alcohol use*.

A more recent study by Powers, McDermott, Loxton and Chojenta (2013) also examined the predictors of concurrent smoking and drinking during pregnancy, using data for 1,591 women from the *Australian Longitudinal Study on Women's Health*. Both pre-pregnancy (an average of three years before pregnancy) and pregnancy data were used, and almost a quarter of the total sample (354 women) were concurrent drinkers and smokers before pregnancy.

Compared with other women in the sample, concurrent drinkers and smokers during pregnancy were more likely than other pregnant women to have fewer than 12 years education, low levels of social support, poor mental health, experienced partner violence, or be stressed about money. These were similar to the factors influencing those who smoked (but did not drink) during pregnancy but not to the factors influencing only drinking during pregnancy.



Looking at what happened to pre-pregnancy concurrent drinkers and smokers during their pregnancies, the researchers found that 73% decreased drinking (including 13% who quit), 72% decreased smoking (62% of these women quit), while 53% decreased drinking *and* smoking during pregnancy (including 7% who quit both). Decreased concurrent drinking and smoking was significantly more likely among women with at least 12 years education, women who drank at least one to two days a week, and women who drank three or more drinks per occasion, and significantly less likely among women who were heavy smokers, had other children, were disadvantaged or stressed about money, had poor mental health, low social support, or experience of partner violence.

Noting the finding that women who already had children were more likely than other women to continue smoking and drinking during a current pregnancy, Powers, et al. (2013) hypothesise that, in subsequent pregnancies, women were less inclined to respond to health behaviour messages. They also point out that, while only 13% of pre-pregnancy concurrent drinkers and smokers stopped drinking altogether, 62% stopped smoking, and suggest that this may be due to the more consistent message about the risks of smoking during pregnancy. Indeed, noting that women who were drinking two drinks a day or drinking more than once a week pre-pregnancy were more likely to decrease their drinking, the researchers suggest that this may indicate women were responding to advice that it was safe to consume small amounts of alcohol.

Referring to the research described above (Powers, et al., 2013), Anderson, et al. (2014) suggest that drinking behaviour should be assessed “... *routinely within the context of other behaviours when trying to identify women at risk of continuing their risky drinking behaviour into pregnancy*” (p.6).



9.0 Socio-demographic factors and drinking alcohol during pregnancy

KEY POINTS

Education

The educational level of women has been linked to drinking in pregnancy, although not consistently. Some studies show that higher-educated women also have an increased risk of re-starting and continuing drinking in late pregnancy.

Indicative research suggests that any increased risk for women with higher education levels is partly explained by the intensity of alcohol intake before pregnancy and physical and psychological problems. However, it appears that other factors, such as cultural and broader social norms, may play greater roles.

Age

Many of the risk factors associated with drinking during pregnancy (e.g. physical abuse and pre-pregnancy smoking) decrease as women get older, yet the proportion of women drinking during pregnancy increases with age. Possible explanations include older women using drinking as a coping mechanism because they experience more stressful pregnancies (due to factors such as greater maternal anxiety, diabetes, and pregnancy-induced hypertension) than women aged 20 to 34 years.

Earlier age of first drink and a lack of knowledge about the impact of alcohol on the fetus are among factors associated with alcohol use during pregnancy by adolescents aged 19 and under.

Partners

The influence of partners' attitudes and behaviours on the consumption of alcohol by pregnant women has been explored in a number of studies. It appears that a partner encouraging reduction or abstinence would not influence most expectant mothers' drinking behaviour during pregnancy (smaller numbers of women report that they *would be* influenced by their partner's attitudes). Research suggests that both women and men may respond to their own individual standards and expectations when making decisions about drinking during a pregnancy.

Maternal occupation

Indicative research suggests that women working in food preparation/serving-related occupations are more likely to engage in moderate to heavy drinking during pregnancy, compared with women in a wide range of other occupations.

A number of socio-demographic factors, such as older age or higher socio-economic status are identified as predictors of alcohol consumption during pregnancy. Recent studies have investigated specific socio-demographic factors and their influence on drinking during pregnancy and these studies are described below.



9.1 Education

The educational level of women has been linked to drinking in pregnancy, although not consistently. Pfinder, Kunst, Feldmann, van Eijdsen and Vrijkotte (2014) looked specifically at educational differences and their contribution to continuing or restarting drinking in early or late pregnancy and also considered the contribution of psychological factors (such as pregnancy-related anxieties, sleeping problems, and whether women were happy to be pregnant) and physical factors (such as hypertension or a previous miscarriage) to educational differences. Using data for 4,885 women, enrolled in a Dutch child development study, who drank alcohol prior to pregnancy, the researchers considered self-reported alcohol intake at 16 weeks gestation and at three months postpartum.

Higher-educated women (compared with low- and mid-educated women) were more likely to continue drinking during early pregnancy, and higher educated women also had an increased risk of restarting and continuing drinking in late pregnancy. Focusing on drinking in early pregnancy, Pfinder, et al. (2014) found that the intensity of participants' alcohol intake before pregnancy explained just over 17% of the continued drinking during early pregnancy, and that all physical and psychological problems together played a relatively small role (8.8%). They suggest that other factors, such as cultural and broader social norms, may play a greater role, including the use of alcohol being perceived as a way to relax due to high levels of stress and responsibility at work, status enhancement, and contributing to social obligations and occasions.

Peadon, et al. (2011) refer to earlier research that found women with higher levels of education had higher levels of knowledge, but were more likely to drink alcohol in pregnancy. They suggest that excessive alcohol use by tertiary education students may foster “... *a more entrenched alcohol culture and more tolerant lifelong attitudes towards alcohol consumption*” (p.8).

9.2 Age

Despite the fact that younger women are more likely to be risky drinkers and more likely to have unplanned pregnancies (Bottorff, et al., 2014; Meschke, Holl & Messelt, 2013), older age has been consistently identified as a predictor of drinking during pregnancy (Callinan & Ferris, 2014; Maloney, et al., 2011; Skagerström, et al., 2013).

Meschke, et al. (2013) investigated antenatal drinking-related risk factors, using data on 9,004 women living in four U.S. states. Older women were found to be *more likely* to drink in the antenatal period, and the researchers describe this as a “contradiction”, noting that exposure to many of the risk factors currently associated with drinking during pregnancy (e.g. physical abuse and prenatal smoking) decreased in this analysis as women got older²⁸.

The researchers offer some possible explanations for the higher rates of drinking during pregnancy in this older group of women, including older women being more likely to have stressful pregnancies than women aged 20 to 34 years, due to factors such as greater maternal anxiety, diabetes, and pregnancy-induced hypertension. They suggest that older women may use their

²⁸ This is also the case for New Zealand women who smoke: http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-social-indicators/Home/Health/tobacco-smoking.aspx



drinking as a coping mechanism, and that age-specific models and prevention efforts may help to explain the factors that contribute to drinking in pregnancy by older women.

Bottorff, et al. (2014) undertook a scoping review of the literature that examined alcohol (and tobacco use) in the context of adolescent pregnancy and postpartum. They identify “compelling gaps” in knowledge and responsiveness to adolescents aged 19 and under who use alcohol during pregnancy. Five of the studies identified in this scoping review focused on alcohol use only. They did not report exceptionally high levels of alcohol use during pregnancy or postpartum (the figure ranged from 5-11%) and, overall, pregnant adolescents reduced alcohol use throughout their pregnancy. Although the research was limited, the researchers describe findings that point to earlier age of first drink, and lack of knowledge about the impact of alcohol on the fetus as among factors associated by researchers with adolescents’ alcohol use during pregnancy.

9.3 Partners

The influence of partners’ behaviours on the consumption of alcohol by pregnant women has been explored in a number of studies. Although expectant fathers may change their drinking during their partner’s pregnancy, or believe that the pregnant woman should reduce or stop drinking, the research in this section suggests that this will not necessarily affect the woman’s attitudes to drinking during pregnancy or their drinking behaviours.

Some New Zealand men do appear to reduce their consumption of alcohol when their partner is pregnant. In the *Growing Up in New Zealand* study (Morton, et al., 2010), nearly 82% of partners reported consuming alcohol regularly prior to the mother’s pregnancy²⁹. During the pregnancy, over half the partners reported drinking less than usual (with 26.2% drinking *much less*), 43% did not make any change to their drinking patterns, and a small number drank more than usual.

A 2009 survey of FASD awareness in Ontario, Canada included 300 women aged 18 to 40 years and 100 men who were spouses or partners of women aged 18 to 40 years (Prevention Working Group of FASD Stakeholders for Ontario, 2009). The survey asked men whether they would stop drinking alcohol if their partner became pregnant. Nearly half (48%) said that it was very likely that they would stop drinking, 18% said it was somewhat likely, while 31% said that it was not very likely or not at all likely.

When asked whether they would encourage their partner to stop or cut back her alcohol use during pregnancy, 91% said that this was very likely. However, the majority of female respondents indicated that their partner’s behaviour would not influence their use of alcohol if they were pregnant. For example, 68% said it would not affect their behaviour if their partner stopped drinking. The response to a question on how they would react if their partner encouraged them to stop or cut back demonstrates the mixed reactions: 55% said it would make no difference (or they did not drink alcohol)³⁰; 27% said that they were less likely to drink alcohol and 15% said that they were *more likely* to drink alcohol.

²⁹ Only some partners were involved in this study and it is not clear at this stage of the research whether they are representative of the New Zealand population.

³⁰ Fifty-four percent of survey participants had not consumed alcohol during the last month.



In the Australian study reported earlier by Peardon, et al. (2011), just over 90.5% said that their partner's drinking during the pregnancy would not change their own behaviour and, a similar number to the Ontario study above (68.9%), said that their partner not drinking during their pregnancy would not change their own behaviour. In addition, 59% said that their partner encouraging them to cut back or stop would not influence their behaviour. However, some respondents did report that they *would be* influenced by their partner's behaviour, with approximately one third saying they would be less likely to drink alcohol in pregnancy if their partner encouraged them to stop or cut back (38.3%) or if their partner stopped drinking alcohol during the pregnancy (30.5%).

A Norwegian study looked at changes in alcohol consumption from before pregnancy to 17 weeks gestation for 82,362 couples, as part of a large, prospective population-based pregnancy cohort study (Mellingen, Torsheim & Thuen, 2013). Both mothers and fathers significantly reduced usual drinking frequency, quantities, and the number of occasions of heavy episodic drinking during pregnancy. Most mothers stopped drinking altogether during pregnancy (90% of drinking, first-time mothers and 82.5% of experienced mothers), and fathers reduced their drinking considerably, particularly first-time fathers who initially had higher levels of drinking; just over 2% of fathers stopped drinking altogether.

The researchers found that fathers reduced their drinking to levels not noted in studies from other countries, such as the United States, and suggest this may be due to cultural reasons, such as an apparently higher level of gender equality. In line with the studies described earlier, they did not find that the drinking patterns of the father or mother strongly influenced the other's drinking pattern.

“Although there was a weak to moderate association between reduced alcohol consumption of mothers and fathers, each parent's change can be explained only to a small extent by the other parent's drinking pattern. Thus, parents seem to make adaptations to pregnancy according to some individual standards and expectations, and these standards and expectations may account for the relatively weak relationship between the partners' alcohol use” (p.8).

Violence by partners towards pregnant women may also influence their uptake of health behaviours. Fanslow, Silva, Robinson and Whitehead (2008) undertook face-to-face interviews with a representative sample of 2,391 New Zealand women (aged 18 to 64 years), who had ever been pregnant, to investigate associations between violence during pregnancy and a number of health behaviours. They found that 6% of urban women and 9% of rural women had experienced violence during one or more pregnancies. The researchers found that these women were significantly more likely to have smoked tobacco during their last pregnancy. Women who experienced violence during pregnancy were also more likely to have consumed alcohol during their last pregnancy, although this finding was not statistically significant.



9.4 Maternal occupation

United States researchers analysed data from a large national study to investigate whether there were differences by maternal occupation in four high-risk behaviours during pregnancy (lack of folic acid supplementation, lack of early prenatal care, smoking, and moderate to heavy drinking) (Agopian, et al., 2012). Data was available for 5,153 women who were employed during early pregnancy from 1997 to 2007.

The researchers found that *“compared to women in management, business, science, and arts occupations, women in other occupations (e.g. service occupations) were significantly more likely to engage in all four high risk behaviours”* (p.341). When they analysed data for 20 individual occupational groups, and after adjusting for income, age, race/ethnicity, and education, significant associations remained between food preparation/serving-related occupations and lack of folic acid use, smoking, and moderate to heavy drinking.

Agopian, et al. (2012) note that these associations may reflect differences in the characteristics between women who choose different occupations and/or the occupation may have an independent effect on certain high-risk behaviours; for example, through work culture and normalisation of behaviours, and work-related stress. They suggest that these findings could inform the development of interventions for women in high-risk occupational groups.

9.5 Economic contraction

Another recent U.S. study used national longitudinal survey data to investigate links between economic contraction (recession³¹ - represented by unemployment rates) and health behaviours (smoking, alcohol use and gestational weight gain) among 7,074 pregnant women (Margerison-Zilko, 2014). Only the most extreme and unexpected economic contractions were analysed in this study.

Margerison-Zilko did find associations between economic contraction and alcohol use, although these differed by race/ethnicity and education, while smoking and gestational weight gain were not associated with economic contraction. Black-non-Hispanic women exposed to economic contraction during the first and second trimester of pregnancy had a 42% increased risk of alcohol for first-trimester exposure and a 33% increased risk of alcohol use for second-trimester exposure. The researcher also found that economic contraction in later pregnancy was significantly associated with alcohol use by women with 12 years or more of education, but notes that, as this finding was more inconsistent across trimesters and for a relatively small sample size, further research would be useful.

³¹ A significant decline in economic activity spread across the economy, lasting more than a few months (<http://www.nber.org/cycles.html>).



PART B: Developing communication strategies that address the use of alcohol in pregnancy

Researchers have yet to identify the “... *intensity and timing of the alcohol exposure needed to produce any type or degree of fetal impairment*” (Babor, et al., 2010, p.15), and there is no consensus on whether there is a threshold below which there is no risk (Elliott, et al., 2008). Given the lack of clear and agreed evidence about whether there is any safe level of drinking during pregnancy, it is important to ensure pregnant women and women in their childbearing years are aware of the importance of not drinking during pregnancy.

Primary prevention communication strategies used to disseminate messages about drinking in pregnancy *before* a woman becomes pregnant are mainly universal strategies, such as media campaigns, social marketing approaches³², educational materials and health warning labels on alcoholic containers (Nguyen, et al., 2011; Young, et al., 2009). These strategies usually aim to raise awareness about the risks of drinking during pregnancy, where people can go for further information and support, and build community awareness and involvement in the issue (Thurmeier, Deshpande, Lavack, Agrey & Cismaru, 2011).

During pregnancy, primary prevention approaches include those described above but can also encompass brief interventions that include clinical advice and counselling, and alcohol screening at doctors’ offices (Nguyen, et al., 2011). Burgoyne, Willet and Armstrong (2006) note that, while media campaigns and other communication strategies are most appropriate for large low-risk populations, those at higher risk may need comprehensive support to make health behaviour changes.

Communication strategies usually target pregnant women, women of childbearing age, and/or those in a position to influence these women (partners, friends and family, and the wider community). “*The underlying assumption is that these individuals have the motivation, opportunity, and ability to achieve the desired behaviour*” (Poole, 2011, p.176).

The following sections focus on universal primary prevention communication strategies targeting alcohol use before and during pregnancy, specifically media campaigns, social marketing approaches, educational materials, messages for health care providers, and messages for health warning labels. They explore what women know and think about alcohol use in pregnancy, the development of messages, and their impact on the intended audience’s knowledge, attitudes, behavioural intentions, and behaviour.

³² Social marketing has been described as “tools and technologies adapted mainly from commercial marketing and applied to issues for the social good” (p.20), aiming to inform *and* persuade and to influence changes in behaviour in individuals, environments, and social structures (Donovan & Henley, 2010). Media campaigns may be used as part of a social marketing approach but may also be developed as a stand-alone strategy to inform *or* persuade.



10.0 Women's knowledge of, and attitudes towards, drinking alcohol during pregnancy

KEY POINTS

Women's knowledge of, and attitudes towards, the risks of drinking alcohol during pregnancy

The majority of women know that stopping alcohol use is an important maternal behaviour associated with increasing the chances of having a healthy baby, although many women have limited knowledge about the specific effects of alcohol on the unborn child.

Women also have differing opinions about the potential risks of low levels of alcohol consumption during pregnancy, about different types of alcohol, and about consumption in the different trimesters of pregnancy.

Education level and knowledge are not necessarily associated with attitude towards drinking in pregnancy. Research suggests that *attitude* to alcohol consumption during pregnancy is a more important influencer of behaviour than *knowledge*.

Mothers describe an internal process of weighing up the, often conflicting, information available to them, as well as the personal experiences of friends and family who may have consumed alcohol while pregnant.

Influences on women's knowledge and awareness of the risks of drinking during pregnancy

Women's awareness of the effects of alcohol in pregnancy comes from health providers, health facilities, brochures, pamphlets, newspaper/magazines, television, the internet, and family and friends. However, pregnant women report receiving inconsistent and unclear information from health care providers on the safety of drinking during pregnancy.

Family and friends of women can be either a positive or negative influence. Pregnant women are often socialising in environments where there are strong social norms that encourage drinking, and some women report an expectation by others that they will drink during social occasions. Those in early pregnancy do not always want to reveal their pregnancy when they are offered alcohol. Women who drink during pregnancy are also more likely to identify benefits to drinking (particularly relaxation) than those women who discontinue drinking during pregnancy.

Conversely, some women who continue to drink during pregnancy may receive negative comments about their drinking from partners, family and friends. Key reasons for abstaining from alcohol during pregnancy are the health of the baby and social pressure.

Awareness of official guidelines

A number of countries have produced guidelines on drinking during and when planning a pregnancy, to inform health care providers and pregnant women about the risks of alcohol consumption during this period. It is not clear to what extent pregnant women are aware of these guidelines.



A number of studies have asked the general public, pregnant women, women of childbearing age, and mothers what they know about alcohol and pregnancy, their attitudes towards drinking during pregnancy, the influences on their decision whether or not to drink, and what messages may work in persuading women not to drink alcohol during pregnancy.

10.1 The general public

A recent Australian study revealed a high level of concern among the *general public* about alcohol use in pregnancy. The Foundation for Alcohol Research and Education's annual alcohol poll assesses attitudes towards alcohol, alcohol consumption trends, awareness of the risks associated with alcohol use, and perspectives on various alcohol policies (Foundation for Alcohol Research and Education, 2014).

The 2014 online poll had 1,545 respondents, and 54% identified drinking during pregnancy as one of the alcohol-related behaviours they were most concerned about (the fourth most identified item after binge drinking, people drinking alcohol and taking drugs, and children and young people under 18 drinking alcohol). Those in the youngest age group (18-34 years) were more likely (62%) than those aged 35 to 49 years (47%) or 50 to 64 years (50%) to be concerned.

Seventy-eight percent agreed that drinking while pregnant is harmful to the fetus. Again, those in the younger group (81%) were more likely than those aged 35 to 49 years (76%) and those in the oldest group (77%) to think this. When asked how many standard drinks a pregnant woman can consume while avoiding harm to the fetus, two-thirds (67%) stated zero drinks, while 17% selected a maximum of one standard drink per day to avoid harm.

Regular drinkers (26%) were more likely than moderate (19%), occasional (10%) and non-drinkers (7%) to state that pregnant women *could* consume alcohol in moderation. Fifty percent of respondents were aware of FASD (61% women and 39% men), although awareness varied by age, with respondents aged 18 to 24 years less likely (38%) than people aged 25 to 34 years (52%), and people aged 35 to 49 years (52%) to be aware.

10.2 Pregnant women

Studies in Australia, the United Kingdom and Switzerland have explored pregnant women's attitudes towards drinking during pregnancy and the influences on their decisions to either drink or abstain during pregnancy.

Australia

An exploratory survey in Perth, Australia considered the views of pregnant women on drinking in pregnancy (McBride, Carruthers & Hutchinson, 2012). One hundred and forty-two women attending Perth public hospitals for prenatal care, and who reported consuming alcohol at some stage in pregnancy, were asked about factors contributing to alcohol consumption during pregnancy and possible strategies to reduce consumption.

Describing the cohort, the researchers report that women who continued to drink were more likely to have drunk in previous pregnancies and during the preconception period and that those who stopped drinking during pregnancy once they realised they were pregnant were significantly more



likely to be engaged in fulltime home duties and had completed less formal education. Women drinking at low levels during pregnancy were more likely to have a university degree than women in the other groups. They also found the following:

- ◆ Pregnant women drinking at risky levels (more than two drinks a week) were more likely to have a Government Health Care Card (a marker for low income), be single, experience a negative comment about their drinking from their partner, and use other drugs (particularly tobacco and cannabis). Risky drinkers were less likely to have a partner but more likely to have a less supportive partner and the researchers suggest that, for these women, interventions providing alternative forms of social support are required.
- ◆ More women in the low-risk (one to two drinks a week) and risky groups identified benefits to drinking than those women who discontinued drinking. The most noted benefit of drinking (by women from all groups) was relaxation, while low and risky groups were more likely than those no longer drinking to identify the *taste* of alcohol as a benefit.
- ◆ Nearly 40% of high-risk women and nearly one-third of low-risk women reported receiving a negative comment about their drinking. For low-risk women, this was more likely to come from family and friends (other than mother and partner), while risky drinkers were more likely to hear a negative comment from their partner.
- ◆ Around one-third of women who continued to drink during pregnancy reported concern about the potential risk of FAS to their unborn child (they were asked whether they had concerns about FAS, liver damage, or concerns related to the new guidelines).
- ◆ One-third of risky drinkers reported that a doctor or health carer had *advised* them not to drink alcohol (although 80% of risky drinkers reported that their doctor or health carer had *asked* about alcohol use).
- ◆ About one-fifth of women not currently drinking and of low-risk women commented on conflicting advice received from health care providers, and women in these two groups asked for more accurate research information.
- ◆ Women not currently drinking were over five times more likely to comment that women should abstain while pregnant compared with other women in the study, while women in the two drinking groups were most likely to comment that moderate consumption during pregnancy is acceptable, with some comments related to previous pregnancy outcomes (of themselves and friends).

In interviews with 12 midwives and 12 pregnant women, in New South Wales, Australia, Jones and Telenta (2012) explored what influences women to *not* drink alcohol during pregnancy. Participants identified a range of risks associated with alcohol consumption for the *general public* but also raised a number of benefits, including health benefits. All participants were in agreement that there were no health benefits to drinking *during pregnancy*. However, most of the pregnant women and many of the midwives weren't able to articulate what the risks were; rather they had only a general understanding that it was unsafe.



Women who thought that the safest option while trying to conceive was no alcohol tended to be those who had been *actively* trying to conceive, while women who had fallen pregnant quickly or unexpectedly had a more relaxed attitude. Although some women were concerned about how much alcohol they had consumed before they knew they were pregnant, most felt that, as their consumption had been relatively low, they were unlikely to experience negative effects.

Both midwives and pregnant women described social issues for pregnant women due to perceived social norms, with alcohol consumption described as a way to enjoy social situations. Most participants noted an expectation (and “pressure”) that alcohol would be drunk during social events and describe the challenges involved in not revealing an early pregnancy, including excuses and actions they took to avoid others realising they were no longer drinking. Midwives also expressed concern at the social pressures for pregnant teenagers to drink with their peers.

“Our participants reported being strongly influenced by two conflicting social norms: the ‘drinking’ norm, which labels non-drinkers as unsocial and makes many women feel pressured to consume alcohol; and the ‘good mother’ norm, which engenders a sense of guilt associated with drinking during pregnancy ... The fact that the good mother norm does not appear to be supported by a clear understanding of the effects on the fetus of alcohol consumption during pregnancy means that many women are making the abstinence decision from a guilt or expectation motive rather than through an informed decision making process” (p.71).

United Kingdom

In an exploratory study, UK researchers investigated pregnant women’s attitudes towards alcohol consumption during pregnancy. Raymond, Beer, Glazebrook and Sayal (2009) undertook interviews with 20 pregnant women (aged 23 to 40 years), who were all in relationships, educated to A-level³³ or further, and had drunk alcohol before pregnancy. All but one had reduced their alcohol consumption during pregnancy. However, although most women acknowledged that there were risks involved in drinking alcohol during pregnancy, only six of the 20 had abstained from alcohol during their pregnancy to date.

Participants were influenced by family and friends and by their previous experiences of pregnancy. This research took place in 2007, a few months after Department of Health guidance had changed. Up until May 2007, the guidance was that pregnant women should not drink more than one to two units of alcohol once or twice a week and should avoid getting drunk. From May 2007, the guidance recommended abstinence, however also noted that if pregnant women choose to drink, this should only be up to the previously recommended limits. Thirteen women knew that there had been a change in the government’s advice, and eight correctly recalled the advice. However, none were confident that their recall was correct.

Barriers and facilitators to drinking in pregnancy were identified from analysis of these interviews:

- ◆ *Evaluation of the risks* – those women who were uncertain about possible risks or thought there was a high risk were more cautious, while women who thought there was a low risk described more relaxed attitudes towards drinking during pregnancy.

³³ Secondary school leaving qualification (students studying for A-levels are usually 16-18 years old).



- ◆ *The unborn child has precedence over drinking during pregnancy* – women described an obligation to protect their child's health and safety, and therefore abstained or limited their drinking during pregnancy.
- ◆ *Influence of previous pregnancy and other women's pregnancies* – women reported their own or other women's experiences of drinking during pregnancy without any adverse effects. These reassuring experiences meant women did not attribute drinking in pregnancy with harm to children. Conversely, there were women who reported possible associations between women drinking during pregnancy and their children's disabilities.
- ◆ *Need to respect individual differences* – women were aware that alcohol can vary in its effects on people, and this was often used to justify women's decisions about drinking during pregnancy.
- ◆ *Facilitators to drinking* – women described drinking as beneficial for stress relief and relaxation, and these effects outweighing any possible risks.
- ◆ *Taking responsibility for own health* – women felt that they should be able to make their own decisions and were concerned that public services were attempting to “control” their choices, although they also recognised that good advice was needed for informed decisions.

Switzerland

A recent study, in Switzerland, also considered women's perceptions of the risks involved in drinking and smoking during pregnancy (Hammer & Inglin, 2014). The researchers note that, in “... countries with ‘tobacco denormalisation policies’, smoking is increasingly stigmatised In contrast, alcohol policies have concentrated on responsible drinking” (p.24). In interviews with 50 pregnant women (mainly white, partnered and educated, and aged 24 to 41 years), they found that, while all the women acknowledged that smoking or drinking during pregnancy could be harmful to the fetus, and most gave up both during pregnancy, they also perceived drinking and smoking during pregnancy as different types of risks with different meanings.

All the women in the study reflected official advice in their view that smoking was harmful during pregnancy. Even those women who reported smoking during pregnancy indicated that they struggled with their addiction and felt guilty that they could not give up smoking completely. Some felt that smoking during pregnancy was “shocking” and felt obliged to intervene to question the behaviour of friends and family who smoked.

However, when discussing drinking during pregnancy, some participants contextualised official recommendations, seeing occasional drinking as acceptable, and arguing that alcohol was different from smoking because experts differed in their advice about drinking, and because official advice had changed. One participant, Géraldine suggested that total abstinence was not based on solid evidence but was “a fashion thing”. Other women were uncertain about the official public health message - abstinence or reduction - and had received conflicting advice from health care providers, and were also aware of the personal experiences of friends and family who drank during pregnancy with no apparent ill effects.



“For these women, personal experience was a more trustworthy source than science in shaping their judgements of risk. The scientific evidence did not seem relevant to their own experiences ... Eugénie, who had drunk alcohol during her previous pregnancies giving birth to two healthy children, claimed to be able to know ‘what is right or wrong’ and said she was drinking three glasses of wine or beer per week during her current pregnancy” (p.27).

Women in the study differentiated between the types of alcohol, how much was drunk, and drinking frequency, when deciding how risky it was to drink alcohol during pregnancy. For example, wine or beer was commonly described as safe while spirits were considered dangerous. For some women who described themselves as not drinking during pregnancy, there were exceptions made for some social situations.

10.3 Women of childbearing age

Studies in New Zealand, Australia, the United States, and Canada have explored the views of women in their childbearing years (but not currently pregnant) towards drinking during pregnancy, their knowledge about the risks of drinking during pregnancy, and the influences on their decisions to either drink or abstain.

New Zealand

The *Alcohol in Pregnancy Study*, undertaken in New Zealand in 2005 by Parackal, et al. (2006; 2013), and described earlier, gathered information from both pregnant and non-pregnant women on a number of issues related to alcohol use in pregnancy. This included perceptions, opinions and knowledge about alcohol consumption in pregnancy, and effective and preferred sources of information on alcohol consumption in pregnancy³⁴.

Of those who were not pregnant, 1,128 women (81.7%) had consumed some alcohol over the preceding year, 52% were risky drinkers (an AUDIT-C score of 3 or more) and 27% were smokers. Analysis of this non-pregnant group showed the following:

- ◆ Three out of four women identified “stop alcohol use” when asked about maternal behaviour associated with increasing the chances of having a healthy baby. Women over 35 years of age, and with a tertiary education, were *less likely* to identify “stop alcohol use”.
- ◆ Just over one-quarter (28%) of the women thought some alcohol was safe in pregnancy. Women who were current smokers, risky drinkers and in a permanent relationship were more likely to think this. However, answers given to other questions in the survey suggested that more than 50% were of the opinion *some* alcohol was safe in pregnancy.
- ◆ Women with a better knowledge of outcomes associated with maternal alcohol consumption were more likely to be non-smokers, of European or Māori ethnicity, tertiary educated, full-time homemakers, or employed.

³⁴ http://www.ahw.org.nz/resources/forums/Alc_in_Pregnancy_S.Parackal.pdf



- ◆ Most of the women who had some awareness of the effects of alcohol in pregnancy had gained this awareness from brochures, pamphlets, booklets, newspaper/magazines, and television programmes. These sources, along with primary health care providers, the websites of ALAC³⁵ and the Ministry of Health, and health warning labels on alcoholic containers were the preferred sources for information on alcohol consumption in pregnancy.

Parackal, et al. (2006) conclude that the majority of New Zealand women aged 16 to 40 years have good awareness of the effects of alcohol consumption in pregnancy.

“Although younger women and women without tertiary education had higher odds of spontaneously stating ‘stop alcohol use’ as a maternal behaviour associated with the likelihood of having a healthy baby, women with tertiary education had higher odds of being ‘highly knowledgeable’ on the various outcomes associated with maternal alcohol consumption. This apparent discrepancy seems to imply that older women of childbearing age with tertiary education are more knowledgeable on the outcomes of maternal alcohol consumption but were less likely to believe that ‘any alcohol’ was unsafe in pregnancy, probably as these women are habitually light but frequent drinkers” (p.33).

In another analysis from the same study, Parackal, Parackal, Harraway and Ferguson (2009) looked at data for 1,109 non-pregnant women. When asked their opinions on the safety of alcohol consumption on a typical drinking day during pregnancy, 44% of respondents thought no alcohol was safe, 45.5% thought one standard drink or less was safe, while 10.2% thought that more than one standard drink was safe during pregnancy.

The researchers report that women of Pacific ethnicity and abstainers were more likely to say that no alcohol is safe in pregnancy. Women who drank more than two standard drinks of alcohol on a typical occasion and/or who binged were more likely to think that more than one standard drink on a typical drinking day is safe. No other socio-demographic variables (of those tested), or smoking, were found to be associated with women’s opinions on the number of drinks that could be safely consumed in pregnancy.

In a master’s thesis, Stuart (2009) describes qualitative research that explored how Māori women “negotiate decisions” about alcohol and pregnancy. That is, what factors they believe influence their decisions to continue or cease drinking alcohol during pregnancy. Analysis of in-depth, unstructured interviews with ten non-pregnant Māori women aged from around 20 years to over 70 years³⁶ (nine were mothers), led the researcher to describe a process of *Trading Off*, which is supported by three processes: drawing on resources, rationalising, and taking control of the role.

“Māori women start by learning the rules about alcohol, get messages about alcohol and pregnancy, change their alcohol use while making role transitions, and use alcohol in the processes of fitting in where you are, releasing the pressure, and carrying on as normal” (p.ii).

³⁵ Alcohol Advisory Council of New Zealand. Now integrated into the Health Promotion Agency.

³⁶ Some of the women in the study were of childbearing age, while some were older.



This thesis identifies both whānau and the social environment as influencing Māori women's use of alcohol during pregnancy. Participants wanted friends, whānau and partners to understand the importance of their support role and to have resources available to ensure that they are aware of appropriate messages and support strategies. Stuart finds that, while pregnancy may be an opportunity for change, it is possible that women who do not receive support in early pregnancy may "carry on as normal".

Australia

Using data from an Australian study reported earlier (Peadon, et al., 2011), Peadon, et al. (2010) investigated the knowledge and attitudes about alcohol consumption in pregnancy of the 1,103 non-pregnant Australian women (aged 18-45 years). Knowledge was assessed by asking questions about the effects of pregnancy on the unborn child. The majority of women (61.5%) said that they had heard of effects on pregnancy or on the unborn child caused by drinking alcohol during pregnancy (FASD, low birth weight and brain damage were the most commonly identified effects). However, women were less able to describe the characteristics of these disorders.

Attitude was assessed with questions related to understanding and feelings. The majority of respondents (80.2%) agreed or strongly agreed that pregnant women should not drink alcohol. Most (92.7%) agreed that drinking alcohol during pregnancy can affect the unborn child; although 16.2% did not agree that it could result in lifelong disabilities. The majority of respondents (79.2%) reported negative attitudes towards seeing a pregnant woman drinking alcohol, while one in five (20.8%) reported neutral or positive attitudes.

The researchers identify a "disjunction between knowledge and attitudes"; for example, although 92.7% of those surveyed agreed alcohol can affect the unborn child, 16.2% did not agree that the disabilities could be lifelong. There was also a low level of knowledge about the specific effects on the unborn child. Women with higher education levels were more likely to *know* the effects of alcohol consumption in pregnancy but, as with Parackal, et al. (2006) above, women's attitudes were not associated with education level.

Women who reported a neutral or positive attitude towards alcohol consumption in pregnancy were more likely to have given birth previously or be smokers. Peadon, et al. (2010) suggest that differences in risk perception may explain the differences in attitudes between those who had given birth previously and those who hadn't, noting an earlier study where those who had a previous healthy pregnancy reported lower perceived risk from drinking alcohol during pregnancy than those pregnant for the first time. They conclude that interventions that address past experience, social influence, risk perception, knowledge gaps, and misconceptions could be a promising approach.

Peadon, et al. (2011) identified alcohol use in the last pregnancy and neutral or positive attitudes towards alcohol use in pregnancy as being strong predictors of both alcohol consumption in past pregnancy and intentions in a future pregnancy, compared to a relatively weak association between knowledge and alcohol consumption in pregnancy. They go on to hypothesise that high levels of knowledge may include awareness of the lack of evidence on the effects of low to moderate alcohol consumption in pregnancy, leading to a perception that the risks from drinking at these levels during pregnancy are low.



Loxton, et al. (2013) explored how pregnant women and service providers acquire and use information about alcohol use during pregnancy. They interviewed 74 mothers (aged 21-49 years) of young children, and held focus groups with 14 service providers who worked with pregnant women. The interviews and focus groups took place in urban and rural areas of New South Wales in 2008. At that stage, the current alcohol guidelines recommended minimising alcohol consumption. However, new guidelines recommending abstinence had been publicly available in draft form since 2007 (they were released in a final version in 2009). The researchers identified themes from the interviews and focus groups, including the following:

- ◆ Confusion and uncertainty among both pregnant women and service providers about the alcohol recommendations, including confusion about the impact of low to moderate alcohol consumption.
- ◆ Pregnant women identified pressure to both drink and not drink, and described receiving advice from “everyone” (including contradictory advice). They described an internal process of weighing up the available information, with those who drank alcohol during pregnancy discounting advice as, for example, “old wives’ tales”. The weighing-up process could include the stage of their pregnancy and the type of alcoholic drinks they might consume. Those who decided not to drink were often afraid of being held responsible for any alcohol-related problems that might occur.
- ◆ Key sources of information for mothers included service providers, friends, family, mass media, books, magazines, and the internet.

United States

In a U.S. study, Elek, et al. (2013) explored women’s knowledge and beliefs about alcohol consumption and its risks during pregnancy, and also their social influences and information sources. Twenty focus groups involved 149 women aged 18 to 35 years. None of the women were currently pregnant, but all had either given birth in the last 12 months, were trying or planning to become pregnant, or were at risk of an unintended alcohol-exposed pregnancy. Eighty-four percent had consumed an alcoholic drink within the previous 30 days.

Many women had a good understanding of the consequences of alcohol use during pregnancy and most expressed negative views about women who drank during pregnancy, although some supported limited alcohol use (particularly wine). However, many women also had misconceptions, including the safety of alcohol in the later stages of pregnancy and the safety of some forms of alcohol, e.g. wine. In addition, some were willing to continue drinking alcohol regularly until their pregnancy was confirmed.

The main reasons for drinking during pregnancy were identified as stress and depression, alcoholism, social pressures, and not caring about the child. The main reasons for abstaining from alcohol during pregnancy were the health of the baby and social pressure. The women also identified social influences on their drinking, and strategies to manage these. Partners that supported a woman’s abstinence from drinking did so by methods such as reinforcing the decision not to drink, not drinking heavily around them, not bringing alcohol into the house, and leaving situations where others were drinking if the pregnant woman felt uncomfortable.



While the family and friends of some women supported abstinence during pregnancy, others provided more negative influences, including encouraging pregnant women to drink. In some cases, this was older relatives whose personal experiences led them to believe that drinking alcohol would not harm the baby.

Those in early pregnancy did not always want to reveal their pregnancy and women identified strategies for responding to offers of alcohol while pregnant. Many were comfortable refusing a drink or leaving situations where there was heavy drinking. Others went out with people who were not drinking or had drinks that could be mistaken for alcoholic drinks. They described a number of explanations that could be used for not drinking, including taking medication, not feeling well, and being a sober driver.

Health care providers and the internet were widely identified as important sources of health information. Other sources for general health information included magazines, books, family and friends, television, and pharmacists. However, many of the women said that health care providers should provide more consistent messages and more extensive information about the risks of alcohol use during pregnancy.

Participants suggested that health care providers should be *required* to discuss the health consequences of drinking during pregnancy with pregnant women and those planning a pregnancy. A variety of ways were identified for how this information could be conveyed, with some women preferring statistics and more information on FASD, others information on the consequences for mother and child, and some preferring personal stories. Across the groups, women preferred the use of graphic images and scare tactics as a way to get people's attention, although the researchers note that this approach would need to be compared with others, such as those focused on changing social norms.

When discussing the channels of communication that could be used to promote these messages, the approaches most commonly mentioned by participants were television, schools and sex education classes, the internet, transit advertisements, radio, billboards, and doctors' offices. Although the groups were segmented by age, pregnancy status and ethnicity, there were few consistent differences in responses between the groups. Elek, et al. (2013) suggest that *"this provides some assurance that messages and campaigns developed from this study may apply to broader target audiences of women"* (p.188).

An online survey of 352 women aged 18 to 44 years in Minnesota in the United States also found some misconceptions about the use of alcohol in pregnancy (Thomsen, 2013); for example, many thought liquor would be more harmful to a fetus than beer or wine. In addition, of those women who had been pregnant in the last five years, nearly all (90% and over) reported that their partners', friends' or families' drinking habits would not affect their own drinking during pregnancy.

Canada

A survey of FASD awareness was undertaken in Ontario, Canada, with 300 women aged 18 to 40 years and 100 men who were spouses or partners of women aged 18 to 40 years. (Prevention Working Group of FASD Stakeholders for Ontario, 2009). The researchers found general agreement amongst respondents that there is no known safe amount of alcohol during pregnancy.



However, there were disagreements about the potential risks of very low levels of alcohol consumption during pregnancy. Among the findings were the following:

- ◆ When asked about the most important things pregnant women could do to increase the likelihood their baby would be born healthy, the three most common answers were eat well/good nutrition/vitamins (89%); cut down/stop smoking (49%); and cut down/stop alcohol use (45%).
- ◆ The majority of respondents (94%) agreed that alcohol use in pregnancy leads to lifelong disabilities. Those who had seen relevant advertising were more likely to agree, while university-educated respondents were less likely to agree.
- ◆ Eighty-three percent of respondents had heard about FAS or FASD, with awareness higher among those who had seen relevant advertising.
- ◆ Seventeen percent of respondents said that some kinds of alcohol were safe (10% thought wine was safe and 5% thought beer was safe). Those with a university education were more likely to think there was not a safe kind of alcohol.
- ◆ When asked at what point a woman should stop drinking if she was planning to become pregnant, 68% said before she was pregnant, 28% said once she thought she was pregnant, and 4% said once her doctor confirmed she was pregnant.
- ◆ When asked how many drinks would be safe in pregnancy, 54% said no drinks, 27% said less than one drink per week, 7% said one drink per week, and 3% said two or three drinks per week. Notably, 8% said five or more drinks per week.
- ◆ Seventy-nine percent said there was no safe time to drink in pregnancy, while 5% said the first trimester was safe, 3% said the second trimester was safe, 5% said the third trimester was safe, and 4% said any time during pregnancy was safe. Respondents who drank four or more drinks over the last month were more likely to think that it was safe to drink in the third trimester.
- ◆ Fifty-five percent of respondents thought that a small amount of alcohol in pregnancy has some risk, and 71% said it could result in serious harm. However, 24% thought that moderate drinking is usually safe during pregnancy. Those who had seen advertising about alcohol during pregnancy were less likely to think a small or moderate amount of alcohol during pregnancy could be considered safe.
- ◆ When asked about the best sources of information about FASD and the effects of drinking alcohol during pregnancy, the most common responses were: doctor, doctor's office, clinic, hospital, public health, internet, television, newspapers, other media, and books and magazines.

The researchers note that, generally the survey showed that women who reported higher levels of alcohol use had lower levels of awareness about FASD, while women who had seen advertising about alcohol use in pregnancy tended to have higher levels of awareness. They conclude that



communication strategies should address topics where there are lower levels of awareness, and that all prevention efforts should include links to additional supports and services.

10.4 Awareness of official guidelines

A number of countries have produced guidelines on alcohol consumption and pregnancy to inform health care providers and pregnant women about the risks of alcohol consumption during and when planning a pregnancy. Some promote abstinence only, while others promote abstinence but also provide guidelines for light drinking if a pregnant woman does decide to drink³⁷. However, only limited research was identified on the impact of guidelines on drinking behaviour during pregnancy and the extent to which women are aware of official guidelines.

In a study described earlier, which looked at four Australian cohorts of pregnant women between 2000 and 2009, Anderson, et al. (2013) analysed drinking over a time when Australian guidelines changed from advising low alcohol consumption to promoting abstinence. They found that 85% of pregnant women (who drank alcohol before pregnancy) consumed alcohol under the low alcohol guidelines, while 78% consumed alcohol during the time that abstinence was promoted. They note the relatively small change and suggest that more effective dissemination of the recommendations from the guidelines (for example, through mass media campaigns) may help to reduce levels of alcohol consumption during pregnancy.

In a further analysis of data from the 2009 cohort, Anderson, Hure, Powers, Kay-Lambkin and Loxton (2012) investigated 837 pregnant women's (aged 30-36 years) compliance with the 2009 Australian alcohol guidelines (which had been available publicly since 2007), and predictors of compliance. Most pregnant women (72%) did not comply with the 2009 alcohol guidelines (the researchers note the limited time between the official introduction of the guidelines and this survey being undertaken, although the guidelines had been available). The odds of complying with the abstinence message were lower for women who consumed alcohol before pregnancy at least weekly, or who reported binge drinking pre-pregnancy, and for women with higher household incomes. Anderson, et al. (2012) conclude that more research is needed on why so few pregnant women were complying with the current alcohol guidelines, noting that it is not known whether women were aware of these guidelines. They also suggest that dissemination and promotion of the alcohol guidelines are probably inadequate.

³⁷ Information on guidelines available in different countries:
<http://www.icap.org/Table/InternationalGuidelinesOnDrinkingAndPregnancy>



11.0 Developing communication campaigns and strategies

KEY POINTS

Primary prevention communication strategies that aim to reach women who are pregnant, or planning to become pregnant, with information about the risks of alcohol use during pregnancy usually address existing knowledge, beliefs, and attitudes, and can act as a support to clinical strategies, such as brief interventions and other work that may take place within the maternity care or wider health care system.

Communication campaigns are usually broadly delivered through television, radio, billboard campaigns, posters, the distribution of leaflets and, increasingly, through social media. They may also be developed as part of a larger social marketing campaign. They can target pregnant women, women of childbearing age, their partners, family and friends, health and social service providers, and/or the general public.

Campaign planning

Best practice approaches to campaign planning include the following:

- Campaigns should be carefully planned, with objectives that are specific, measurable, attainable, realistic, and time-specific.
- Campaigns are often undertaken when others are addressing FASD, such as International FASD Awareness Day.
- Campaigns should be one component of a broader strategy and should involve a wide range of partners. This can increase the staff time and funding available, broaden the scale and reach of a project, and help to build community support. Including the population of interest helps to ensure the issue is addressed in an appropriate manner.
- Campaigns should be carefully designed for a specific group or groups. Campaigns are likely to be most effective with a large, well-defined group of individuals at lower risk.
- Campaigns should consider current levels of awareness in the community being targeted. Message development should focus on areas where the level of awareness is not as high.
- Campaigns should have good exposure and reach to increase the likelihood that messages will be heard and remembered. There may be benefits to developing new resources for specific populations and messages, but both new and existing resources should be tested with the population that is being targeted.
- Campaigns should identify how the goals of the campaign will be evaluated.

Developing the message/s

There is limited evidence on the specific elements that contribute to the effectiveness of a campaign message. However, a number of useful questions have been identified that can be used to structure campaign messages: “What” (important information, such as “It is safest not to drink alcohol during pregnancy”); “So what?” (relevant reasons for change, such as potential birth defects in the baby); “Then what?” (define an easy action, such as talking to a health care provider).



KEY POINTS

Both messages and images can be powerful, and should be chosen with care and tested with the population of interest. Several researchers note the need to avoid instilling too much fear in women about the consequences of drinking before pregnancy recognition. Those developing messages must determine the most effective balance between describing the “threat” and promoting coping mechanisms and the self-confidence of the targeted audience, so that they can undertake the health behaviour being promoted.

Images should be chosen after the population of interest and key messages are identified, and should be relevant to the targeted population and support the key campaign messages. There are often differences of opinion over the use of supportive versus stronger images. Many campaigns do not show images of alcohol associated with pregnant women, babies and children.

Primary prevention communication strategies that aim to reach women who are pregnant, or planning to become pregnant, with information about the risks of alcohol use during pregnancy usually address existing knowledge, beliefs, and attitudes, and can act as a support to clinical strategies, such as brief interventions and other work that may take place within the maternity care or broader health system.

Communication campaigns are usually broadly delivered through television, radio, billboard campaigns, posters, the distribution of leaflets and, increasingly, through social media. They can target pregnant women, women of childbearing age, their partners, family and friends, health and social service providers, and/or the general public (Young, et al., 2009).

See Section 13.0 for a description of international campaigns that have development and/or evaluation information available, and Appendix 1 for examples of current and recent campaigns undertaken in New Zealand and internationally that do not have substantial evaluation information available.

11.1 Campaign planning

In 2006, a review of recent Canadian communication campaigns about alcohol exposure during pregnancy was undertaken, with the aim of assisting groups planning future awareness strategies related to FASD or alcohol use in pregnancy (Burgoyne, 2006). The review involved phone surveys with groups/organisations that had developed large-scale campaigns or smaller innovative campaigns, with the focus on those that had pre- and post-campaign data. Four campaigns had undertaken pre- and/or post-campaign surveys, and identified increases in awareness and good campaign and/or message recall. In a separate review, Thurmeier, et al. (2011) also looked at previous campaigns, and suggested questions that campaign planners should consider when developing a FASD prevention campaign.



A selection of these questions, and the common characteristics of successful awareness campaigns identified by Burgoyne, are summarised below³⁸:

- ◆ Campaigns should be carefully planned, with objectives that are specific, measurable, attainable, realistic and time-specific. The planning stage should identify the definition of campaign success, how long the campaign will run, how much it will cost, and how funding will be obtained.

Burgoyne notes that many respondents had difficulty defining measurable objectives for their activities. A small number used rates of alcohol use in pregnancy or rates of FASD. *“However, it is difficult to link the impact of a short-term awareness campaign with measurable changes in the rates of alcohol use in pregnancy or rates of syndromes that are difficult to diagnose at birth”* (Burgoyne, 2006, p.30).

- ◆ Campaigns are often undertaken when others are addressing FASD (e.g. International FASD Awareness Day³⁹) or at times of the year when alcohol use is more prevalent.
- ◆ Awareness strategies should be *one component of a broader strategy*. Developers should consider whether social marketing strategies can be used to achieve the intended outcomes. What opportunities need to be provided in the environment that will attract the audience to practice the desired behaviour?
- ◆ Campaigns should *involve a wide range of partners*. This can increase the staff time and funding available, broaden the scale and reach of a project, and help to build community support. Including the population of interest helps to ensure the issue is addressed in an appropriate manner.
- ◆ Campaigns should be *focused on a specific problem*, reflecting community needs; that is, be carefully designed for a specific group or groups. Campaigns are likely to be most effective with a large, well-defined group of individuals at lower risk (i.e. not women who are alcohol-dependent). While some campaigns were targeted to a particular cultural group, other campaign planners avoided this approach in case it gave the impression that FASD was only a concern for some groups and not others. If behavioural change is a goal, it should be clear what behavioural change is expected, and how this change will be made.
- ◆ Campaigns should consider *current levels of awareness*. For example, there may be high levels of awareness that alcohol use in pregnancy leads to lifelong consequences, but confusion about the exact consequences or the safety of lower levels of alcohol use. Sub-populations and higher risk groups may have lower levels of awareness.
- ◆ Campaigns should use *carefully selected messages and images*. Both messages and images can be powerful, and should be chosen with care and be tested with the

³⁸ This is an edited version. The full details are available on p.189 of Thurmeier, et al. (2011) and in Burgoyne (2006).

³⁹ For examples of New Zealand activities related to World FASD Awareness Day, go to:

<http://www.scoop.co.nz/stories/GE1309/S00025/auckland-marks-world-fasd-awareness-day.htm>



population of interest. Careful planning is needed to avoid seeming to blame women who drink alcohol or families affected by FASD.

- ◆ Campaigns should have *good reach and exposure*, which increase the likelihood that messages will be heard and remembered. A wide variety of strategies can be used in campaigns, including media (television, radio and print), personal contact or events. Other common activities include workshops, displays, speeches, internet, and transit advertisements. While there are many *existing* FASD campaign resources, there may also be benefits to developing new resources for specific populations and messages. The four campaigns described by Burgoyne all included some level of resource development and distribution. Both new and existing resources should be tested with the population of interest.
- ◆ Campaign planners should consider *how the goals of the campaign will be evaluated?* What evaluation strategies are in place pre-campaign, during the campaign and post-campaign? How will the outcomes be disseminated?

Campaign planners should also consider what theoretical concepts will be used to develop a campaign and explain the process of change that is being encouraged (Burgoyne, 2006; Thurmeier, et al., 2011). Burgoyne outlines Prochaska and DiClemente's Model of Change Theory, which describes six main stages in the process of behaviour change (1982; 1985, *cited in* Burgoyne, 2006):

- ◆ **Precontemplation:** before an individual thinks of making a change.
- ◆ **Contemplation:** thinking about making a change.
- ◆ **Preparation:** serious commitment to change.
- ◆ **Action:** begins to make specific changes.
- ◆ **Maintenance:** support needed to maintain the change.
- ◆ **Termination:** change successfully completed.

Burgoyne (2006) suggests that awareness campaigns usually target individuals in the first three stages of change and that different types of messages are needed for each stage. For example, in the precontemplation stage, informing the public about the relationship between alcohol use and pregnancy; in the contemplation stage, outlining the benefits of change; and, in the preparation stage, providing information on how to access resources and support.

In a critique of fetal alcohol syndrome communication strategies targeted at American Indians and Alaskan Natives, Rentner, Dixon and Lengel (2011) note that it is essential for representatives of these communities to be involved in the design and implementation of health campaigns, and for others involved in the campaign to be knowledgeable about their identity, cultures, and history, and diversity.



11.2 Developing the message/s

There is limited evidence on the specific elements that contribute to the effectiveness of a campaign message. Burgoyne (2006) describes the following questions as being useful for structuring campaign messages:

- ◆ **What?** Include important information, such as “It is safest not to drink alcohol during pregnancy.”
- ◆ **So what?** Present relevant reasons for change, such as brain damage or birth defects in the baby.
- ◆ **Then what?** Define an easy action, such as calling a helpline or talking to a health care provider.

Burgoyne also notes that campaigns reviewed for her study often had two or more key messages, with the most common messages being:

- ◆ consequences of alcohol use in pregnancy (32%)
- ◆ community support for pregnant women (21%)
- ◆ no known safe amount of alcohol in pregnancy (19%).

In the review by Burgoyne, respondents used various strategies to select key messages, including focus groups, resources from other campaigns, feedback from staff, community partners, and FASD experts, as well as using research about awareness levels in the intended audience. The most common area of controversy was the relative benefits of warm, supportive campaigns, versus stronger approaches. Additional areas of controversy or debate were identified, including:

- ◆ inclusion of messages for male partners and images of male partners
- ◆ concerns over ethnicity of campaign images
- ◆ use of images of unclothed pregnant women
- ◆ use of segmented images of pregnant women (i.e. headless women)
- ◆ use of images showing alcohol
- ◆ the safety of small amounts of alcohol
- ◆ how to recognise that not all pregnancies were planned, and many women drink alcohol before they know they are pregnant.

“There was a lot of interest in clear, simple, straightforward messages. Many chose to avoid using terms such as FAS, FAE, FASD, etc., as it was easier to talk about alcohol use or brain damage, rather than to define complex, evolving terminology. Some groups started out with



basic messages about the risks of alcohol use in pregnancy, and then moved on in subsequent campaigns to messages about community support for pregnant women and where pregnant women can access help” (Burgoyne, 2006, p.44).

Burgoyne also describes controversial messages and the concerns associated with those messages, such as “choose not to drink during pregnancy” (does not address the issue of addiction) and “it takes only one drink” (could provoke distress for the many women who drink a small amount of alcohol before they know they are pregnant).

Clarren, Salmon and Jonsson (2011) note that there has been only limited research on the effectiveness of direct messaging campaigns. Moreover, little is known about the harm that may be caused by exposing pregnant women to campaign materials, including the worry that pregnant women might feel about the harm to which their fetus has been exposed, and how campaigns can avoid a “blame and shame” effect. Indeed, in a discussion on bringing a women’s perspective to FASD prevention, Poole (2011) notes that prevention campaigns and materials produced in the 1980s and 1990s in Canada led to concerns that judgmental attitudes and practices were being employed that either directly blamed women who did not stop drinking and smoking during pregnancy or were unsympathetic and oversimplified the challenges that faced pregnant women; for example, “Pregnant? No alcohol!”

“In fact, women whose alcohol use has progressed to dependency, and those dealing with emotional and health problems associated with intimate partner violence, inadequate housing or nutrition, mental health issues, and lack of support from partners and families, may be unable to stop on their own, even when they want to. Yet prevention campaigns placed the responsibility solely on the woman, and did not signal how the healthcare system was prepared to help” (Poole, 2011, p.162).

Deshpande, et al. (2005) review the literature and suggest the following social change strategies for the different groups of women who drink during pregnancy and their partners.

- ◆ Social marketing strategies may be most effective for older well-educated women who may be drinking for social reasons. For this group, Deshpande, et al. (2005) recommend strategies that suggest alternative alcohol-free opportunities for socialisation.
- ◆ Women who drink until they realise they are pregnant could benefit from a primary prevention campaign. The researchers suggest that these women are often not aware of the safe limits in pregnancy and, while they may be aware that alcohol can be harmful to the fetus, they may not be aware of exactly what those problems may be or the levels of alcohol consumption that are considered harmful.
- ◆ Community-based programmes are likely to be more appropriate for women who are dealing with economic hardship, stress and violence, as message-based approaches alone may not be effective.
- ◆ Partners may benefit from education and marketing campaigns that create awareness about the effects of alcohol use on fetus development and the importance of providing support to their partners to abstain from alcohol, and that also promote alcohol-free alternatives to social activities for the couple during pregnancy.



Tellingly, Deshpande, et al. (2005) note that, while they propose segmentation and a targeted approach, the effectiveness of these approaches is yet to be evaluated.

11.2.1 Threat appeals and positive appeals

As discussed above, the general tenor of the message is a source of some controversy and disagreement among those developing communication strategies, with some emphasising the effectiveness of supportive messages and others the need for a stronger, more threat-based approach. This difference in approaches is discussed in more detail in this section.

Health behaviour models can be used to guide efforts to achieve behaviour change; for example, by identifying the factors that contribute to a decision to drink alcohol while pregnant. Protection Motivation Theory is a widely used health behaviour model for describing the influencing factors of health behaviour. It was developed as a result of research on fear-based appeals, which communicate about a threat to an individual's wellbeing. It was then revised over time to incorporate coping appraisal and self-efficacy processes (Cismaru, et al., 2010; Milne, Sheeran & Orbell, 2000; Thurmeier, et al., 2011). The theory consists of two major components:

- ◆ Threat appraisal: evaluating the perceived rewards of the behaviour (intrinsic and extrinsic), the severity of the danger, and vulnerability to the danger.
- ◆ Coping appraisal: evaluating whether the recommended health behaviours will be effective (perceived response efficacy), and confidence in ability to perform the recommended behaviour change (perceived self-efficacy). Perceived cost is also included in the model, i.e. balancing the costs and benefits of the protective behaviour against those of the dangerous behaviour (Thurmeier, et al., 2011).

"[P]rotection motivation is maximized when: (a) the threat to health is perceived as being severe; (b) the individual feels vulnerable to the threat; (c) the adaptive response is believed to be an effective means of averting the threat (high response efficacy); (d) the costs associated with the adaptive response are small; and (e) the person is confident in her abilities to successfully complete the adaptive response (high self-efficacy)" (Cismaru, et al., 2010, p.71).

Among the factors that play a role in behaviour change, the coping-appraisal component of the model has been identified by researchers as having the most significant impact, particularly perceived self-efficacy or confidence in the ability to make the behaviour change (Cismaru, et al., 2010; Milne, et al., 2000).

When developing campaigns, those involved must determine the most effective balance between describing the "threat", and promoting coping mechanisms and the self-efficacy of the targeted audience. Thurmeier, et al. (2011) demonstrate this by deconstructing a poster developed by the Saskatchewan Prevention Institute, *Take Action*, which provided the following messages:

- ◆ "Drinking alcohol during pregnancy can cause Fetal Alcohol Spectrum Disorder. There is no safe time, kind or amount of alcohol". The researchers suggest this message could increase the perceived vulnerability of the reader and the severity of the message (triggering threat appraisal).



- ◆ “Plan not to drink alcohol during pregnancy or when breastfeeding”. This may involve inconvenience (costs).
- ◆ “Talk to others about the harmful effects of alcohol during pregnancy”. This message aims to increase perceived response efficacy.
- ◆ “Support a pregnant woman’s choice not to drink alcohol”. This message attempts to reduce the perceived costs of action by establishing that there is a social norm of not drinking alcohol during pregnancy and that others can also take action.

In a qualitative review of social marketing campaigns aimed at preventing or reducing alcohol consumption among pregnant women, Cismaru, et al. (2010) examined programme material from 20 campaigns (United States, 8; Canada, 8; Australia, 2; and the United Kingdom, 2). They discuss the campaigns in the context of Protection Motivation Theory.

Most of the campaigns were developed by government or non-profit organisations and had several components, including websites, print materials, radio and television advertisements, events, t-shirts, newsletters, and support groups. The campaigns took a variety of approaches to messaging, including creating awareness of the risks, stating that no alcohol is safe during pregnancy, stating that FASD is 100% preventable, emphasising the power that pregnant women have to prevent FASD, and highlighting the role of friends and family in supporting pregnant women to stop consuming alcohol. One campaign advised women what to say when offered alcohol during pregnancy.

Cismaru, et al. (2010) note that most campaigns focused on threat variables (severity and vulnerability) in their emphasis on the possible severe consequences of drinking alcohol during pregnancy. Some campaigns focused on increasing self-efficacy and pointing out the role of friends and family. Others provided information that covered all the variables of the Protection Motivation model. The researchers conclude that, to improve the effectiveness of campaigns, an emphasis on perceived vulnerability and severity should be balanced by more advice about how to avoid drinking alcohol while pregnant (emphasising low costs and high levels of self-efficacy), so that women feel confident they can follow the advice.

It is also important that any help offered as part of a communication campaign is available to the targeted audience, with health systems and services prepared to provide help when women ask for it, and particularly to women who are not able to stop drinking on their own (Salmon & Clarren, 2011). Burgoyne notes that, although fear-based approaches have been effective in raising awareness about other health concerns, “... a positive, supportive approach is recommended for FASD campaigns, avoiding the use of blame, shame and fear-based strategies” (p.4). For messages to be effective, Burgoyne suggests that efficacy must be higher than the threat⁴⁰. She goes on to say that the barrier to a woman changing her drinking behaviour may not be her level of awareness of the risks but a need for information and support to help with any behaviour change.

In a recent study, France, et al. (2014) looked in more detail at the value of threat appeals and positive appeals in campaigns targeting drinking in pregnancy, comparing three different concepts (a threat appeal, a positive appeal and a concept that combined the two approaches) to determine

⁴⁰ Sourced from *Council for Tobacco-free Ontario, et al., 2000; Witte and Allen, 2000*



their impact on women's intentions to drink during pregnancy. Three hundred and fifty-four women of childbearing age and 116 pregnant women viewed either a control or one of the three experimental concepts and completed a computer-based survey. Only the results for the 354 women of childbearing age were reported by the authors⁴¹.

The positive and threat appeals used in the study appear to be two of those described by France, et al. (2013) later in this review – the best friend concept (positive appeal) and the obstetrician concept that focused on a generalised risk (threat appeal). A combination of the two was also tested, as well as a control concept (a “drink less – you'll feel better for it” message with no reference to, or information about, the period of pregnancy, and no reference to specific negative consequences).

The three concepts tested were *all* effective at increasing women's intentions not to drink during pregnancy compared with the control concept. However, the two concepts that included a threat appeal were, overall, more effective than the control and the positive appeal (self-efficacy only), particularly for behavioural intentions and confidence to change behaviour. The two threat appeal concepts resulted in few defensive responses or counter-arguments. The researchers note that this is consistent with previous research, which found that as long as a woman is capable of making the requested behaviour change, a threat appeal can be a powerful motivator for behaviour change.

They also report that, while the inclusion of a self-efficacy message with the threat appeal did not increase the intention to change behaviour or the participants' confidence that they could modify their behaviour, it did contribute to lowering the level of negative emotional arousal. They go on to recommend the combined threat and self-efficacy concept be developed as part of a mass-media campaign. The *No Alcohol in Pregnancy is the Safest Choice* campaign materials (described later in this review) were based on this research and other research conducted by Edith Cowan University.

11.2.2 Message framing

In another study, Yu, Ahern, Connolly-Ahern and Shen (2010) investigated the communication of the risks of FASD, using two established communication contexts: message framing (whether the behaviour change being sought is presented as a loss or as a gain) and exemplification (whether the message is delivered through the use of statistics or by using individual's stories as exemplars). The behaviour being encouraged was abstinence from alcohol during pregnancy. Participants in the study were 213 female undergraduate students (aged 18 to 25 years) from a U.S. university.

The study presented participants with one of four messages (randomly assigned) formatted as newspaper public service announcements (text only). The four messages took the following approaches: a loss-statistics message appeal; a gain-statistics message appeal; a loss-exemplar message appeal; and a gain-exemplar message appeal. *“Statistics appeals emphasized numbers, and exemplar appeals vividly depicted an individual's story. Gain appeals focused on children born without FASD, while loss appeals focused on children born with FASD”* (p.695).

⁴¹ This was due to the “... relatively small numbers of pregnant women assigned to each exposure condition”, although the researchers note that no substantial differences were identified between the two groups.



Participants were asked a series of questions after viewing a message, including the likelihood that they would take measures to prevent FASD, and search for more information related to FASD, after reading the message. Participants were asked to rate their perception of FASD on a scale from *not dangerous* to *very dangerous* and from *not a severe health problem* to *a very severe health problem*. Participants were also asked to rate the extent to which the messages made them feel frightened, tense, nervous, anxious, and uncomfortable, and the degree to which they agreed or disagreed with three statements about whether and how FASD could be prevented, and to report their beliefs about their own ability to prevent FASD. The researchers conclude the following from the results:

- ◆ Gain frames tend to promote FASD prevention intention.
- ◆ Exemplar appeals tend to promote greater perceived severity, although only when combined with loss frames (e.g. the story of a baby suffering from FASD).
- ◆ Statistics appeals elicit the same level of fear with loss- or gain-framed approaches.

This study also considered the effect of loss-gain frames and exemplar-statistics appeals on external and internal efficacy. The researchers found that the gain-statistics message appeal had a stronger impact on perceived external efficacy and perceived internal efficacy than the loss-statistics appeal. Yu, et al. (2010) note the mixed findings and conclude that “... *the combination of exemplar appeal with loss frames and statistics appeal with gain frames each had its unique advantages in predicting attitudes, beliefs, affective responses, and behavioural intentions toward FASD*” (p.698).

11.2.3 Images

Images are a core part of a prevention campaign message and Burgoyne (2006) notes that they should be chosen with care, and only after the population of interest and key messages are identified. She goes on to say that images should be relevant to the targeted population and support the key messages of the campaign.

Clarren, et al. (2011) report that many previous campaigns have used images of a lone pregnant woman, or even a pregnant torso. They note that this approach may reinforce an idea that FASD prevention is the individual responsibility of a pregnant woman, rather than being a responsibility shared by society.

Respondents in the survey undertaken by Burgoyne (2006) reported difficulties in reaching consensus on images because of differences of opinion over supportive versus stronger images. Most did not include images of alcohol, particularly where they could be associated with pregnant women, babies and children. The most common images used were pregnant women (38%), babies (13%), pregnant bellies (8%), and community groups (8%). Other images included pregnant women with a partner, women in a bar, fathers, young women drinking alcohol, friends, family, and a fetus inside a pregnant woman. “*There is no perfect answer. Many respondents talked about the compromises they made in choosing their campaign visuals and about the benefits and concerns related to images that have been used in campaigns about alcohol and pregnancy*” (p.46).



12.0 The role of health care providers

KEY POINTS

Health care providers can be a key source of information on alcohol for pregnant women and can act as “endorsers or spokespersons” for prevention messages.

What messages do women receive from health care providers?

Women report wanting to know more about the reasons and evidence for current advice. Yet many health care providers do not have a clear understanding of the risks of drinking during pregnancy. In addition, research suggests the following:

- Women may not recall receiving advice on drinking during pregnancy from health care providers, particularly if it is only delivered verbally.
- A lack of formal training for service providers, with information often received in an unstructured way and learning often self-directed.
- While health care providers report feeling able to discuss alcohol use with women they perceive to be high risk, with other women they may face issues such as being unsure how to respond, a lack of referral pathways, or more personal reasons, such as feeling a woman’s drinking is not their business.

Women often see the risks of smoking during pregnancy differently from the risks of drinking during pregnancy; where smoking is considered generally unacceptable (reflecting the lack of an overarching smoking culture in society as a whole and consistent messages from health care providers). Health providers may also receive more training and resources focused on smoking.

Resources for health care providers

One team of researchers reviewed earlier research and concluded that it would be helpful to have relevant resources (such as referral resources and clinical practice guidelines) available in one place to support health care providers, including written information that can be given to expectant parents to ensure that limited time does not prevent messages about alcohol use in pregnancy being delivered.

Health care providers can be a key source of information on alcohol for pregnant women (Deshpande, et al., 2005; France, et al., 2013). Deshpande, et al. (2005) identify health care providers as potential “endorsers or spokespersons” for prevention messages. Indeed, a Canadian study (described earlier), of 3,004 women aged 15-55 years who had given birth in the last five years, found that a predictor of *decreased* risk of drinking during pregnancy was having had a general doctor or family physician visit over the last year (Thanh & Jonnson, 2010). The researchers suggest that the involvement of general and family practitioners in interventions targeting pregnant women could help to reduce the consumption of alcohol during pregnancy.

However, as this review has shown, women report not receiving clear and consistent advice from health care providers on the risks of drinking during pregnancy (Elek, et al., 2013; McBride, et al., 2012) and research suggests that health care providers do not always have a clear idea themselves of the risks of drinking during pregnancy. A survey of fellows of the American College



of Obstetricians and Gynaecologists found that only 66% of respondents reported that occasional alcohol use is *not* safe during pregnancy, and there was little agreement on whether alcohol's effect on fetal development is clear, with just under 47% reporting it was clear and just under 46% reporting that it was not clear (Anderson, et al., 2010). Those who thought that alcohol's effects on FASD were not clear were more likely to indicate that occasional alcohol during pregnancy is safe during the first trimester of pregnancy.

Interestingly, older obstetricians and gynaecologists felt less prepared to screen for risky drinking during pregnancy than their younger peers. When asked what resources and support would be of use to them, the majority indicated a need for patient education materials on the impact of alcohol on the fetus during pregnancy (62.9%) and listings of community-based resources for female patients with alcohol-related problems (62.1%).

Describing interviews with 241 New Zealand health care providers (midwives, obstetricians, general practitioners, and practice nurses based in Auckland, Northland and Waikato), Wouldes (2009) reports that over 85% of those interviewed believed that women who were pregnant or planning to become pregnant should abstain from alcohol. However, while the majority did identify a wide range of possible health and developmental issues associated with alcohol during pregnancy, there were some issues that were not as clearly understood, such as the increased risk of psychiatric problems later in childhood. Wouldes concludes that "... *approximately 50% of health professionals felt that they did not have enough knowledge about the effects of alcohol use during pregnancy*" (p.61). In addition, over half of those interviewed did not believe that health care providers were sufficiently aware of FASD, and only 23.7% were able to identify all of the four main criteria for a diagnosis of FASD.

12.1 What messages about alcohol use during pregnancy do women receive from health care providers?

In the *2007/08 New Zealand Alcohol and Drug Use Survey*⁴², nearly seven in ten women (68%) who had been pregnant in the past three years reported that they had been advised not to drink alcohol when pregnant (Ministry of Health, 2009). There were no significant differences by age group or between women living in the least deprived areas and the most deprived areas. However, Pacific and Asian women were significantly less likely to have been advised not to drink alcohol while pregnant than women in the total population.

In the New Zealand research by Wouldes (2009), described earlier, 78% of the health care providers interviewed reported that they routinely asked about the use of alcohol, and 79% reported that they felt competent to give advice. However, health care providers also identified a number of barriers that they face when discussing alcohol use during pregnancy with their patients. Forty percent of respondents identified some factors that impeded alcohol screening, including the following:

- ◆ A first visit where they had not established a relationship or with the patient.

⁴² The survey measured alcohol and drug use behaviours among over 6,500 New Zealanders aged 16 to 64 years.



- ◆ Where the patient was from an ethnic, culture or socio-economic group that the health professional perceived put them at “no” or “low” risk for problems.
- ◆ Where there was no clear procedure in the clinical environment for managing women who reported they were using alcohol.

In interviews with 12 midwives and 12 pregnant women in New South Wales, Australia (Jones & Telenta, 2012), Jones, Telenta, Shorten and Johnson (2011) note that both groups generally agreed that, with the exception of brief screening questions at the first prenatal visit, the risks of alcohol are not discussed or explained, with the exception of high-risk women and sometimes teenagers (because of possible binge drinking). Interestingly, while all the midwives reported undertaking these screening questions, many of the pregnant women did not recall being asked about their alcohol consumption.

Both midwives and pregnant women said they would be comfortable with discussions about alcohol consumption but midwives felt that they lacked knowledge about the risks and current recommendations. Indeed, most did not name the Australian guidelines as their main source of information for recommending abstinence from alcohol and some were not aware of the guidelines. They identified a range of other sources, including books, brochures, alcohol and drug services, and health websites. Many of the pregnant women were willing to use other sources of information, including talking to other mothers, the media and the internet. However, most also felt that they should be routinely provided with hand-outs about alcohol and its risks. The researchers conclude that there is a need for clearer information both for midwives and pregnant women.

The pregnant women interviewed by Raymond, et al. (2009) described the information and advice about alcohol that they received during pregnancy as confusing, and also reported that it lacked evidence and detail. Half of the 20 women interviewed could not recall receiving advice on drinking during their current pregnancy from health care providers, although others had received written information from a general practitioner or midwife. The advice received varied from abstinence to low levels of consumption.

The women called for advice from health care providers, government and other sources to be more consistent, as it is with smoking during pregnancy. Women also wanted to know more about the reasons and evidence for current advice, with sufficient detail, including the research evidence. Women often reported that they had been *asked* about their alcohol consumption by health care providers but had not received *advice* on alcohol consumption during pregnancy.

In their interviews with Australian women, and focus groups with service providers, Loxton, et al. (2013) note that service providers reported a lack of formal training, with information often received in an unstructured way and learning often being self-directed. This meant that they passed on recommendations to pregnant women in the way that they felt was most appropriate, calling on their own experiences and perceptions. This led to inconsistencies in the messages provided to pregnant women.

Health care providers felt able to discuss alcohol use with women they perceived to be high risk. Otherwise, they faced issues such as being unsure how to respond, a lack of referral pathways, or for more personal reasons, such as feeling it was “none of our business”. The prevailing Australian drinking culture was raised at every focus group and in some of the interviews with mothers, with



service providers reporting that their advice “... could not compete with existing partner, family and social network norms” (p.527).

Many of the mothers and all of the focus groups discussed the difference between abstaining from alcohol during pregnancy compared with abstaining from smoking. Smoking during pregnancy was seen as generally unacceptable (reflecting the lack of an overarching smoking culture in society as a whole), with research clear on its negative impact on health and fetal development. In addition, service providers were given training and resources on the topic of smoking and felt this was easier to address with pregnant women than alcohol use. The researchers conclude that there is a need for a clearly stated public message that addresses both pregnant women and their service providers, and that service providers need training and support to ensure consistent messages reach pregnant women.

In the qualitative research by Stuart (2009), Māori women also said that the messages around the risks of smoking during pregnancy were clearer than those about the risk of drinking alcohol. They wanted midwives and others involved in maternity care to be provided with clear messages about the effects of alcohol on fetal development to pass on to Māori women, and to ask questions about a women’s alcohol consumption.

Among the suggestions for increasing support at this time were extending the Early Start programme (which operates from birth) into early pregnancy, using social media sites to get health messages to Māori women, and involving kuia in the support of pregnant Māori women. Considering the implications of this research for future actions, Stuart suggests that proven population health strategies should be used, and that these should segment Māori women based on factors, such as life stage or alcohol use pattern.

12.2 Resources for health care providers

Deshpande, et al. (2005) review earlier research and also recommend clear, personal communication with health care providers to ensure the abstinence message is consistently delivered. They go on to suggest that brochures should be available that can be given to parents to ensure limited time does not prevent the message being delivered, and that a collection of resources (such as referral resources and clinical practice guidelines) should be available in one place online to support health care providers.

Payne, et al. (2011) report on the development of alcohol and pregnancy resources to inform health care providers in Western Australia about prenatal alcohol exposure and fetal alcohol spectrum disorders. The educational resources were aimed at a variety of health care providers, including Aboriginal health workers, allied health professionals, nurses working in the community, general practitioners, obstetricians, and paediatricians. The researchers undertook a literature review, and also conducted focus groups and in-depth interviews with 53 health care providers and 57 women of childbearing age to explore the communication of information on alcohol consumption during pregnancy. As a result of this research, four educational resources were developed:

- ◆ A 38-page booklet adapted from a handbook for Canadian physicians, with information on the consequences of drinking alcohol during pregnancy, FAS and FASD, the role of



the health professional, and addressing alcohol before and during pregnancy. It contained the message, *No Alcohol in Pregnancy is the Safest Choice*. Contact details were provided for referrals.

- ◆ A double-sided laminated fact sheet that summarised the booklet.
- ◆ A wallet card that health care providers could give to women. This included statements women could use to say “no” to alcohol during pregnancy, information on the possible effects of drinking alcohol during pregnancy, contact numbers for alcohol and drug information services, and the message, *No Alcohol in Pregnancy is the Safest Choice*.
- ◆ A desktop calendar, with each month displaying the message, *No Alcohol in Pregnancy is the Safest Choice*.

The resources were distributed to 3,348 health care providers and six months later, 1,001 completed a questionnaire about the resources. Most health care providers (79.6%) who cared for pregnant women and had seen the resources used them, with the desktop calendar being the most used resource. The wallet cards were used by 50.6% of health care providers, the A4 fact sheet by 35.4%, and the 38-page booklet by 20.1%. Different groups tended to prefer different resources. For example, the wallet cards were used by 68.2% of Aboriginal health workers and 61.9% of community nurses.

Compared with a survey undertaken five years earlier, there was a 31% increase in the proportion of health care providers routinely providing pregnant women with information about the consequences of drinking alcohol during pregnancy. Of health care providers who cared for pregnant women, 26% said the resources had assisted them to change their practice and 11.3% said they intended to change their practice.

In the New Zealand research described by Wouldes (2009), 77.3% agreed that they had access to printed resources for patients/clients about the effects of alcohol use that accurately reflected the risks⁴³. However, only 35.7% reported that they had enough training in assessing the risk of alcohol use during pregnancy, and 79.8% agreed that they would find a short questionnaire useful in screening for alcohol and/or other drug use during pregnancy.

Since the research by Wouldes was published in 2009, two resources have been published for use by health care providers in New Zealand. *Alcohol and Pregnancy: A practical guide for health professionals*⁴⁴ (Ministry of Health, 2010) aims to prompt and support primary care health providers to:

- ◆ ask women who are planning a pregnancy or are pregnant if they are drinking alcohol
- ◆ provide brief advice about not drinking alcohol when planning a pregnancy or when pregnant and explain why [drinking alcohol in pregnancy is risky]

⁴³ The pamphlet, *Alcohol and pregnancy: When you drink alcohol so does your baby*, is available for use by health care providers in New Zealand: <https://www.healthed.govt.nz/resource/alcohol-and-pregnancy-when-you-drink-alcohol-so-does-your-baby>

⁴⁴ <http://www.health.govt.nz/publication/alcohol-and-pregnancy-practical-guide-health-professionals>



- ◆ assist women who are having difficulty stopping drinking, or whose drinking is problematic, and refer them to a specialist addiction treatment service.

*The Pregnancy and alcohol cessation toolkit: An education resource for health professionals*⁴⁵ is a collaborative project between Alcohol Healthwatch and the University of Otago⁴⁶ (2012), which aims to improve health care providers' consultation confidence and competence in implementing the practical guide described above. The toolkit has four modules, each with two evaluation questionnaires.

⁴⁵ <http://akoatearora.ac.nz/projects/pact>

⁴⁶ Funded by the Ministry of Health.



13.0 Evaluation of communication strategies: case studies

KEY POINTS

While a large number of campaigns addressing alcohol use during pregnancy have been undertaken, messages are not often based on theory or formative research. Evaluations tend to be of poor to fair quality and often do not draw any meaningful conclusions.

The focus of most campaign evaluations is on campaign recall, awareness of the topic, and/or changes in attitude to alcohol consumption in pregnancy. Other indicators can include media reach, requests for resources, participation in events, requests for displays or presentations, number of campaign partners, calls for information, qualitative feedback at events and activities, and feedback forms.

13.1 Challenges in evaluating communication strategies

Evaluation of campaigns provides those designing future campaigns with a way to avoid previous mistakes or to further develop promising strategies. Many universal prevention campaigns have been developed that address alcohol use in pregnancy; for example, there have been over 350 campaigns in north-western Canada since 2000 (Clarren, et al., 2011). Yet, while a large number of campaigns addressing alcohol use during pregnancy have been undertaken, messages are not often based on theory or on formative research that can help to identify the target audience and target behaviours, and the factors that may influence the targeted audience's behaviour, including testing campaign concepts. In addition, campaigns are often not evaluated effectively, if at all (France, et al., 2013).

Any behavioural changes are likely to occur over a relatively long period of time and may be hard to detect in the short term. Any evaluations that are undertaken tend to focus on intermediate outcomes, such as campaign recall, awareness of the topic, increases in knowledge about the effects of alcohol use in pregnancy, changes in attitudes towards alcohol in pregnancy, and/or changes in intention to abstain from alcohol in future pregnancies (Clarren, et al., 2011; France, et al., 2013).

The four campaigns identified by Burgoyne (2006) that were able to measure campaign recall, message recall or levels of awareness all demonstrated increased awareness and good campaign and message recall. Other indicators can include media reach, requests for resources, participation in events, requests for displays or presentations, number of campaign partners, calls for information, and feedback forms.

In a systematic review, Elliott, et al. (2008) identified very little evidence on the effect of primary prevention strategies on drinking *behaviour* during pregnancy. Only six papers were identified, and they evaluated quite different strategies (including warning labels on alcohol products and an alcohol ban). The one educational campaign (undertaken in 1989) resulted in no significant



change in alcohol consumption. The researchers concluded that the studies were generally poor to fair quality, and were not able to draw any meaningful conclusions.

A more recent systematic review by Ospina, Moga, Dennett and Harstall (2011) considered studies published from 1970 to 2010. They identified 18 universal prevention evaluations. Social marketing was the approach most frequently used. Changes in knowledge were the most frequently assessed outcome, followed by changes in alcohol intake and attitudes towards alcohol use in pregnancy. However, the researchers conclude, in a qualitative synthesis, that most of the programme evaluations were of poor quality, and showed mixed results. When programmes were found to be effective, the gains reported were usually in levels of knowledge. They also note that it is not clear if interventions undertaken up to 44 years ago are still relevant today.

13.2 Campaign case studies

This part of the review describes recent campaigns addressing the risks of drinking during pregnancy and discusses their development and/or evaluation. Evaluations of campaigns focus on campaign recall, changes in awareness and knowledge, and intended changes in behaviour.

***No Alcohol in Pregnancy is the Safest Choice* campaign (Western Australia)**

<http://www.alcoholthinkagain.com.au/Campaigns/No-Alcohol-In-Pregnancy-Is-The-Safest-Choice.aspx>

In 2009, qualitative research was undertaken in Western Australia to explore beliefs and attitudes on alcohol use during pregnancy and motivations for behaviour change, and to test television concepts (France, 2011; France, et al., 2013). Previous research had identified high levels of drinking during pregnancy in Western Australia (60%), and that many women lacked knowledge about the consequences of drinking alcohol during pregnancy.

In an exploratory phase, four focus groups were held with 23 women to identify motivations for healthy choices during pregnancy, their knowledge, beliefs and practices around alcohol use during pregnancy, and barriers and facilitators for abstinence. Two focus groups involved women who had been pregnant within the last three years (and who had drunk alcohol within the previous month), one group involved pregnant women (who were not drinking alcohol), and the final group was made up of women without children who thought that they might have children in the near future⁴⁷. Most of the women had a tertiary qualification and were married or in a de-facto relationship.

France, et al. (2013) identified the beliefs, attitudes and practice of the women involved in the focus groups and then considered the implications of these for messaging⁴⁸:

- ◆ The focus groups identified that abstinence from alcohol during pregnancy is known to be recommended and, therefore, the researchers suggest that messaging can go beyond a “do not drink alcohol in pregnancy” communication objective.

⁴⁷ Pregnant women who were consuming alcohol were not eligible to participate.

⁴⁸ For the full list of beliefs, attitudes and practice and the implications for messaging, go to France, et al. (2013), p.1511.



- ◆ The focus groups identified that a change in alcohol consumption is one of a range of behaviour changes that women can make during pregnancy, with others including diet and tobacco use. The researchers suggest that messaging can increase the relevance of abstaining from or reducing alcohol consumption during pregnancy by linking to other behaviour changes that are regularly adopted.
- ◆ Barriers to abstinence from alcohol were identified, including feeling social pressure to drink, receiving conflicting information about risks, and being told by a health professional that it was safe to drink some alcohol. Women who had experienced more than one pregnancy discussed being less motivated about behaviour change in subsequent pregnancies. Early pregnancy was identified as a time when good intentions could be undermined, especially if women are not ready to divulge their pregnancy to others. Discussing messaging, the researchers note that this could include providing strategies for avoiding alcohol during social situations without disclosing pregnancy.

The focus groups also identified motivations for reducing or abstaining from alcohol during pregnancy. These included negative motivations, such as avoiding feeling responsible for poor pregnancy or fetal outcomes and positive motivations, such as gaining social approval and a feeling of doing the “right thing” by following professional advice. Based on these findings, the researchers describe the message strategy objectives as being to *“create and reinforce healthy beliefs and social norms with regards to abstinence from alcohol use during pregnancy”* (p.1513). Four communication concepts were developed based on this research.

- ◆ **Partner and Best Friend.** These two concepts focus on self-efficacy and social norms. The partner concept models the support of a male partner (modifying his own alcohol use), and both concepts model a strategy for avoiding alcohol without disclosing pregnancy; for example, the best friend states that she and her pregnant friend are both on a “health kick”. Both concepts demonstrate the social inclusion of the pregnant woman.
- ◆ **Woman.** Focuses on self-approval, self-efficacy and control, with a woman making a decision to safeguard the health of her baby, to give herself “peace of mind”, by choosing a non-alcoholic beverage at a work-related event while in the early stages of pregnancy.
- ◆ **Obstetrician.** Focuses on encouraging women to avoid fear, worry, and possible negative consequences for the fetus. Addresses the risk of low/moderate exposure and provides an expert source of information. Two versions were developed, with one including more specific information and stronger messages than the other concepts on the potential consequences of alcohol consumption; for example, “any alcohol poses a risk to the baby” and “alcohol can disturb the development of the fetus”.

These concepts were tested in five focus groups, with 31 participants representing each of the target audiences:

- ◆ Women aged 18 to 45 years who consume alcohol; middle socioeconomic status; in a current relationship with no children, but have not ruled out having a child in the next five years (primary audience).



- ◆ Women aged 18 to 45 years who consume alcohol; middle socioeconomic status; have a child who is five years of age or younger (primary audience).
- ◆ Men aged 18 to 45 years who consume alcohol; middle socioeconomic status; have a partner who was pregnant in the past five years (secondary audience).
- ◆ Pregnant women in their first pregnancy who have stopped drinking alcohol (primary audience⁴⁹).
- ◆ Pregnant women who are in a pregnancy subsequent to their first and have stopped drinking alcohol (primary audience).

Primary messages that participants took from each concept “closely matched” their intended objective. The obstetrician concept was the most effective in promoting an intention to not drink alcohol during pregnancy. *“This suggests that the avoidance of negative feelings and outcomes for the pregnancy and fetus are greater motivators for abstinence than positive motivators”* (p.1516).

The researchers suggest that, although a threat appeal is delivered in the obstetrician concept, as long as it is factual and supportive of women making informed choices, it can be persuasive. They note that the credibility of this message was underpinned by an acknowledgement of uncertainty regarding the risks of low to moderate alcohol consumption – which acted as a rationale for a recommendation of abstinence. *“An honest and scientific framing of the message and delivery by an expert source were also shown to minimize counterargument and strengthen the message’s persuasiveness”* (p.1516). They go on to say that, although the positive messaging approaches were not as persuasive, they could be used alongside a threat-based message.

The *No Alcohol in Pregnancy is the Safest Choice* campaign was launched in June 2012. It is the first Western Australian campaign to target alcohol use during pregnancy in the general population⁵⁰. The campaign targets women aged 25 to 39 years, who are pregnant, planning a pregnancy, or breastfeeding, by educating them about alcohol use. This includes information on alcohol's potential effects on the development of a baby. The message conveyed by the campaign is that *not* drinking is always the safest option.

Television advertising was shown throughout Western Australia during popular daytime programming and also when family and friends of the primary target audience would be viewing. Digital advertising was targeted at popular parenting and baby websites.

Although an evaluation is underway, there is little evaluation data available to date. However, a media statement suggests that *“... nine out of 10 women who saw the adverts and currently drank alcohol would not drink at all if pregnant, and half of women who viewed the campaign would stop drinking completely while trying to get pregnant in the future”*⁵¹.

⁴⁹ An exploratory phase indicated that women can think and behave differently in their first pregnancy versus subsequent pregnancies with regard to health behaviour.

⁵⁰ The campaign is part of the Western Australia *Alcohol think again* strategy: <http://www.alcoholthinkagain.com.au/>

⁵¹ <http://www.mediastatements.wa.gov.au/pages/StatementDetails.aspx?listName=StatementsBarnett&StatId=7967>



Alcohol hurts unborn babies (Saint Louis, United States)

A targeted campaign undertaken in the city of St Louis aimed to increase FASD knowledge and awareness among African Americans (Mengel, Ulione, Wedding, Jones & Shurn, 2005). A previous study had shown self-reported alcohol consumption among pregnant African Americans in the city to be, on average, two times higher than among Caucasians. Community input and formative research showing knowledge gaps about FASD informed the development of prevention messages.

The campaign was based on social marketing principles, and those developing the campaign worked with the community, adapting the messages to the target community to ensure they were culturally authentic, with the messages focused on using social influence to change knowledge about drinking during pregnancy.

The campaign ran from October 2002 to March 2004 and used television and radio advertisements, billboards (including on buses), print advertisements, direct marketing to the community (including churches and physicians), public relations/media interviews, displays at community events, and educational videos for high school students. The slogan for the campaign was *Alcohol hurts unborn babies*. The logo was a picture of an African American female holding a liquor bottle that directed alcohol into the umbilical cord with her fetus stating, “None for me, Momma”.

It was decided not to show pictures of children affected by FASD as this type of “scare tactic” was considered inappropriate. Women felt that campaign materials should include examples of situations where alcohol was available and women were faced with a choice about whether to drink, but were still able to enjoy themselves with friends and family.

The campaign developed the following four FASD prevention messages, with targeted message strategies focused on both positive and negative consequences:

- ◆ A “no safe time” message described birth defects associated with FAS and FASD, and reiterated that these can occur early in pregnancy, before women know they might be pregnant, and throughout pregnancy.
- ◆ A “no safe level” message emphasised that pregnant women should totally abstain from drinking alcohol.
- ◆ A “no drinking if not using reliable forms of birth control” message emphasised that sexually active women should not drink if they could become pregnant.
- ◆ A “if drinking and can’t stop, see a physician” message encouraged women who were pregnant or could become pregnant, and felt their alcohol use may place them at risk for FASD, to see their doctor for assessment and treatment recommendations as soon as possible.

Pre- and post-intervention surveys of African American women were undertaken in St. Louis and in a control community (Kansas City), with around 400 women participating in each of the surveys. Just over 70% of participants remembered the campaign in St. Louis with 22.9% hearing the



message over 20 times. The messages most frequently recalled were the “no safe level,” and the “no safe time” messages. The most remembered distribution channels were television and billboards. Knowledge scores increased in proportion to the number of times that respondents reported having heard the message.

However, the researchers note that, overall, there was a small *decline* in knowledge scores post-intervention in St Louis, and that, although there was no evidence that any FASD campaigns occurred in Kansas City during the study period, 58.8% of participants in Kansas City remembered hearing FASD messages. Although they conclude that this targeted campaign did not improve FASD knowledge among African American women in Saint Louis, Mengel, et al. (2005) go on to say that hearing the message at least ten times *did* produce positive changes in knowledge in the target population. They suggest that future campaigns of this type should include high message penetration.

The *Be Safe Campaign* (Ontario, Canada)

<http://www.alcoholfreepregnancy.ca>

<http://www.beststart.org/apcampaign/index.html>

The goal of the *Be Safe Campaign* was to raise awareness about the risks of alcohol use in pregnancy (Burgoyne, et al., 2006; Health Communication Unit, 2004)⁵². The design, implementation, and evaluation of *Be Safe* took 15 months (July 2003-October 2004), and the campaign itself took place across Ontario in May and June 2004.

Campaign development included input from an advisory committee, with representatives from a range of agencies. Other experts on health promotion and FASD contributed to the process, and stakeholders who contributed to campaign objectives and message development included pregnant women, parents of children who had FASD, others who had experience working with pregnant women, women struggling with substance issues, and members of a maternal and new-born online network.

Research had shown two groups to be of particular concern: women aged over 30 years, with “successful careers” who were most likely to report they consumed alcohol during their most recent pregnancy; and women who used other substances, had low self-esteem or who were young poor, unemployed or depressed, as they required substantial support to address their alcohol use. The first of these groups was the main focus when developing images, messages and strategies, as the developers felt that they would be most likely to respond to a communication campaign.

There was also research to show that the general public had a relatively high level of awareness that alcohol use in pregnancy could result in lifelong problems, although there were misperceptions about ‘safe’ alcohol use in the different trimesters of pregnancy, whether certain types of alcohol were safer than others and whether there were safe amounts of alcohol.

⁵² The campaign was part of the *Best Start* programme, funded by the Government of Ontario, and established to improve maternal, new-born and child health.



The main audience for the campaign was identified as women of childbearing age. The secondary audience was community members, health care providers, service providers, and family members, as they could share information with, or provide support to, pregnant women. The campaign had the following communication objectives for individuals:

- ◆ To increase awareness in women of childbearing age that there is no safe time, no safe amount, and no safe kind of alcohol during pregnancy, and to increase awareness that it is safest to stop drinking alcohol before getting pregnant.
- ◆ To increase the knowledge of women who are pregnant or planning a pregnancy about services related to alcohol use and pregnancy.

The campaign aimed to increase the number of health care and other service providers sharing information on alcohol and pregnancy with their patients/clients, and to increase support from local groups and communities on alcohol and pregnancy. Campaign messages provided information about the consequences of alcohol use in pregnancy, the timing and amount of alcohol in pregnancy, and links to additional information and services. The main campaign text was: *“Be safe: Have an alcohol-free pregnancy. Drinking alcohol during pregnancy can cause birth defects and brain damage to your baby. The safest choice in pregnancy is no alcohol at all. In fact, it is best to stop drinking before you get pregnant. For more information: 1-877-FAS-INFO www.alcoholfreepregnancy.ca”*.

Warm, positive colours, such as blue and orange, were used and stakeholders felt that the images used should also be warm and positive, showing a supporting partner (to emphasise that it is not the woman’s sole responsibility) and avoiding negative images, such as a pregnant woman or fetus drinking alcohol. The campaign avoided shame and fear-based strategies, not wanting to raise fears in women who had drunk small amounts of alcohol early in pregnancy.

The campaign used print (e.g. posters, brochures, tear-off sheets, transit ads, and outdoor advertisements), television and radio advertisements, and a campaign website. All campaign resources were field-tested with the targeted audience and revised where necessary.

Campaign strategies included province-wide approaches to media, health care providers and licensed establishments, and supports for local activities. The campaign took a multi-level approach with the Best Start Resource Centre planning large-scale provincial strategies, such as resource development, mass media exposure, distribution of resources to health providers, while local groups undertook community-level activities. Web-based information was provided to assist local groups, and campaign materials were sent to health providers and other agencies ahead of the media campaign.

A range of evaluation activities took place, including media tracking, analysis of calls to a national alcohol and substance use in pregnancy helpline, and contact with local groups to assess their satisfaction with support received to develop local activities. A pre- and post-campaign phone survey was also undertaken of women of childbearing age living in Ontario. Each survey involved 340 women aged 18 to 40 years.



In the post-campaign survey, 62% reported having recently seen or heard information about alcohol use during pregnancy, and most recalled key aspects of the campaign messages. They were most likely to have seen or heard it on television (39%), in magazines (20%), or at a doctor's office or hospital clinic (20%). Despite high pre-campaign levels of knowledge, the evaluation identified some significant changes:

- ◆ An increase of 15% in awareness that "... 'stopping alcohol use in pregnancy' is one of the most important things that pregnant women can do".
- ◆ A decrease in the amount of alcohol considered safe in pregnancy.
- ◆ An increase in the proportion of respondents who thought women should stop drinking prior to conception.
- ◆ An increase in awareness that alcohol use in pregnancy can result in problems for children, including difficulties learning and birth defects.

The campaign reached 5,120,693 people with key messages about alcohol and pregnancy, although contacts with associated services, such as a helpline, did not appear to significantly change over the campaign period. The researchers conclude that the campaign increased knowledge about alcohol use in pregnancy amongst women of childbearing age and that the multi-level approach, combining local and provincial strategies, was an effective model for the campaign.

***Mother Kangaroo* campaign (Saskatchewan, Canada)**

The *Mother Kangaroo* campaign ran from 2006 to 2008 and included television and radio advertisements, posters, and information cards for liquor stores, restaurants and public health buildings (Fast Consulting, 2006; Thurmeier, et al., 2011). The campaign featured a mother kangaroo, alternatively shown with her partner, friends and a baby called Joey. The message encouraged alcohol-free pregnancy and showed examples of how family, friends and the community could provide support.

A pre-campaign survey (401 participants) provided a baseline to assess the success of the campaign and found that awareness of the impact of alcohol during pregnancy was generally high in Saskatchewan; for example, 97% of respondents believed that alcohol use during pregnancy can lead to lifelong disabilities in the child; 70.3% said that there is no safe amount of alcohol consumption; 88.8% said that there was no safe time to drink alcohol during pregnancy; and 73.4% said that a woman should stop drinking before she gets pregnant (Norsask Consumer Interviewing Services, 2005). However, *taking action* to help prevent the effects of alcohol during pregnancy was reported less, with only 28.2% of male respondents and 47.5% of female respondents having done or planning to do at least one activity, such as offering non-alcoholic drinks to pregnant women and not drinking alcohol during pregnancy.



A campaign survey was undertaken in 2006 with 400 participants that tested recall of the *Mother Kangaroo* campaign and any changes in attitudes or perceptions about alcohol use during pregnancy (Fast Consulting, 2006; Thurmeier, et al., 2011). Among the findings were the following:

- ◆ Seventy-one percent of respondents reported seeing advertisements about alcohol use in pregnancy (81% saw them on television). Respondents with some high school or less education were more likely than those who had completed high school or had a higher level of education to indicate they learned something from the campaign.
- ◆ As with the previous survey, 97% of respondents agreed that alcohol use during pregnancy has effects on a fetus, and 96% agreed that alcohol use during pregnancy can lead to lifelong disabilities in a child. Respondents with some high school or less education, and income under \$20,000, were more likely to agree that alcohol use during pregnancy has *no effect* on the child, that most effects disappear as the child grows older, and that only large amounts of alcohol can lead to disabilities in the child.
- ◆ There was an increase in the number of participants who would engage in preventive behaviours, with 49% saying they would offer non-alcoholic beverages and 47% saying that they would show support by not drinking themselves. In addition, 44% said that they *had* supported a pregnant woman's choice not to drink, and 4% said that they *had* told others about the harmful effects of alcohol during pregnancy.

I'm a mama-to-be, no drinks for me | Missed your period. Don't drink period (Southern California, United States)

Glik, Prelip, Myerson and Eilers (2008) describe two community-based narrowcast campaigns undertaken in low-income, multi-ethnic areas in Southern California in 2003. A narrowcast campaign tends to use low-cost print materials such as posters, fliers and t-shirts.

Unique messages and resources were developed for each campaign and were pre-tested with community members and leaders. The researchers describe a debate during development of the campaigns about the desirability of a strong threat-based approach. However, they found during the testing phase that audiences favoured social norms approaches, which portrayed what "*idealised*' women should do if they were pregnant or thought they were pregnant" (p.4).

One community campaign (Compton) used slogans and images for posters that emphasised assertiveness and empowerment. The main slogan (for the English-language version) was *I'm a mama-to-be, no drinks for me*. T-shirts for pregnant women, with urban poetry that echoed campaign themes, were distributed at clinics and businesses.

The other campaign (Bakersfield) used a slogan for posters suggested by participants in a focus group. *Missed your period. Don't drink period* reflected concerns about young women drinking before they knew they were pregnant. Additional materials included cards that were smaller versions of the posters, with further information on the back about the impact of drinking or using drugs during pregnancy, and describing risk factors and consequences.



Because of financial limitations, little use was made of paid placements, with the focus on distributing materials to businesses and organisations frequented by women of childbearing age in the two areas. A full-time person from each community was hired to organise community outreach.

A random telephone survey of women aged 18 to 35 years was conducted at baseline, and eight months later at the conclusion of the campaign. Surveys were also undertaken at women's health clinics and doctors' offices. The telephone surveys revealed very low exposure to the campaign in both areas, (11.2% Compton; 7.2% Bakersfield). Different results were found at the clinics (54.2%; Compton; 11.2% Bakersfield). Discussing the high level of awareness for the Compton campaign in clinic settings, the researchers note that Compton achieved much higher saturation of campaign messages. In Bakersfield, most venues only displayed one poster, whereas the coordinator in Compton clustered more materials in fewer places. Glik, et al. (2008) also note that, while both campaigns used social norm messages, the Compton message, "I'm a mama-to-be", promoted feelings of empowerment, while the Bakersfield message, "Missed your period?" led to a feeling of "I messed up. Not only am I pregnant, but now I can't drink", which may have had less appeal to the targeted audience.

Being a good mother starts early and lasts a lifetime (Iowa, United States)

This multi-component campaign provided information on fetal alcohol syndrome and drinking during pregnancy for pregnant women living in a rural area. The primary aim was to motivate them to discuss alcohol use in pregnancy with people in their social network. All materials emphasised the message, *Being a good mother starts early and lasts a lifetime* (Lowe, Baxter, Hirokawa, Pearce & Peterson, 2010). The message was delivered in three ways:

- ◆ A 30-second television commercial.
- ◆ A ten-minute video/DVD for distribution to participating clinics⁵³.
- ◆ A pamphlet for distribution at clinics.

The researchers used a randomised-controlled study to evaluate the effectiveness of the messages. The 700 pregnant participants were encouraged not to consume alcohol and the 321 women in the control group also had an opportunity to watch the television commercial. The 379 women in the intervention group watched the commercial and were also given the DVD and a pamphlet based on the DVD. The women completed a questionnaire three months after watching the commercial (77.9% response rate).

More women in the intervention group (64.1%) recalled seeing the television commercial than in the control group (48.5%). All women in the intervention group recalled receiving the DVD and 62.2% reported that they watched it. Nearly 40% of these women watched it with someone else and 54.5% discussed the DVD with someone else.

⁵³ <http://www.amazon.com/DVD-ALcohol-Pregnancy-University-lifetime/dp/images/B002ITVCVM>



Half of the women who watched the DVD passed on information about its content to other women and nearly half passed on their copy to others, and significantly more women in the intervention group had talked to friends about alcohol use during pregnancy compared with the control group. The intervention group had also significantly improved their knowledge scores at the three-month evaluation, compared with the control group who had unchanged scores. The researchers describe this increase in social network communication as an “... *important early step towards behaviour change for either the women themselves or their pregnant friends*” (p.741).

Mamma Beve Bimbo Beve (Mummy Drinks Baby Drinks) (Veneto Region, Italy)

<http://www.mammabevebimbove.it/>

In May 2010, the Italian Local Health Authority of Treviso launched *Mamma Beve Bimbo Beve (Mummy Drinks Baby Drinks)* - a communication campaign targeted at women aged 20 to 45 years and their families (particularly their partners). The aim was to raise awareness about the harmful effects for the developing fetus and baby from drinking alcohol during pregnancy and breastfeeding (Bazzo, et al., 2012).

A multidisciplinary team designed and oversaw the planning, implementation and evaluation of the campaign. The campaign was developed using social marketing principles and was informed by research into the alcohol use of local pregnant women and the opinions of health care providers. Partnerships with social and commercial stakeholders were used to facilitate the spread of the messages in the community.

The visual for the campaign was the headline *Mamma Beve, Bimbo Beve*, accompanied by the image of a fetus inside a glass of a typical local alcoholic drink. The health message used with the image was one of the following:

- ◆ Drinking alcohol during pregnancy and breast-feeding can damage the physical and mental development of your baby.
- ◆ Avoid drinking during pregnancy, breastfeeding and while trying to conceive.
- ◆ Your doctor, midwife and family members can help you remember.

Visual and print advertisements were used, including street and bus banners, and banners in the entrance hall of the two public hospitals. Posters were displayed at the entrance, along the corridors and in the waiting rooms of all public hospital wards. Leaflets were available in the waiting rooms of wards, and in the offices of paediatricians and family physicians. Leaflets were distributed to visitors to the hospitals and posters were distributed to all local restaurants and bars. Workshops were held with school teachers, and two conferences involved health care providers, social workers, school teachers, and secondary school students.

Bazzo, et al. (2012) describe a strong debate in the media about the confrontational image used in the campaign, and this provided further publicity. An evaluation was undertaken to assess the impact of the image on the target population one year after the campaign began. The evaluation considered the level of exposure, emotional reactions and awareness of the health message.



Nurses in a random sample of clinics used a questionnaire with all parents or caregivers who accompanied children aged up to two years for vaccinations in the area during June 2011. A copy of the image, without the headline text, was attached to each questionnaire.

Six hundred and ninety-four questionnaires were completed and 84.3% of the respondents said that they remembered the image. The image was noticed mostly in health care services and about one-fifth saw it on television and in newspapers. Almost all respondents recalled the warning message conveyed by the image. When asked their feelings about the image, around 50% expressed distress emotions while only 13% were pleasantly affected. The researchers did not identify any clear relationships between the level and kind of emotional reactions reported and the recall of health behaviours suggested by the campaign.

When asked what the picture was suggesting they do, about 50% responded with an answer that fit into at least one of the following categories: “do not drink alcohol in pregnancy” or “spread the health messages conveyed by image” (e.g. “tell a pregnant woman not to drink”). Meanwhile, 32.9% reported only generic assertions (e.g. “I think about the possible side effects of alcohol”) or actions not anticipated by the developers of the campaign.

Remembering having seen the image was significantly associated with an increase in the frequency of recall of the warning message and suggested health behaviours. Interestingly, the number of settings where the image had been seen was not associated with recall of appropriate behaviours. The researchers suggest that such a strong image may not need to be frequently seen to be remembered.

The *Yuonihan* Project - media campaign for Northern American Indian Communities (Iowa, Nebraska, North Dakota and South Dakota, United States)

This project was a collaboration between the University of South Dakota and the Northern Plains Tribal Epidemiology Center⁵⁴. Rates of drinking during pregnancy and rates of FASD are high in Northern American Indian communities. This campaign aimed to be both linguistically and culturally appropriate and took a social norms approach, using positive role models to “normalise” not drinking during pregnancy (Hanson, Winberg & Elliott, 2012).

Project development took two years, with three years focused on message delivery and evaluation. To inform campaign development, focus groups were undertaken in 2005 with community members from one tribe (including elder tribal women and women aged 18-44 years). Themes identified by these groups included the following:

- ◆ The importance of using traditional language and images from the tribal communities.
- ◆ Women of childbearing age felt it was important to include local community members and local enunciation in the media messages.
- ◆ Elder tribal women felt it was better to create a positive message than use shocking and negative messages.

⁵⁴ <http://fasdprevention.wordpress.com/2012/05/16/the-yuonihan-project-an-fasd-prevention-campaign-in-american-indian-communities-in-the-northern-plains/>



These themes were incorporated into the three posters and five radio advertisements (and newspaper advertisements) that were developed. For example:

- ◆ the image of a turtle amulet (a traditional symbol given to a pregnant woman or a new mother by her grandmother or elder female relative that symbolises long life, good health, and protection for that infant) was used throughout the posters
- ◆ radio advertisements were read by community members and, in one advertisement, the Lakota language was used, with the English translation playing softly in the background
- ◆ one poster showed seven community members of various ages (from a young child to an elder woman)
- ◆ one poster showed a pregnant Northern Plains Lakota woman choosing *not* to drink in a party situation.

These resources, as well as brochures, t-shirts and pens, were disseminated by community liaison staff hired from three local communities (a manual was developed for this role). They also undertook grassroots activities, such as radio interviews, booths at local events and organising community presentations.

To evaluate the campaign, 119 women who had participated in the FASD prevention project as a result of the campaign, were asked questions about the media campaign. Based on their feedback, the researchers concluded that the campaign was seen as culturally appropriate. Most women reported that the media campaign increased their knowledge about FASD and the effects of drinking during pregnancy and that, as a result of the campaign, they decreased their drinking behaviour. No baseline measures were available to confirm changes in awareness and behaviour.

It's about whānau: Smoking in pregnancy (New Zealand)

It's about whānau was launched in 2001 and was a Māori-specific media campaign that aimed to increase motivation to quit among Māori and encourage Māori smokers to call the Quitline (Grigg, Waa & Bradbrook, 2008). It included messages about smoking in pregnancy. A collaborative working group developed the campaign, and included Māori experts in public health, research, tobacco control, and communications.

Te Whare Tapa Whā, a Māori model of health⁵⁵ underpinned the development, highlighting the central role of whānau in health and also promoting physical health, mental health and spiritual health. Research undertaken to inform the development of the campaign included a literature review, qualitative interviews, and pre-testing of the campaign concepts. Feedback included concerns about the creation of negative stereotypes of Māori as smokers. For this reason, the campaign avoided threat appeals, focusing on Māori identity through empowering positive messages, and the concept of whānau as a key motivator to stop smoking.

⁵⁵ <http://www.health.govt.nz/our-work/populations/maori-health/maori-health-models/maori-health-models-te-whare-tapa-wha>



An evaluation by Grigg, et al. (2008) found that the television advertisements for the campaign were recalled by a substantial proportion of both Māori smokers (78%) and their whānau (73%). The campaign was also seen as very believable and relevant by those who had seen the advertisements. Just over half of smokers (54%) stated that the campaign had an influence in making them more likely to quit smoking.

Wilson Grigg, Graham and Cameron (2005) investigated the effectiveness of *It's about whānau* and three other television advertising campaigns aimed at smokers in generating calls by Māori to a national Quitline during 2002 to 2003. *It's about whānau* generated 91 calls to Quitline from Māori callers, per 100 target audience rating points (TARPs). The researchers note that two second-hand smoke campaigns that did not display the Quitline number were much less effective at 25 and 45 calls per 100 TARPs. The researchers conclude that the campaign was both effective and cost effective in generating calls to Quitline by Māori.

In another analysis, Wilson (2004) notes that, while individual advertisements in the *It's about whānau* campaign were effective for both Māori and non-Māori, the advertisements that addressed smoking and pregnancy may have too small a potential audience to show an impact in a national-level analysis. He goes on to say that the advertisements "... are still highly desirable from a public health perspective. Even so, they could possibly have more impact if the theme was expanded to the threat from any person smoking in the presence of a woman who is hapū" (p.50).



14.0 Innovative approaches

KEY POINTS

Recent innovative communication strategies include the development of a campaign that can be modified to suit different the needs of different organisations and different countries, the inclusion of messages related to alcohol and pregnancy in text messages sent to pregnant women, and the development of templates for educational resources that can be adapted for use by different cultures.

A number of innovative approaches have been developed for delivering messages about drinking during pregnancy and FASD.

Text4baby

<https://www.text4baby.org/>

The use of information technology, including the internet and smartphones, continues to grow. These technologies have the potential to spread messages to a wider group of people at a lower cost, and also to target messages to those who need them the most.

Text4baby, launched in 2010 in the United States (as a public-private partnership), aims to reduce barriers to accessing information and resources, increase knowledge around key health topics, improve positive health behaviours, and build a mother's self-efficacy to engage in healthy behaviours that will benefit both herself and her baby (Remick & Kendrick, 2013). The primary target audience is women at higher risk for poor health outcomes who may have problems accessing health information (i.e. young women under 25 years, low-income women, and women of colour).

Participants can enrol in *text4baby* by text message or through the programme's website. The user registers her due date or her baby's birth date and then receives a text message on her mobile phone three days a week that address issues relevant to her due date or the baby's birthday. All text messaging fees have been waived for this programme by U.S. wireless phone companies.

During programme development, informal discussion groups were held with pregnant women and new mothers to gauge interest in *text4baby*, identify topics of importance, and explore the relevance and comprehension of sample messages. In addition, a team of clinicians, medical epidemiologists, public health practitioners, and communications experts identified potential topics for inclusion, including messages about the risks of drinking alcohol during pregnancy. Topics were prioritised based on public health importance, health disparities, and the strength of the supporting evidence.

Messages are available in English and Spanish and are written at a sixth-grade⁵⁶ reading level. *Text4baby* messages have action-oriented educational content, and many include phone numbers

⁵⁶ Around 11-12 years of age.



connecting users to resources for more information or for help. There are 114 messages included in the pregnancy protocol and 159 messages in the infant protocol.

The website suggests that *text4baby* has reached over 685,000 mothers since 2010. In a small-scale pilot evaluation, Evans, Wallace and Snider (2012) randomised pregnant women (who were predominantly Hispanic) presenting for care in one county of Virginia to either receive *text4baby* text messages or usual care. They then surveyed the woman before the intervention group received *text4baby* (123 interviews completed) and again at approximately 28 weeks gestational age (90 interviews completed).

Those women who had received the *text4baby* intervention were nearly three times as likely to agree that “I am prepared to be a new mother”. The researchers did not find evidence of any other effects on targeted beliefs. However, participants with a high school education or greater were significantly more likely to agree with attitudes against alcohol consumption during pregnancy. Evans, et al. (2012) go on to say that they “... *observed several other effects of higher levels of education on beliefs targeted by the text4baby messages This may reflect the importance of literacy and comprehension on message effectiveness*” (p.8).

Fetal Alcohol Spectrum Disorders app

<https://itunes.apple.com/us/app/fetal-alcohol-spectrum-disorders/id517058288?mt=8>

An app developed by the Centers for Disease Control and Prevention (CDC) provides the latest information related to the use of alcohol during pregnancy, and the prevention, recognition, and treatment of FASD. The app is aimed at women planning a pregnancy, health care providers and educators. The app includes alcohol consumption data by state, information on diagnosis and treatments for children with FASD, training and education resources, and information on the work being done by CDC in this area.

FASD PosterMaker

<http://fasdpostermaker.com.au/>

The *FASD PosterMaker*⁵⁷ is a free app that provides health care providers working in Aboriginal and Torres Strait Islander health settings across Australia with a tool to create their own locally relevant and culturally-appropriate resources on FASD that reflect shared issues but also local differences (National Drug Research Institute, 2014a; 2014b). The app provides pre-loaded, evidence-based messages and culturally relevant images that can be used in the creation of local resources; or, it allows users to create their own evidence-based text and add their own images. The app also provides a database of colours, shapes and fonts, and contains a series of training videos on how to create posters (National Drug Research Institute, 2014a).

The *FASD PosterMaker* was developed as part of the National FASD Resources project, conducted from 2010 to 2013 by the National Drug Research Institute, Curtin University⁵⁸. It was developed after consultation with Aboriginal and Torres Strait Islander communities, where it was

⁵⁷ www.fasdpostermaker.com.au

⁵⁸ Funding for this project was provided by the Australian Government Department of Health under the National Drug Strategy.



clear that communities wanted access to evidence-based, locally relevant resources and also wanted involvement in their development. The project had six main stages:

- ◆ Establishment of a reference group, including members of Aboriginal and Torres Strait Islander health organisations and services, government, drug and alcohol service providers, and consultants with experience in Aboriginal and Torres Strait Islander service delivery, research and policy development.
- ◆ Identification and review of existing FASD health promotion resources.
- ◆ Identification of the processes required to develop templates.
- ◆ Extensive consultation with key stakeholders.
- ◆ Workforce development.
- ◆ Evaluation of responses to the consultation process and resources.

Seventeen consultations were held and identified inconsistencies between the messages that health care providers believed they delivered to their clients about alcohol and pregnancy and the messages that the community believed they were receiving (National Drug Research Institute, 2014b). In addition, while community members wanted messages to be hard-hitting and to the point, health care providers favoured a less confrontational approach. The project coordinators concluded that, while sensitivity is important, messages need to be clear about the risks of drinking in pregnancy (National Drug Research Institute, 2014a).

Campaigns for different organisations and countries

An international campaign is being developed by the European FASD Alliance⁵⁹, in collaboration with the local health authority of Treviso, Italy and a creative partner, which can be adapted for countries and cultures around the world. The initiative will be coordinated at the European level and involve institutions, non-governmental organisations, and associations in many countries belonging to the World Health Organization European Region, with the aim of sharing objectives, materials and resources to develop an integrated communication campaign (Bazzo, Marini & Black, 2014).

The campaign will be based on a social marketing model and the primary target group will be women aged 14 to 45 years and their partners. The campaign will also target the general population to ensure the engagement of the community with the message. The goals include raising awareness of the dangers of drinking during pregnancy and ensuring research-based information on the risks of using alcohol during pregnancy is available.

The developers note that both traditional and unconventional communication tools will be used, including guerrilla marketing and social media. Key expertise would be provided by the team of the successful *Mamma Beve Bimbo Beve* project, described earlier. The campaign is due to be launched in 2014 if a fundraising campaign is successful⁶⁰.

⁵⁹ The European FASD Alliance is a non-profit organisation that aims to help European professionals and NGOs concerned with FASD to share ideas and work together.

⁶⁰ <http://www.eufasd.org/campaign.php> and <http://www.eufasd.org/pdf/campaign.pdf>



15.0 Messages for health warning labels

KEY POINTS

Only a small number of countries have mandatory health warning labels about drinking in pregnancy⁶¹. Some other countries, including New Zealand and Australia, have voluntary industry labelling warning about drinking alcohol in pregnancy.

Research in this area is limited. There is some evidence that health warning labels impact on knowledge and perception and can raise public awareness (including about drinking in pregnancy) and change intentions, but there is limited evidence that warning labels can change drinking behaviour.

Warning labels are likely to be most effective when used as one element within a wider primary prevention communication strategy that reinforces the messages shown on the warning labels and provides more detail on the risks of drinking alcohol during pregnancy and where women can access further information and support.

Warning labels may also be useful in keeping the message about not drinking in pregnancy visible over time, and particularly when no other major communication strategies are underway.

There is little conclusive information available to guide decisions about message development, or on how to best link alcohol warning labels to other strategies. Indicative research suggests that specific warning messages, which highlight a causal link between alcohol consumption and a specific harm, are more effective than generic warnings.

Indicative New Zealand research shows that women at greater risk of risky drinking in pregnancy (young women and Māori and Pacific women) are most likely to be positive about the use of warning labels on alcohol containers. However, international research suggests they may also be the most likely to “discount or disbelieve the information”.

Health warning labels on the packaging of alcoholic beverages (either voluntary or mandated) are used internationally as a primary prevention communication strategy. Health warning labels often address not drinking during pregnancy or the impact of alcohol on an unborn baby.

Only a small number of countries have mandatory health warning labels about drinking in pregnancy. Countries with mandated pictorial or text warning labels, indicating that alcohol should not be consumed during pregnancy, include France, United States, South Africa, and the Russian Federation⁶². For example, all alcohol products sold or distributed within France must have at least one of the following two health messages recommending that pregnant women do not drink alcohol:

- ◆ “Drinking alcoholic beverages during pregnancy even in small quantities can have grave/serious consequences for the health of the baby”.

⁶¹ <http://www.icap.org/table/HealthwarningLabels>

⁶² <http://www.icap.org/table/HealthwarningLabels>



- ◆ Display of the government-issued symbol showing a diagonal line superimposed on an image of a pregnant woman holding a glass.

In New Zealand and Australia, initiatives by the alcohol industry to place pregnancy-related health warning labels on their products are currently voluntary.

15.1 Effectiveness of health warning labels

15.1.1 Impact of health warning labels on the drinking behaviour of pregnant women

While there is some evidence for a limited impact of warning labels on increasing knowledge and raising public awareness (including about drinking in pregnancy) and intentions, there is only limited evidence that warning labels can change drinking behaviour (Babor, et al., 2010; Elliott, et al., 2008; International Center for Alcohol Policies, 2013). Elliott, et al. (2008) note the small number of studies available and the variability in quality. They report on two studies that took place in the 1990s. One showed no difference between different levels of exposure to warning labels and alcohol consumption during pregnancy. The other identified a “modest reduction in alcohol consumption in light drinkers ... but not heavy drinkers” and some impact on reduced alcohol consumption amongst first-time mothers but not pregnant mothers who already had children. The researchers suggest that there is unlikely to have been any clinically relevant effect.

A recently published scoping review of the literature investigated the effectiveness of alcohol warning labels in the prevention of fetal alcohol spectrum disorder. Thomas, Gonneau, Poole and Cook (2014) conclude that while there is little or no evidence that alcohol warning labels alone can significantly change judgements about the risk of drinking while pregnant, beliefs about alcohol, or reduce risky drinking behaviours, they may be able to influence some behaviours related to drinking. For example, they note that previous research has shown them stimulating conversations between pregnant women who are drinking and their health care providers.

In a review written for Food Standards Australia New Zealand, Wilkinson, et al. (2009) identified a lack of research on unintended and adverse outcomes from health warning labels, such as an increase in terminations amongst women who have consumed alcohol during pregnancy, or a reduction in the proportions of women considering breastfeeding.

Thomas, et al. (2014) suggest that “public messaging campaigns that incorporate advances in prevention-messaging science and practice, coupled with better label design, would likely improve the ability of warning labels to help change cultural norms and behaviour around alcohol” (p.101). They conclude that warning labels, along with other primary prevention strategies can, if carefully designed, play a role in in multi-faceted FASD prevention strategies. The AER Foundation (2011) also suggests that warning labels are most effective when used as one element within a wider primary prevention communication strategy, which reinforces the messages shown on the warning labels and provides more detail on the risks of drinking alcohol during pregnancy and where women can access further information and support.



Warning labels also reach a wide audience and may be useful in keeping the message about not drinking in pregnancy steadily visible over time, particularly when no other major communication strategies are underway (Deshpande, et al., 2005).

15.1.2 Health warning labels as a source of information on the risks of drinking alcohol during pregnancy

In 2010, Parackal, Parackal and Harraway reported the results of a cross-sectional survey that asked 1,129 non-pregnant New Zealand women to rate warning labels on alcohol containers as a source of information on the risks of drinking alcohol during pregnancy. Just over half the women (53%) gave a positive rating (1-2 on the scale), 17% gave a medium rating (3) and about 30% a low rating (4-5). The oldest age group in the study (women aged 35-40 years) were less likely to give a positive rating than women in the youngest age group (16-19 years). In addition, non-European women (Māori, Pacific and Asian) were more likely than European/other women to give a positive rating for warning labels.

The researchers note that two groups at greater risk of drinking heavily in pregnancy were the groups most likely to be positive about the use of warning labels on alcohol containers. They point to United States research where younger women and heavy drinkers were more likely to be aware of warning labels than older women and light drinkers. However, they also note overseas research, which suggests that “women who need this information most are more likely to discount or disbelieve the information contained in the warning label ... and not reduce alcohol consumption in pregnancy” (p.304). They conclude by saying that further information is needed to inform the design of effective labels that address alcohol use during pregnancy.

15.2 Content of the health warning label

In a review, Wilkinson, et al. (2009) found a “... paucity of discussion about the models that underpin alcohol warning labels”, with little information to guide decisions about message development, including whether pictorial advice is more or less effective than a written message⁶³. They also note that there is no clear evidence about how to best link alcohol warning labels to other strategies.

In a policy position paper, the AER Foundation (2011) (now the independent charitable organisation Foundation for Alcohol Research and Education or FARE) in Australia notes that evidence-based research on alcohol product labelling suggests that specific warning messages highlighting a causal link between alcohol consumption and a specific harm, are more effective than generic warnings. “[T]hey are unambiguous, convey a vivid message, and elicit an emotive response in the consumer” (p.10). The AER Foundation made a number of recommendations for the content of health warning messages, including the following:

- ◆ All messages should be preceded by the text HEALTH WARNING, which should be capitalised, and larger than the warning message and be separated from the message by a single space.

⁶³ Examples of warning labels used internationally, including some on pregnancy are available at: <http://www.icap.org/Table/HealthWarningLabels/tabid/249/Default.aspx>



- ◆ The language and tone should be simple, clear and direct; strong and active (e.g., “will” increase your risk) and personalised (“you” or “your”); educative and informative in tone; factual and evidence-based; inclusive of new information where possible; and based on the specific risks associated with alcohol consumption.
- ◆ Warning messages should be accompanied by a recommendation for action (in a smaller font). For example, “If you are concerned about your alcohol consumption, call [appropriate help line and phone number] or visit [appropriate website]”.
- ◆ Health warning labels should be tested with a range of audiences prior to implementation.
- ◆ Evaluation should be undertaken and should consider the effect of health warning labels and related policies on changing both attitudes and behaviours. AER note that “evaluations of the tobacco labelling experience and associated public education campaigns have led to numerous changes to improve the effectiveness of health warning labels. These changes have included a move to rotating messages, increasing the number of warning messages and the progression towards graphic warning labels, which have been shown to increase awareness and reduce rates of smoking” (p.12).

The Foundation for Alcohol Research and Education (2011) undertook research to compare warning labels that they had developed with labels developed by DrinkWise (an independent, not-for-profit organisation established by the alcohol industry) for voluntary application to alcohol products. In their report on the research findings, FARE notes that the DrinkWise labels had received some criticism from the public health sector for being ambiguous. The DrinkWise labels included two focused on pregnancy; one was a silhouette of a pregnant woman holding a wine glass with a line through it, and the other had the message, “It is safest not to drink while pregnant”.

FARE’s policy position was that warning labels should be mandated for application on all alcohol products in Australia, with at least five different messages, one of which should convey the risks of drinking alcohol during pregnancy. They also proposed that all warning labels should be headed with the text, “HEALTH WARNING”. FARE produced five sample warning labels that complied with their recommended specifications. Focus groups informed the development of the labels and FARE commissioned online market testing to examine perceptions of the FARE labels compared with the DrinkWise labels.





DrinkWise label

FARE label

Five hundred and four questionnaires were completed, with respondents selected from all Australian states and reflecting the Australian adult population. Eighty-eight percent had consumed alcohol in the previous 12 months. Participants were shown the FARE pregnancy warning label “Drinking alcohol can harm your unborn baby” and the DrinkWise pregnancy silhouette as applied to alcohol products, and asked to select which would be most likely to:

- ◆ raise awareness of the harms that can result from drinking alcohol during pregnancy (86% of participants selected the FARE message; 14% chose the DrinkWise message)
- ◆ prompt conversations about the risk of drinking alcohol during pregnancy (84% of participants selected the FARE message; 16% chose the DrinkWise message)
- ◆ stop women from drinking alcohol while pregnant (85% of participants selected the FARE message; 15% chose the DrinkWise message).

Participants were also shown the full series of FARE and DrinkWise labels and asked a range of questions, including whether labels should explicitly use the words “health warning” (72% were in favour of its use, 16% opposed its use, and 12% were unsure). The overall set of FARE labels was also perceived to be more likely to raise awareness, prompt conversations, reduce consumption, be more noticeable, be easy to understand, and tell people something they did not know.



16.0 Future research directions

This review has provided an overview of the state of current research on who drinks alcohol during pregnancy, women's knowledge and attitudes about drinking during pregnancy and the development of primary prevention communication strategies that may be effective in reaching these women, their families, friends, and communities. The review allows strengths and gaps in the evidence base and possible future research directions to be identified. It also contributes to an understanding of potential target audiences and messages for primary prevention communication strategies.

The predictors of alcohol consumption during pregnancy

There has been a significant amount of interest by researchers in identifying the predictors of alcohol consumption. This has resulted in a clearer understanding of the groups of women who are most likely to continue to drink during pregnancy. However, much of what is known about the influences on New Zealand women drinking during pregnancy is based on research conducted nearly ten years ago.

Future research could help to clarify how relevant the predictors identified in international studies are to a New Zealand context, which groups are most likely to continue drinking after pregnancy recognition and which groups are most likely to be drinking at *risky* levels before and after pregnancy recognition.

Developing communication strategies and messages, and identifying target audiences

Although much effort has gone into the creation of prevention campaigns and other strategies internationally, there is only limited information available that describes their development (including message development) and limited evidence to assess their effectiveness. Only one New Zealand campaign was identified that fell within the scope of this review (see Appendix 1), and this does not appear to have been formally evaluated.

Best practice approaches to the development of communication strategies, and campaign planning and development, have been identified, and provide some guidance. Future strategies should draw on these best practice approaches where appropriate, with robust evaluation undertaken and published to inform future campaigns. Recent innovative communication strategies demonstrate the potential for information technology to reach wider or more diverse audiences.

One challenge is achieving an effective balance between describing the risks of drinking during pregnancy (the "threat") and encouraging the targeted audience to feel confident that they can make changes in their own drinking or help others to avoid drinking alcohol during pregnancy. The *No Alcohol in Pregnancy is the Safest Choice* campaign, described in this review, provides an interesting overview of how campaign developers can test different motivators with focus groups, and particularly the balance between threat appeals and positive messaging (such as displays of social support for pregnant women).



As understanding of the predictors of alcohol consumption in pregnancy increases, there is more potential to identify target audiences for primary prevention communication strategies. Research to date suggests two key potential audiences for prevention campaigns:

- ◆ Younger women who are risky drinkers before pregnancy and continue these patterns of drinking until their pregnancy is confirmed. For some, this may be because their pregnancy is unintended and they are unaware they are pregnant for a significant part of the first trimester.
- ◆ Older women, who are aware that drinking during pregnancy is not recommended, but based on their own experiences of previous pregnancies, and the experiences and attitudes of their friends and families, continue to drink socially, although often reducing consumption to low/moderate levels.

New Zealand research suggests that (when looking at all age groups) Māori and Pacific women are at higher risk of binge drinking during the early pregnancy period than European women, along with smokers and drug users. A better understanding of the various influences on these women would help to inform campaign development.

Targeting attitude and behaviour change through communication campaigns may be appropriate for women who can change their behaviour once they become aware of the possible negative outcomes from drinking during pregnancy – that is, if they are motivated to change and have the ability to make the change. However, women who are alcohol dependent, experiencing a range of social disadvantages, or living in high-stress situations are unlikely to be able to make this change on their own. Any campaign messages may need to reference a range of services where women can receive individual assistance, after ensuring that these services have the capacity to respond.

Campaign messaging is more likely to be successful if it presents information that many women of childbearing age do not already know, and if it targets a change in attitude about drinking alcohol during pregnancy. It may also need to consider the social pressures to drink that pregnant women face and how to build a community of support for a pregnant woman's decision not to drink.

Smoking is consistently identified as a predictor of drinking alcohol during all stages of pregnancy. However, it appears that the risks of smoking during pregnancy are seen differently by women from the risks of drinking during pregnancy, with smoking considered generally unacceptable (even by those who continue smoking). There may be benefits to linking messages about the risks of drinking during pregnancy with other positive health behaviours during pregnancy, such as quitting smoking.

Women report receiving inconsistent advice from health care providers. Campaign messages should align with advice being delivered by health care providers and more detail on the evidence behind the recommendations should be made available for those who want it. If not already available, additional professional development and resources should be provided for health care providers to ensure their advice is consistent with messages delivered by any campaign and that they have appropriate information to leave with pregnant women.



Appendix 1: Current and recent campaigns and resources

Campaigns and resources are included here to demonstrate the range of strategies being used to address drinking during pregnancy. Only limited, or no, information on development and/or evaluation was identified for these campaigns. For campaigns that have more development and evaluation information available, see Section 13.0.

New Zealand

Babies + Booze (Auckland, New Zealand)⁶⁴

<http://www.youtube.com/user/FASDNetworkNZ>

The Rotary Club of Parnell worked with two community organisations, Well Women's and Family Trust and Alcohol Healthwatch, to develop the Babies + Booze youth social media awareness campaign. The aim of the project was to educate potential parents of the risk of the mother drinking while pregnant.

The campaign targeted teenage girls (initially in lower socioeconomic groups). As this target audience had little exposure to traditional mass media channels but is an intensive user of social media, the primary channel for communicating the education message was social media, with relevant community groups and services reinforcing the message.

The organisations involved youth in the design and production of a social media resource, including filming and performing in the videos. The video material is available on YouTube, along with a discussion of the risk of drinking alcohol during pregnancy by Auckland neonatologist Dr Simon Rowley, and the recollections of two birth mothers whose drinking during pregnancy had an adverse effect on their children. A DVD resource was also developed to complement the social media approach and was circulated throughout the community to education providers and service providers working with young pregnant women.

The campaign was launched on Thursday 18th October 2012 at Ruapotaka Marae, Glen Innes, Auckland. Media coverage included TVNZ Breakfast Show, radio interviews, Māori TV and promotion in public health media across New Zealand.

⁶⁴ For further information, see <http://www.stuff.co.nz/auckland/local-news/east-bays-courier/7881520/Warning-on-babies-and-booze> and <http://rotarystories-nzandpacific.blogspot.co.nz/2013/02/babies-booze-fetal-alcohol-spectrum.html>



United States

***Love. Hope. Joy.* (Minnesota, United States)**

<http://www.mofas.org/love-hope-joy/>

The *Love. Hope. Joy.* campaign was originally created in 2013 for FASWorld in Toronto, Canada and was customised by the Minnesota Organization on Fetal Alcohol Syndrome (MOFAS) for Minnesota. It features pictures of women, of all ages, sizes and cultures, with pregnant bellies protruding through the letter 'o' in *Love, Hope and Joy*⁶⁵.

The goal of the campaign is to educate and create public awareness among women of childbearing age about the issue of drinking during pregnancy. In March 2014, campaign messages were to be delivered using billboards, bus shelters, cable television spots, and social media to help spread the message about no safe level of alcohol during pregnancy. Advertisements would also target health care providers and professionals who treat and care for women during their pregnancy.

The positive words, *Love. Hope. Joy.* are used as a reminder to young women, who are pregnant or could become pregnant, that there is a connection between the decisions a mum-to-be makes and her unborn baby. The campaign provides the following key messages:⁶⁶

- ◆ There is no safe level of alcohol use.
- ◆ Alcohol during pregnancy is more dangerous than crack cocaine or heroin.
- ◆ [FASD is] incurable, but 100% preventable.
- ◆ FASD facts speak for themselves (e.g. 60% of women over-pour or underestimate the size of a drink).
- ◆ Spread the word about FASD.
- ◆ The solution – changing the social norm.

***Be in the kNOw* (New Jersey, United States)**

<http://beintheknownj.org/>

The pilot *Be in the kNOw* multimedia public education campaign was launched in July 2006 by the New Jersey Fetal Alcohol Spectrum Disorders Task Force and continued until December 2006 (Awopetu, Brimacombe & Cohen, 2008; The Governor's Council on the Prevention of Developmental Disabilities and The New Jersey Fetal Alcohol Spectrum Disorders and Other Perinatal Addictions Task Force, 2012). The campaign urged women of childbearing age to not

⁶⁵ <https://trailblz.info/mofas/documents/Love.%20Hope.%20Joy.%20Press%20Release.pdf>

⁶⁶ For detailed messaging, go to: <https://trailblz.info/mofas/documents/Press-ready%20Commentary.pdf>



drink alcohol, take drugs or smoke cigarettes if they were pregnant, and to avoid these substances if they could become pregnant in order to reduce risks.

The images and text used in the campaign aimed to answer questions about the negative consequences associated with alcohol consumption in pregnancy (e.g. “Why is drinking alcohol while I’m pregnant such a bad thing?”), and provide resources for women with alcohol dependency. Messages were developed in both English and Spanish.

The campaign used various media outlets, including billboard posters along transit routes, local newspapers and radio public service announcements. Printed material was distributed throughout the community. All media materials included a free-calling number for the New Jersey Family Health Line and the website address for the New Jersey FASD Diagnostic Centers. Partnerships were formed with other relevant local agencies.

Awopetu, et al. (2008) describe the implementation and evaluation of the pilot 2006 campaign undertaken in two counties of New Jersey, and note that a distinguishing feature of the campaign was a 24-hour referral service available for individuals to FASD diagnostic centres via the New Jersey Family Health Line. From July 2006 to December 2006, 49 FASD-related telephone calls were received by the Family Health Line, a small increase from the 5-6 calls received in a similar period in 2005-2006. The area that the calls originated from was wide-ranging compared with the focus areas of the campaign, although campaign materials were displayed along major transit routes.

A campaign based on this pilot began in 2007 and continues today. The website, launched in 2007, includes information on prenatal substance use and developmental issues, with a focus on alcohol. As part of the campaign, individuals concerned about their use of alcohol, cigarettes or illicit substances during pregnancy are encouraged to call the New Jersey Family Health Line or visit the campaign website. The site had over 74,000 visits in 2011, with a total number of 219,612 visits from 2007 to 2012.

In their five-year strategic plan, the The New Jersey Fetal Alcohol Spectrum Disorders and Other Perinatal Addictions Task Force (2012) describe their goal, by 2017, to *“increase the use of media and the websites beintheknownj.org and alcohol free pregnancynj.org to spread the prevention message of no substance use during pregnancy”* (p.14). The activities associated with this goal are to:

- ◆ incorporate social media strategies, such as social networks, and increase the use of webinars and podcasts, to allow for wider access to prevention messages
- ◆ increase general media outlet use - public service announcements, radio station advertisements, banners, billboards, television spots, general signage on transportation outlets, and a website awareness campaign.



049 (Vermont, United States)

<http://www.healthvermont.gov/adap/049/>

In 2013, the Vermont Department of Health launched an information outreach campaign called 049. The campaign informs women of childbearing age, and encourages health care providers to advise their patients about 049: to drink zero alcohol while trying to become pregnant, and throughout nine months of pregnancy.

Resources available include fact sheets, tip sheets, brochures, and posters. The campaign was launched state-wide with a news release, social media messages and web resources. Health Department district office staff were to deliver posters, buttons and print materials to help health care providers advise and support their patients in the decision not to drink⁶⁷.

Canada

Just found out you're pregnant? It's never too late to get the facts about alcohol and pregnancy (Ontario, Canada)

http://www.beststart.org/alcohol_fasd/index.htm

These resources were released in March 2008, and are designed primarily for women who drank alcohol before they knew they were pregnant. They provide information on safe levels of alcohol use, and where women can get helpful information

A range of awareness materials were developed both electronically and in print, and modest provincial media buys were undertaken, including mall advertisements and interior bus, street car and subway advertisements. The materials were tested with 34 women who were pregnant, or recently had a baby, in four Ontario communities. The focus groups were presented with four design concepts. Their input was used to refine the images, tone, wording, colours, and design of the materials⁶⁸.

The materials were developed by the Prevention Working Group of FASD Stakeholders of Ontario (including representation from Motherisk, Mothercraft, Best Start Resource Centre, AWARE, Union of Ontario Indians, Porcupine Health Unit, and Jane Hoy Initiatives), and were funded by the Public Health Agency of Canada, Ontario Region.

With Child Without Alcohol (Manitoba, Canada)

<http://www.withchildwithoutalcohol.com/>

With Child Without Alcohol was developed and implemented to provide women and the “villages” in their lives with information about alcohol use during pregnancy (Burgoyne, et al., 2006; Thurmeier, et al., 2011). The programme used television and radio commercials, posters, brochures, information kits, and a website to raise awareness about alcohol use during pregnancy.

⁶⁷ http://healthvermont.gov/advisory/2013/documents/051713_049.pdf

⁶⁸ http://www.beststart.org/alcohol_fasd/FocusTestReport.pdf



A post-campaign survey of 400 Manitoba residents, aged 18 to 45 years (75% were female) was undertaken in 2006 (Changemakers, 2006, *cited in* Thurmeier, et al., 2011). There was relatively high unaided recall of the advertisements (80% of respondents with a post-secondary education and 64% without a post-secondary education). Seventy-three percent recalled seeing a public service announcement on television, although only 7% recalled seeing a poster in a restaurant or bar. Ninety-three percent said that they had heard of FAS and 95% were aware that drinking during pregnancy could result in FAS. Behaviour change was not assessed.

Circle of Friends (Calgary, Canada)

<http://calgaryfasd.com/cfan-initiatives/circle-of-friends>

<http://humanservices.alberta.ca/documents/FAS0028-circle-of-friends-initiatives.pdf>

<http://humanservices.alberta.ca/documents/FAS0030-Help-A-Pregnant-Friend.pdf>

In 2002, the Calgary Fetal Alcohol Network, in partnership with the Calgary Health Region, developed a community-based social marketing campaign for the Calgary area about friends helping friends avoid alcohol when pregnant. A pilot programme was undertaken to inform the final campaign design and messaging process, and the campaign was launched in 2003.

The main messages are: *Friends helping friends*; *No alcohol is best when pregnant*; and *Friends caring for pregnant friends*. The main population of interest was over 244,000 youth aged 16 to 24 years old. The campaign aimed to empower and validate these peer groups in their role of support and influence with their pregnant friends. The campaign does not use scare or guilt tactics focused on the pregnant woman but rather attempts to alleviate the pressure that a pregnant women may feel if she is drinking or thinking about drinking during pregnancy.

The campaign included media and advertising strategies, community development on FASD issues within groups and organisations involved with 16 to 24 year olds, planning and undertaking community events, and the development of resources, including posters, pamphlets, handouts, tip sheets, media kits, and PowerPoint presentations.

No thanks, I'm pregnant (Saskatchewan, Canada)

<http://www.skprevention.ca/fetal-alcohol-spectrum-disorder/>

This education and awareness campaign included advertisements in bars, restaurants, and on billboards and buses, as well as brochures being placed in restaurants, bars, schools, university cafeterias and other locations. The *No thanks, I'm pregnant* campaign was tested with focus groups⁶⁹ and was designed to connect with a segment of the population at risk of having children with FASD - professional women with a higher income.

⁶⁹ Information sourced from conference presentation - http://www.youtube.com/watch?v=lx2VjS0mp_M



Australia

Pregnant Pause (Australia)

<http://pregnantpause.com.au/>

The *Pregnant Pause* campaign, launched in September 2013 by the Foundation for Alcohol Research and Education, challenges 500 Australians to “take a pause” from alcohol consumption during the pregnancy of a loved one - wife, partner, daughter, sister, friend, or work colleague. Fathers and fathers-to-be are a particular focus of the campaign.

Pregnant Pause aims to build a support system around pregnant couples to help them achieve a zero alcohol pregnancy together. Family, friends and colleagues can pledge either to join in the Pause themselves or donate to the cause. The campaign also aims to raise money to provide support to people living with FASD and their families.

The campaign uses social media, such as Twitter, Instagram and Facebook and has soon-to-be parents, Olympic swimmer, Elka Graham, and her husband, Olympic water polo champion, Tom Whalan, as ambassadors.

Strong Spirit Strong Future – Promoting healthy women and pregnancies (Western Australia)

<http://www.dao.health.wa.gov.au/Informationandresources/Engagingthecommunity/CommunityPrograms/StrongSpiritStrongFuture.aspx>

<http://www.healthinonet.ecu.edu.au/key-resources/programs-projects?pid=1042>

The *Strong Spirit Strong Future - Promoting healthy women and pregnancies* project in Western Australia started in 2010 and is funded under the Council of Australian Government’s “Closing the Gap” funding until 30 June 2014.

The campaign is part of the larger Western Australian *Alcohol Think Again* campaign⁷⁰, which aims to reduce alcohol-related harm by changing the drinking culture in Western Australia. The project, designed for Aboriginal people and communities, aims to raise awareness of the National Health and Medical Research Council’s 2009 guidelines about alcohol use when planning a pregnancy, during pregnancy and when breastfeeding.

The *Strong Spirit Strong Future* project's specific aims are to:

- ◆ raise Aboriginal people's awareness of the harms associated with alcohol and other drug use in pregnancy and with respect to sexual health
- ◆ improve awareness in regional communities of the harms associated with alcohol use in pregnancy

⁷⁰ <http://alcoholthinkagain.com.au/>



- ◆ improve professional awareness about alcohol use and FASD, and competence and confidence to deliver evidence-based early interventions, treatment and referral to women of childbearing age.

The project included the development of culturally-secure resources, a community awareness media campaign (television and radio advertisements), and training and education for health care providers and other workers. The target audiences for the media campaign included women, men, and the general community, and the messages have been designed for rural and urban audiences.

Strong Spirit Strong Mind promotes the uniqueness of Aboriginal culture as a central strength in guiding efforts to manage and reduce alcohol and other-drug related harm in Aboriginal communities. The campaign builds upon the Aboriginal Inner Spirit Model (Ngarlu Assessment Model)⁷¹ developed by Joseph ‘Nipper’ Roe, who belonged to the Karajarri and Yawuru people.

It was worth it, I didn’t drink when pregnant (South West of Western Australia)

<http://www.fare.org.au/community-projects/it-was-worth-it-i-didnt-drink-when-pregnant/>

This project promoted awareness of “zero alcohol during pregnancy” and knowledge of FASD and its consequences.

A television advertisement with the message, *If you’re pregnant or breastfeeding, there is no known ‘safe level’ of alcohol consumption*, was aimed at the whole community, based on work by a focus group which believed that if a woman is well supported by friends and family she will make the safest choice for her pregnancy by not drinking alcohol. The advertisements aired approximately 300 times during 2011. The advertisement was placed on YouTube, and the link was printed on the educational postcard. Between 1 January and 13 December 2011, there were 1,179 views of the advertisement online.

Other activities included 15 health education sessions held at schools, an expo display for hospital staff, mothers’ groups, and a Breastfeeding Association meeting. Twenty-thousand educational postcards were distributed to all Year 11 and 12 students in the South West of Western Australia.

Qualitative feedback suggested that the advertisements were generally very well received. Surveys completed by people who viewed the videos during health education sessions included comments that: the subject is very important; people in the community could relate to the various people shown in the advertisements; the main message was very clear; and the advertisements were too short. There was some negative feedback about the background music and the fact that the advertisements did not outline the risks associated with drinking while pregnant.

⁷¹ <http://alcoholthinkagain.com.au/Strong-Spirit-Strong-Mind.aspx>



It is safest not to drink alcohol while pregnant (Australia)

<http://www.drinkwise.org.au/alcohol-pregnancy/parents-to-be/>

In a joint initiative between the Australian Government's Department of Health and Ageing and DrinkWise Australia (independent, not-for-profit organisation established in 2005 by the alcohol industry), major liquor retailers included educational literature with alcohol purchases to increase consumer awareness and understanding on the risks of women drinking alcohol while pregnant

The brochure encourages consumers to get the facts from the DrinkWise website, which provides expert advice from Professor Alec Welsh (Head of Maternal-Fetal Medicine, Royal Hospital for Women, Sydney and a Fellow of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists).

Alcohol and pregnancy – practical information for parents (Australia)

<http://www.drinkwise.org.au/?s=pregnancy>

<http://drinkwisewebsite.s3-ap-southeast-1.amazonaws.com/2012/10/Drinkwise-Pregnancy-A3-Poster-for-GPs.pdf>

Practical information for parents on alcohol and pregnancy was distributed nationally to general practitioners and other health care providers as part of an education campaign initiated by DrinkWise Australia and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists.

The campaign included posters, brochures and an educational video. The campaign asked general practitioners to be proactive in discussing this issue with their patients. The Royal Australian College of General Practitioners helped to promote the education campaign and assisted in the distribution of materials through its network of members.

The *Alcohol and pregnancy – practical information for parents* education initiative is part of DrinkWise's broader community awareness campaign to help people make informed choices about drinking.

Northern Ireland

No Alcohol No Risk (Northern Ireland)

http://www.ascert.biz/Alcohol_and_Pregnancy.asp

<http://bluegatorcreative.com/national-launch-fasd-campaign/>

ASCERT (a Northern Ireland charity that addresses alcohol and drug misuse) launched this campaign to address the risks caused to unborn babies because of alcohol use during pregnancy. The campaign is funded by the Public Health Agency. The campaign involves high profile



advertising on billboards and adshells across the Belfast and South Eastern Trust areas, with information leaflets⁷² for the public and health care providers.

International

FASD Awareness Day

<http://www.fasday.com/>

International FASD Awareness Day (FASDay) is observed every year on 9 September in many countries, and is associated with events to raise awareness about the dangers of drinking during pregnancy and the plight of individuals and families who struggle with FASD.

FASDay was founded by Bonnie Buxton and Brian Philcox of FASworld⁷³ and Teresa Kellerman of Fasstar⁷⁴, with the first FASDay celebrated on 9/9/99. This day was chosen so that on the ninth day of the ninth month of the year, the world will remember that during the nine months of pregnancy a woman should abstain from alcohol. An example of a resource produced for FASD Awareness Day is a toolkit published by the Ministry of Health in British Columbia, Canada – *Promotion and prevention: Activities and resources*⁷⁵.

⁷² <http://www.ascert.biz/uploads/files/Ascertainment%20FASD%20Public%20Flyer.pdf>

⁷³ <http://www.fasworld.com/>

⁷⁴ <http://fasstar.com/>

⁷⁵ <http://www.health.gov.bc.ca/women-and-children/pdf/fasd-toolkit.pdf>



Appendix 2: References

AER Foundation [2011]. *Alcohol product labelling: Health warning labels and consumer information*. Deakin ACT: Foundation for Alcohol Research and Education. Retrieved 1 May 2014, from http://www.fare.org.au/wp-content/uploads/2011/07/AER-Policy-Paper_FINAL.pdf

Agopian, A.J., Lupo, P.J., Herdt-Losavio, M.L., Langlois, P.H., Rocheleau, C.M., Mitchell, L.E. & the National Birth Defects Prevention Study (2012). Differences in folic acid use, prenatal care, smoking, and drinking in early pregnancy by occupation. *Preventive Medicine*, 55, 341-345.

Alcohol Healthwatch / University of Otago [2012]. *Pregnancy & alcohol cessation toolkit: An education resource for health professionals*. [Wellington]: Ako Aotearoa. Retrieved 14 May 2014, from <http://ako.aotearoa.ac.nz/projects/pact>

Aliyu, M.H., Wislon, R.E., Zoorob, R., Brown, K., Alio, A.P., Clayton, H. & Salihu, H.M. (2009). Prenatal alcohol consumption and fetal growth restriction: Potentiation effect by concomitant smoking. *Nicotine & Tobacco Research*, 11(1), 36-43. Retrieved 17 April 2014, from http://www.frfasd.org/documents/Research%20Articles/SW_RTCl.pdf

Anderson, A.E., Hure, A.J., Powers, J.R., Kay-Lambkin, F.J. & Loxton, D.J. (2012). Determinants of pregnant women's compliance with alcohol guidelines: A prospective cohort. *BMC Public Health*, 12, 777. Retrieved 28 March 2014, from <http://www.biomedcentral.com/1471-2458/12/777>

Anderson, A.E., Hure, A.J., Forder, P., Powers, J.R., Kay-Lambkin, F.J. & Loxton, D.J. (2013). Predictors of antenatal alcohol use among Australian women: A prospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*, 120, 1366-1374.

Anderson, A.E., Hure, A.J., Forder, P., Powers, J.R., Kay-Lambkin, F.J. & Loxton, D.J. (2014). Risky drinking patterns are being continued into pregnancy: A prospective cohort study. *PLoS ONE* 9(7): e86171. Retrieved 28 March 2014, from <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0086171>

Anderson, B.A., Dang, E.P., Floyd, L., Sokol, R., Mahoney, J. & Schulkin, J. (2010). Knowledge, opinions and practice patterns of obstetrician-gynecologists regarding their patients' use of alcohol. *Journal of Addiction Medicine*, 4(2), 114-121.

Arch, J.J. (2013). Pregnancy-specific anxiety: Which women are highest and what are the alcohol-related risks? *Comprehensive Psychiatry*, 54(3), 217-228. Retrieved 28 March 2014, from <http://psych.colorado.edu/~clinical/arch/docs/Arch,%20pregnancy%20specific%20anxiety,%202012.pdf>

Awopetu, O., Brimacombe, M. & Cohen, D. (2008). Fetal alcohol syndrome pilot media intervention in New Jersey. *Canadian Journal of Clinical Pharmacology*, 15(1), e124-e131. Retrieved 26 March 2014, from http://www.cjcp.ca/pdf/FARJFAS7006_brimacombe_e124-e131.pdf



Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., Grube, J., Hill, L., Holder, H., Homel, R., Livingston, M., Österberg, E., Rehm, J., Room, R. & Rossow, I. (2010). *Alcohol: no ordinary commodity – research and public policy*. Oxford: Oxford University Press.

Barry, K.L., Caetano, R., Chang, G., DeJoseph, M.C., Miller, L.A., O'Connor, M.J., Olson, H.C., Floyd, R.L., Weber, M.K., DeStefano, F., Dolina, S., Leeks, K., National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect (2009). *Reducing alcohol-exposed pregnancies: A report of the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect*. Atlanta, GA: Centers for Disease Control and Prevention. Retrieved 27 March 2014, from <http://www.cdc.gov/ncbddd/fasd/pastactivities-taskforce.html>

Bazzo, S., Battistella, G., Riscica, P., Moino, G., Marini, F., Geromel, M. & Czerwinsky, L. (2012). Evaluation of the impact of the image used in a communication campaign to raise awareness about the effects of alcohol use during pregnancy. *Alcohol and Alcoholism*, 47(6), 657-662. Retrieved 28 March 2014, from <http://alcalc.oxfordjournals.org/content/47/6/657.full>

Bazzo, S., Marini, F. & Black, D. (2014). An international campaign to raise awareness of the risks of drinking in pregnancy. *International Journal of Alcohol and Drug Research*, 3(1), 113-116. Retrieved 28 March 2014, from <http://www.ijadr.org/index.php/ijadr/article/view/175>

Beijers, C., Burger, H., Verbeek, T., Bockting, C.L.H. & Ormel, J. (2014a). Continued smoking and continued alcohol consumption during early pregnancy distinctively associated with personality. *Addictive Behaviors*, 39, 980-986.

Beijers, C., Ormel, J., Meijer, J.L., Verbeek, T., Bockting, C.L.H. & Burger, H. (2014b) Stressful events and continued smoking and continued alcohol consumption during mid-pregnancy. *PLoS ONE*, 9(1), e86359. Retrieved 28 March 2014, from <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0086359>

Bottorff, J.L., Poole, N., Kelly, M.T., Greaves, L., Marcellus, L. & Jung, M. (2014). Tobacco and alcohol use in the context of adolescent pregnancy and postpartum: A scoping review of the literature. *Health and Social Care in the Community*. Advance online publication. doi: 10.1111/hsc.12091. Retrieved 11 April 2014, from <http://onlinelibrary.wiley.com/doi/10.1111/hsc.12091/full>

Burgoyne, W. (2006). *What we have learned: Key Canadian FASD awareness campaigns*. Ottawa: Public Health Agency of Canada. Retrieved 1 April 2014, from <http://www.phac-aspc.gc.ca/publicat/fasd-ac-etcaf-cs/index-eng.php>

Burgoyne, W., Willet, B. & Armstrong, J. (2006). Reaching women of childbearing age with information about alcohol and pregnancy through a multi-level health communication campaign. *Journal of FAS International*, 4, e17. Retrieved 1 April 2014, from http://www.motherisk.org/JFAS_documents/JFAS_e17F_9_19_06_6008.pdf



Callinan, S. & Room, R. (2012). *Alcohol consumption during pregnancy: Results from the 2010 National Drug Strategy Household Survey*. Deakin West, ACT: Foundation for Alcohol Research & Education. Retrieved 4 April 2014, from <http://www.fare.org.au/wp-content/uploads/2011/07/Alcohol-Consumption-During-Pregnancy-Final.pdf>

Callinan, S. & Ferris, J. (2014). Trends in alcohol consumption during pregnancy in Australia, 2001–2010. *International Journal of Alcohol and Drug Research*, 3(1), 17-24. Retrieved 28 March 2014, from <http://www.ijadr.org/index.php/ijadr/article/view/108>

Cameron, C.M., Davey, T.M., Kendall, E., Wilson, A. & McClure, R.J. (2013). Changes in alcohol consumption in pregnant Australian women between 2007 and 2011. *Medical Journal of Australia*, 199, 355-357. Retrieved 30 April 2014, from <https://www.mja.com.au/journal/2013/199/5/changes-alcohol-consumption-pregnant-australian-women-between-2007-and-2011>

ChangeMakers (2006). *Summary of advertising awareness study*. Winnipeg: Manitoba Liquor Control Commission.

Cheng, D., Kettinger, L., Uduhiri, K. & Hurt, L. (2011a). Alcohol consumption during pregnancy: Prevalence and provider assessment. *Obstetrics and Gynecology*, 117(2, part 1), 212-217. Retrieved 30 April 2014, from http://journals.lww.com/greenjournal/Fulltext/2011/02000/Alcohol_Consumption_During_Pregnancy_Prevalence.3.aspx

Cheng, D., Kettinger, L., D'Agati, D., Lockhart, P.J. & Hurt, L. (2011b). *Alcohol use pre- and late-pregnancy: Epidemiology and comments from postpartum surveys* (pp.105-127). In: J.D. Hoffman (Ed.). *Pregnancy and Alcohol Consumption*. New York: Nova Science.

Cismaru, M., Deshpande, S., Thurmeier, R., Lacack, A.M. & Agrey, N. (2010). Preventing fetal alcohol spectrum disorders: The role of Protection Motivation Theory. *Health Marketing Quarterly*, 27, 66–85.

Clarren, S., Salmon, A. & Jonsson, E. (2011). Introduction to *Prevention of Fetal alcohol spectrum disorder FASD*, by S. Clarren, A. Salmon & E. Jonsson (Eds.), pp.1-25. Weinheim: Wiley-VCH Verlag.

Connor, J. & Casswell, S. (2012). Alcohol-related harm to others in New Zealand: Evidence of the burden and gaps in knowledge. *New Zealand Medical Journal*, 125(1360), 11-27. Retrieved 1 April 2014, from <http://journal.nzma.org.nz/journal/125-1360/5308/>

Council for a Tobacco Free Ontario, Program Training and Consultation Centre & The Health Communication Unit (2000). *Understanding and using fear appeals for tobacco control*. Toronto: Council for a Tobacco Free Ontario, Program Training and Consultation Centre and The Health Communication Unit. Retrieved 1 April 2014, from <http://www.thcu.ca/infoandresources/publications/fear%20appeals%20-%20web%20version.pdf>



Deshpande S., Basil, M., Basford, L., Thorpe, K., Piquette-Tomei, N., Droessler, J., Cardwell, K., Williams, R.J. & Bureau, A. (2005). Promoting alcohol abstinence among pregnant women: potential social change strategies. *Health Marketing Quarterly*, 23(2), 45-67.

Donovan, R. & Henley, N. (2010). *Principles and practice of social marketing: An international perspective*. Cambridge: Cambridge University Press.

Drug and Alcohol Office, (2011). *The Western Australian Fetal Alcohol Spectrum Disorder (FASD) Prevention Aboriginal Consultation Forum 2010: Strong Spirit Strong Future - Promoting healthy women and pregnancies*. Retrieved 1 May 2014, from <http://www.dao.health.wa.gov.au/Informationandresources/Engagingthecommunity/CommunityPrograms/StrongSpiritStrongFuture.aspx>

Drug and Alcohol Office, Western Australia. (n.d.). *FASD prevention for Western Australia: A Drug and Alcohol Office perspective*. Perth: Drug and Alcohol Office. Retrieved 27 March 2014, from http://alcoholpregnancy.childhealthresearch.org.au/media/466344/focus_on_fasd_prevention_forum_dao_gary_kirby.pdf

Elek, E., Harris, S.L., Squire, C.M., Margolis, M., Weber, M.K., Dang, E.P. & Mitchell, B. (2013). Women's knowledge, views, and experiences regarding alcohol use and pregnancy: Opportunities to improve health messages. *American Journal of Health Education*, 44(4), 177-190.

Elliott, L., Coleman, K., Suebwongpat, A. & Norris, S. (2008). *Fetal alcohol spectrum disorders (FASD): Systematic reviews of prevention, diagnosis and management* (HSAC Report, 1:9). Christchurch: Health Services Assessment Collaboration. Retrieved 3 April 2014, from http://www.health.govt.nz/system/files/documents/publications/hsac07_fasd_finalv2.pdf

Ethen, M.K., Ramadhani, T.A., Scheuerle, A.E., Canfield, M.A., Wyszynski, D.F., Druschel, C.M. & Romitti, P.A. (2009). Alcohol consumption by women before and during pregnancy. *Maternal and Child Health Journal*, 13, 274-285.

Evans, W.D., Wallace, J.L. & Snider, J. (2012). Pilot evaluation of the text4baby mobile health program. *BMC Public Health*, 12, 1031. Retrieved 8 April 2014, from <http://www.biomedcentral.com/1471-2458/12/1031>

Fanslow, J., Silva, M., Robinson, E. & Whitehead, A. (2008). Violence during pregnancy: Associations with pregnancy intendedness, pregnancy-related care, and alcohol and tobacco use among a representative sample of New Zealand women. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 48, 398-404.

Fast Consulting (2006). *FASD prevention – Post-campaign survey: Final report summary*. Saskatoon: Fast Consulting. Retrieved 1 May 2014, from <http://www.gov.sk.ca/Default.aspx?DN=cf861306-d5a7-40f7-89d5-27af3634c1b9>

Foundation for Alcohol Research and Education (FARE) (2011). *Alcohol health labelling: Community perceptions of the FARE and DrinkWise model alcohol labels*. Deakin West ACT:



Foundation for Alcohol Research and Education. Retrieved 1 April 2014, from <http://www.fare.org.au/wp-content/uploads/2011/07/FARE-Labeling-Market-Testing-Report.pdf>

Foundation for Alcohol Research and Education (FARE) (2013). *The Australian Fetal Alcohol Spectrum Disorders Action Plan 2013–2016*. Deakin West ACT: Foundation for Alcohol Research and Education. Retrieved 1 April 2014, from <http://www.fare.org.au/wp-content/uploads/2011/07/FARE-FASD-Plan.pdf>

France, K.E. (2011). *Creating persuasive messages to promote abstinence from alcohol during pregnancy*. PhD thesis, Edith Cowan University, Western Australia.

France, K.E., Donovan, R.J., Bower, C., Elliott, E.J., Payne, J.M., D'Antoine, H. & Bartu, A.E. (2014). Messages that increase women's intentions to abstain from alcohol during pregnancy: Results from quantitative testing of advertising concepts. *BMC Public Health*, 14, 30. Retrieved 27 March 2014, from <http://www.biomedcentral.com/1471-2458/14/30>

France, K.E., Donovan, R.J., Henley, N., Bower, C., Elliott, E.J., Payne, J.M., D'Antoine, H. & Bartu, A.E. (2013). Promoting abstinence from alcohol during pregnancy: Implications from formative research. *Substance Use & Misuse*, 48(14), 1509-1521.

Glik, D., Prelip, M., Myerson, A. & Eilers, K. (2008). Fetal alcohol syndrome prevention using community-based narrowcasting campaigns. *Health Promotion Practice*, 9(1), 93-103.

Gray, J. & Nosa, V. (2009). Tau fifine fiafia: The binge drinking behaviours of nine New Zealand born Niuean women living in Auckland. *Pacific Health Dialog*, 15(1), 104-111. Retrieved 27 March 2014, from <http://www.pacifichealthdialog.org.fj/>

Grigg, M., Waa, A. & Bradbrook, S.K. (2008). Response to an indigenous smoking cessation media campaign – It's about whānau. *Australian and New Zealand Journal of Public Health*, 32(6), 559-564.

Hammer, R. & Inglin, S. (2014). 'I don't think it's risky, but...': Pregnant women's risk perceptions of maternal drinking and smoking. *Health, Risk & Society*, 16(1), 22-35.

Hanson, J.D., Winberg, A. & Elliott, A. (2012). Development of a media campaign on fetal alcohol spectrum disorders for Northern Plains American Indian communities. *Health Promotion Practice*, 13, 842.

Health Communication Unit (2004). *Implementing THCU's Twelve Steps: Best Start's campaign on alcohol and pregnancy*. Toronto: Health Communication Unit, Centre for Health Promotion, University of Toronto. Retrieved 14 April 2014, from http://www.beststart.org/apcampaign/BestStart-Case_Study3_v10.pdf

Ho, R. & Jacquemard, R. (2009). Maternal alcohol use before and during pregnancy among women in Taranaki, New Zealand. *New Zealand Medical Journal*, 122(1306), 20-29. Retrieved 3 April 2014, from <http://journal.nzma.org.nz/journal/122-1306/3883/content.pdf>



House of Representatives Standing Committee on Social Policy and Legal Affairs, Parliament of the Commonwealth of Australia (2012). *FASD: The hidden harm - Inquiry into the prevention, diagnosis and management of Fetal Alcohol Spectrum Disorders*. Canberra: Commonwealth of Australia. Retrieved 25 April 2014, from [http://www.aph.gov.au/Parliamentary Business/Committees/House of Representatives Committees?url=spla/fasd/report.htm](http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=spla/fasd/report.htm)

Huckle, T., Yeh, L.C., Lin, J. & Jensen, V. (2013). *Trends in alcohol consumption and alcohol-related harms among females in New Zealand: Research report commissioned by the Health Promotion Agency*. Wellington: Health Promotion Agency. Retrieved 26 March 2014, from <http://www.hpa.org.nz/research-library/research-publications/trends-in-alcohol-consumption-and-alcohol-related-harms-among-females-in-new-zealand>

Hutchinson, D., Moore, E.A., Breen, C., Burns, L. & Mattick, R.P. (2013). Alcohol use in pregnancy: Prevalence and predictors in the Longitudinal Study of Australian Children. *Drug and Alcohol Review*, 32, 475-482.

Ingersoll, K.S., Hetteema, J.E., Cropsey, K.L. & Jackson, J.P. (2011). Preconception markers of dual risk for alcohol and smoking exposed pregnancy: Tools for primary prevention. *Journal of Women's Health*, 20(11), 1627-1633. Retrieved 26 March 2014, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3216067/>

International Center for Alcohol Policies (2013). *Health warning labels (ICAP Issues Briefings)*. Washington, D.C.: International Center for Alcohol Policies. Retrieved 22 April 2014, from <http://www.icap.org/PolicyTools/ICAPIssuesBriefings/>

Jones, S.C., Telenta, J., Shorten, A. & Johnson, K. (2011). Midwives and pregnant women talk about alcohol: What advice do we give and what do they receive. *Midwifery*, 27, 489-496.

Jones, S.C. & Telenta, J. (2012). What influences Australian women to not drink alcohol during pregnancy? *Australian Journal of Primary Health*, 18, 68-73.

Jonsson, E., Salmon, A. & Warren, K.R. (2014). The international charter on prevention of fetal alcohol spectrum disorder. *The Lancet Global Health*, 2(3), e135-e137. Retrieved 27 March 2014, from [http://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(13\)70173-6/fulltext](http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(13)70173-6/fulltext)

Kitsantas, P., Gaffney, K.F., Wu, H. & Kastello, J.C. (2014). Determinants of alcohol cessation, reduction and no reduction during pregnancy. *Archives of Gynecology and Obstetrics*, 289(4), 771-779.

Lowe, J.B., Baxter, L., Hirokawa, R., Pearce, E. & Peterson, J.J. (2010). Description of a media campaign about alcohol use during pregnancy. *Journal of Studies on Alcohol and Drugs*, 71(5), 739-741.



Loxton, D., Chojenta, C., Anderson, A.E., Powers, J.R., Shakeshaft, A. & Burns, L. (2013). Acquisition and utilization of information about alcohol use in pregnancy among Australian pregnant women and service providers. *Journal of Midwifery & Women's Health*, 58, 523-530.

Mallard, S.R., Connor, J.L. & Houghton, L.A. (2013). Maternal factors associated with heavy periconceptional alcohol intake and drinking following pregnancy recognition: A post-partum survey of New Zealand women. *Drug and Alcohol Review*, 32, 389-397.

Maloney, E., Hutchinson, D., Burns, L., Mattick, R.P. & Black, E. (2011). Prevalence and predictors of alcohol use during pregnancy and breastfeeding among Australian women. *Birth*, 38(1), 3-9.

Margerison-Zilko, C. (2014). Economic contraction and maternal health behaviours during pregnancy in a national sample of U.S. women. *Annals of Epidemiology*. Advance online publication. doi: 10.1016/j.annepidem.2014.02.014.

McBride, N., Carruthers, S. & Hutchinson, D. (2012). Reducing alcohol use during pregnancy: Listening to women who drink as an intervention starting point. *Global Health Promotion*, 19(2), 6-18.

Mellingen, S., Torsheim, T. & Thuen, F. (2013). Changes in alcohol use and relationship satisfaction in Norwegian couples during pregnancy. *Substance Abuse Treatment, Prevention, and Policy*, 8, 5. Retrieved 31 March 2014, from <http://www.substanceabusepolicy.com/content/8/1/5>

Mengel, M.B., Ulione, M., Wedding, D., Jones, E.T. & Shurn, D. (2005). Increasing FASD knowledge by a targeted media campaign: Outcome determined by message frequency. *Journal of FAS International*, 3, e13. Retrieved 27 March 2014, from http://www.motherisk.org/JFAS_documents/JFAS5000_e13.pdf

Meschke, L.L., Holl, J. & Messelt, S. (2013). Older not wiser: Risk of prenatal alcohol use by maternal age. *Maternal and Child Health Journal*, 17(1), 147-155.

Milne, S., Sheeran, P. & Orbell, S. (2000). Prediction and intervention in health-related behavior: A meta-analytic review of Protection Motivation Theory. *Journal of Applied Social Psychology*, 30, 106-143.

Ministry of Health (2010). *Alcohol and pregnancy: A practical guide for health professionals*. Wellington: Ministry of Health. Retrieved 28 March 2014, from <http://www.health.govt.nz/publication/alcohol-and-pregnancy-practical-guide-health-professionals>

Ministry of Health (2007). *Alcohol use in New Zealand: Analysis of the 2004 New Zealand health behaviours survey – alcohol use*. Wellington: Ministry of Health. Retrieved 26 March 2014, from <http://www.health.govt.nz/>

Ministry of Health (2009). *Alcohol use in New Zealand: Key results of the 2007/08 New Zealand Alcohol and Drug Use Survey*. Wellington: Ministry of Health. Retrieved 26 March 2014, from



<http://www.health.govt.nz/publication/alcohol-use-new-zealand-key-results-2007-08-new-zealand-alcohol-and-drug-use-survey>

Ministry of Health (2013). *Hazardous drinking in 2011/12: Findings from the New Zealand Health Survey*. Wellington: Ministry of Health. Retrieved 17 April 2014, from <http://www.health.govt.nz/system/files/documents/publications/12-findings-from-the-new-zealand-health-survey.pdf>

Morton, S.M.B., Atatoa Carr, P.E., Bandara, D.K., Grant, C.C., Ivory, V.C., Kingi, T.R., Liang, R., Perese, I.M., Peterson, E., Pryor, J.E., Reese, E., Robinson, E.M., Schmidt, J.M. & Waldie, K.E. (2010). *Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Report 1: Before we are born*. Auckland: Growing Up in New Zealand. Retrieved 26 March 2014, from <http://www.growingup.co.nz/pdf/reports/report01.pdf>

Mullally, A., Cleary, B.J., Barry, J., Fahey, T.P. & Murphy, D.J. (2011). Prevalence, predictors and perinatal outcomes of peri-conceptional alcohol exposure-retrospective cohort study in an urban obstetric population in Ireland. *BMC Pregnancy and Childbirth*, 11, 27. Retrieved 26 March 2014, from <http://www.biomedcentral.com/1471-2393/11/27>

Murphy, D.J., Mullally, A., Cleary, B.J., Fahey, T. & Barry, J. (2013). Behavioural change in relation to alcohol exposure in early pregnancy and impact on perinatal outcomes - a prospective cohort study. *BMC Pregnancy and Childbirth*, 13, 8. Retrieved 26 March 2014, from <http://www.biomedcentral.com/1471-2393/13/8>

National Drug Research Institute (2014a). *National Indigenous FASD resources project: Snapshot for communities*. Perth: National Drug Research Institute. Retrieved 25 April 2014, from <http://www.healthinonet.ecu.edu.au/key-resources/promotion-resources?lid=26967>

National Drug Research Institute (2014b). *National Indigenous FASD resources project: Snapshot for health professionals*. Perth: National Drug Research Institute. Retrieved 25 April 2014, from <http://www.healthinonet.ecu.edu.au/key-resources/practice-resources/?lid=26968>

Nguyen, T.T., Coppens, J. & Riley, E. (2011). Prenatal alcohol exposure, FAS and FASD: An introduction. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp.1-13). Weinheim: Wiley-Blackwell.

Niclasen, J. (2014). Drinking or not drinking in pregnancy: The multiplicity of confounding influences. *Alcohol and Alcoholism*, 49(3), 349-355.

Norsask Consumer Interviewing Services (2005). *FASD prevention pre-campaign survey: June 2005*. Saskatoon: Norsask Consumer Interviewing Services. Retrieved 1 May 2014, from <http://www.gov.sk.ca/Default.aspx?DN=5644cb06-e55d-4098-b7cc-96241183e09f>

Ospina, M., Moga, C., Dennett, L. & Harstall, C. (2011). A systematic review of the effectiveness of preventive approaches for fetal alcohol spectrum disorder. In: S. Clarren, A. Salmon & E. Jonsson (Eds.), *Prevention of fetal alcohol spectrum disorder* (pp.99-335). Weinheim: Wiley-VCH Verlag.



Parackal, S., Parackal, M., Ferguson, E. & Harraway, J. (2006). *Awareness of the effects of alcohol use during pregnancy among New Zealand women of childbearing age*. [Wellington]: Alcohol Advisory Council and Ministry of Health.

Parackal, S. M., Parackal, M. K., Harraway, J. A. & Ferguson, E.L. (2009). Opinions of non-pregnant New Zealand women aged 16–40 years about the safety of alcohol consumption during pregnancy. *Drug and Alcohol Review*, 28, 135-141.

Parackal, S.M., Parackal, M.K. & Harraway, J.A. (2013). Prevalence and correlates of drinking in early pregnancy among women who stopped drinking on pregnancy recognition. *Maternal and Child Health Journal*, 17(3), 520-529.

Parackal, S.M., Parackal, M.K. & Harraway, J.A. (2010). Warning labels on alcohol containers as a source of information on alcohol consumption in pregnancy among New Zealand women. *International Journal of Drug Policy*, 21, 302-305.

Payne, J.M., France, K.E., Henley, N., D'Antoine, H.A., Bartu, A.E., O'Leary, C.M., Elliott, E.J., Bower, C. & Geelhoed, E. (2011). RE-AIM evaluation of the Alcohol and Pregnancy Project: Educational resources to inform health professionals about prenatal alcohol exposure and fetal alcohol spectrum disorder. *Evaluation & the Health Professions*, 34(1), 57-80.

Peadon, E., Payne, J., Henley, N., D'Antoine, H., Bartu, A., O'Leary, C., Bower, C. & Elliott, E.J. (2010). Women's knowledge and attitudes regarding alcohol consumption in pregnancy: A national survey. *BMC Public Health*, 10, 510. Retrieved 26 March 2014, from <http://www.biomedcentral.com/1471-2458/10/510>

Peadon, E., Payne, J., Henley, N., D'Antoine, H., Bartu, A., O'Leary, C., Bower, C. & Elliott, E.J. (2011). Attitudes and behaviour predict women's intention to drink alcohol during pregnancy: the challenge for health professionals. *BMC Public Health*, 11, 584. Retrieved 26 March 2014, from <http://www.biomedcentral.com/1471-2458/11/584>

Pfinder, M., Kunst, A.E., Feldmann, R., van Eijnsden, M. & Vrijotte, T.G.M. (2014). Educational differences in continuing or restarting drinking in early and late pregnancy: Role of psychological and physical problems. *Journal of Studies on Alcohol and Drugs*, 75(1), 47-55.

Poole, N. (2011). Bringing a women's health perspective to FASD prevention. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp.161-173). Weinheim: Wiley-Blackwell.

Population Research Laboratory, University of Alberta (2009). *Fetal alcohol spectrum disorder awareness campaign project: Literature review*. Edmonton: University of Alberta. Retrieved 14 April 2014, from <http://fasd.alberta.ca/documents/FASD-Aware-Camp-Lit-Review.pdf>

Powers, J.R., McDermott, L.J., Loxton, D.J. & Chojenta, C.L. (2013). A prospective study of prevalence and predictors of concurrent alcohol and tobacco use during pregnancy. *Maternal and Child Health Journal*, 17(1), 76-84.



Prevention Working Group of FASD Stakeholders for Ontario (2009). *Implications for Ontario: Awareness of FASD in 2009*. Toronto: Public Health Agency of Canada with the Best Start Resource Centre. Retrieved 8 April 2014, from http://www.beststart.org/resources/pdfs/implications_report_09.pdf

Rankine, J., Gregory, A., Tonks, A. & Thompson-Evans, T. (2013). *Women and alcohol in Aotearoa/New Zealand / Te waipiro me ngā wāhine i Aotearoa*. [Wellington]: Alcohol Healthwatch and Women's Health Action. Retrieved 27 March 2014, from <http://www.womens-health.org.nz/uploads/20131203%20Women%20and%20alcohol%20literature%20review.pdf>

Raymond, N., Beer, C., Glazebrook, C & Sayal, K. (2009). Pregnant women's attitudes towards alcohol consumption. *BMC Public Health*, 9, 175. Retrieved 27 March 2014, from <http://www.biomedcentral.com/1471-2458/9/175>

Remick, A.P. & Kendrick, J.S. (2013). Breaking new ground: The Text4baby Program. *American Journal of Health Promotion*, 27(3), S4-S6. Retrieved 6 April 2014, from <http://ajhpcontents.org/doi/pdf/10.4278/ajhp.27.3.c2>

Rentner, T.L., Dixon, L.D. & Lengel, L. (2011). Critiquing fetal alcohol syndrome health communication campaigns targeted to American Indians. *Journal of Health Communication: International Perspectives*, 17(1), 6-21.

Salmon, A. & Clarren, S. (2011). FASD research in primary, secondary, and tertiary prevention: Building the next generation of health and social policy responses. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp.389-398). Weinheim: Wiley-Blackwell.

Schluter, P.J., Tautolo, E-S., Taylor S. & Paterson, J. (2013). Alcohol consumption by parents of Pacific families residing in New Zealand: Findings from the Pacific Islands Families Study. *Alcohol*, 47, 241-248.

Skagerström, J., Alehagen, S., Häggström-Nordin, E., Årestedt, K. & Nilsen, P. (2013). Prevalence of alcohol use before and during pregnancy and predictors of drinking during pregnancy: A cross sectional study in Sweden. *BMC Public Health*, 13, 780. Retrieved 2 May 2014, from <http://www.biomedcentral.com/1471-2458/13/780>

Skagerström, J., Chang, G. & Nilsen, P. (2011). Predictors of drinking during pregnancy: A systematic review. *Journal of Women's Health*, 20(6), 901-913.

Stene-Larsen, K., Torgersen, L., Strandberg-Larsen, K., Normann, P.T. & Vollrath, M.E. (2013). Impact of maternal negative affectivity on light alcohol use and binge drinking during pregnancy. *Acta Obstetrica et Gynecologica Scandinavica*, 92, 1388-1394.

Strandberg-Larsen, K., Nielsen, N.R., Andersen, A-M.N., Olsen, J. & Grønbaek, M. (2008). Characteristics of women who binge drink before and after they become aware of their pregnancy. *European Journal of Epidemiology*, 23(8), 565-572.



Stuart, K. (2009). *Trading off: A grounded theory on how Māori women negotiate drinking alcohol during pregnancy*. Master of Public Health thesis, Massey University, Wellington. Retrieved 27 March 2014, from

<http://muir.massey.ac.nz/bitstream/handle/10179/1211/02whole.pdf;jsessionid=FA0251A17A8066149656A1A8254104FB?sequence=1>

Stuart, K. (2013, November). *Trading off: Māori women negotiating decisions about alcohol and pregnancy*. Paper presented at the Australasian FASD Conference, Brisbane, Australia.

Terplan, M., Cheng, D. & Chisolm, M.S. (2014). The relationship between pregnancy intention and alcohol use behaviour: An analysis of PRAMS data. *Journal of Substance Abuse Treatment*, 46(4), 506-501.

Thanh, N.X. & Jonsson, E. (2010). Drinking alcohol during pregnancy: Evidence from Canadian Community Health Survey 2007/2008. *Journal of Population Therapeutics and Clinical Pharmacology*, 17(2), e302-307. Retrieved 7 April 2014, from

<http://www.ncbi.nlm.nih.gov/pubmed/20729565>

Thanh, N.X., Jonsson, E., Dennett, L. & Jacobs, P. (2011). Costs of FASD. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp.45-69). Weinheim: Wiley-Blackwell.

The Governor's Council on the Prevention of Developmental Disabilities and The New Jersey Fetal Alcohol Spectrum Disorders and Other Perinatal Addictions Task Force (2012). *Be In The Know: A 5-year strategic plan to prevent perinatal alcohol exposure and other addictions in New Jersey*. Trenton, NJ: New Jersey Department of Human Services. Retrieved 4 April 2014, from <http://www.nj.gov/humanservices/opmrd/news/BeintheKnowFINAL12.12.pdf>

Thomas, G., Gonneau, G., Poole, N. & Cook, J. (2014). The effectiveness of alcohol warning labels in the prevention of Fetal Alcohol Spectrum Disorder: A brief review. *International Journal of Alcohol and Drug Research*, 3(1), 91-103. Retrieved 8 April 2014, from

<http://www.ijadr.org/index.php/ijadr/article/download/126/237>

Thomsen, D. (2013). *Alcohol use and pregnancy: The beliefs and behaviour of Minnesota women*. St Paul: Wilder Research. Retrieved 15 April 2014, from <https://www.mofas.org/2013/10/alcohol-use-and-pregnancy/>

Thurmeier, R., Deshpande, S., Lavack, A., Agrey, N. & Cismaru, M. (2011). Next steps in FASD primary prevention. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp. 175-191). Weinheim: Wiley-Blackwell.

Tough, S.C. & Jack, M. (2011). Frequency of FASD in Canada, and what this means for prevention efforts. In: E.P. Riley, S. Clarren, J. Weinberg & E. Jonsson (Eds.), *Fetal Alcohol Spectrum Disorder: Management and policy perspectives of FASD* (pp. 27-43). Weinheim: Wiley-Blackwell.



Tough, S., Tofflemire, K., Clarke, M. & Newburn-Cook, C. (2006). Do women change their drinking behaviours while trying to conceive? An opportunity for preconception counselling. *Clinical Medicine & Research*, 4(2), 97-105. Retrieved 9 April 2014, from

<http://www.clinmedres.org/content/4/2/97.long>

Walker, M.J., Al-Sahab, B., Islam, F. & Tamim, H. (2011). The epidemiology of alcohol utilization during pregnancy: An analysis of the Canadian Maternity Experiences Survey (MES). *BMC Pregnancy and Childbirth*, 11, 52. Retrieved 27 March 2014, from

<http://www.biomedcentral.com/1471-2393/11/52>

Wilkinson, C., Allsop, S., Cail, D., Chikritzhs, T., Daube, M., Kirby, G. & Mattick, R. (2009). *Alcohol warning labels: Evidence of impact on alcohol consumption amongst women of childbearing age*. [Canberra]: Food Standards Australia New Zealand. Retrieved 27 March 2014, from

<http://www.foodstandards.govt.nz/about/ips/foilog/documents/Curtin%20University%20of%20Technology%20Alcohol%20Warning%20Labels.pdf>

Wilson, N. (2004). *The impact of television advertising campaigns on calls to the New Zealand Quitline*. [Wellington]: The Quit Group. Retrieved 23 April 2014, from

<http://www.quit.org.nz/file/research/publicationsAndPresentations/MediaStudyOfQuitline.pdf>

Wilson, N., Grigg, M., Graham, L. & Cameron, G. (2005). The effectiveness of television advertising campaigns on generating calls to a national Quitline by Māori. *Tobacco Control*, 14, 284-286. Retrieved 8 April 2014, from <http://tobaccocontrol.bmj.com/content/14/4/284.full>

Witte, K. & Allen, M. (2000). A meta-analysis of fear-appeals: Implications for effective public health campaigns. *Health Educator and Behaviour*, 27, 591-615. Retrieved 8 April 2014, from

<http://www.mnt.ee/public/Fear.pdf>

World Health Organization (2010). *Global strategy to reduce the harmful use of alcohol*. Geneva: World Health Organization. Retrieved 3 April 2014, from

http://www.who.int/substance_abuse/alcstratenglishfinal.pdf?ua=1

Wouldes, T. (2009). *What health professionals know and do about alcohol and other drug use during pregnancy*. [Auckland]: Alcohol Healthwatch. Retrieved 3 June 2014, from

<http://www.ahw.org.nz/page.php?p=172&fp=152>

Young, N.K., Gardner, S., Otero, C., Dennis, K., Chang, R., Earle, K., & Amatetti, S. (2009). *Substance-exposed infants: State responses to the problem* (HHS Pub. No. SMA 09-4369).

Rockville, MD: Substance Abuse and Mental Health Services Administration. Retrieved 10 April 2014, from <http://www.ncsacw.samhsa.gov/files/Substance-Exposed-Infants.pdf>

Yu, N., Ahern, L.A., Connolly-Ahern, C. & Shen, F. (2010). Communicating the risks of fetal alcohol spectrum disorder: Effects of message framing and exemplification. *Health Communication*, 25(8), 692-699. Retrieved 3 April 2014, from

<http://www.frfasd.org/documents/Research%20Articles/Communicating%20Risks%20of%20FASD.pdf>



Zelner, I. & Koren, G. (2013). Alcohol consumption among women. *Journal of Population Therapeutics and Clinical Pharmacology*, 20(2), e201-e206. Retrieved 24 April 2014, from <http://www.jptcp.com/pubmed.php?articleId=419>