

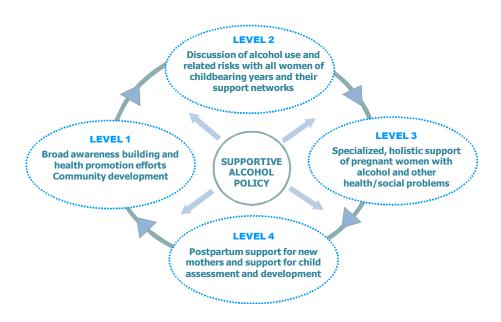
FASD Prevention Literature Search 2015

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Introduction

Annually, researchers associated with the Prevention Network Action Team (pNAT) of the CanFASD Research Network search the academic literature for articles related to fetal alcohol spectrum disorder (FASD) prevention. The findings are organized using a four-level prevention framework used by the pNAT to describe the wide range of work that comprises FASD prevention. The annual literature search is intended to update those involved in FASD prevention in Canada, so they can inform their practice and policy work with current evidence. The members of the pNAT also have the opportunity in monthly webmeetings to discuss the implications of the findings for their work.



Search Methods

The following databases were searched using Ebsco Host for articles published between January and December 2015:

- 1. Academic Search Complete
- 2. Bibliography of Native North Americans
- 3. CINAHL Complete (Cumulative Index of Nursing and Allied Health Literature)
- 4. MEDLINE with Full Text
- 5. PsycINFO
- 6. Social Work Abstracts
- 7. Urban Studies Abstracts
- 8. Women's Studies International

Searches of each database were conducted using the following search terms: 1) Fetal alcohol syndrome (SU); 2) fetal alcohol spectrum disorder (SU); 3) FASD (SU); 4) FASD (any) + Prevention (any); 5) FASD (any) + Preventing (any); 6) Fetal Alcohol (any) + Prevention (any); 7) Alcohol exposed pregnancy (any) + Prevention (any); 8) Alcohol exposed pregnancy (any) + Preventing (any); 9) Alcohol (SU) + Pregnancy (SU) + Prevention (any); 10) Alcohol (SU) + Pregnancy (SU) + Preventing (any); 11) Fetal (any) + Alcohol (SU); 12) Fetus (any) + Alcohol (SU); 13) Foetus (any) + Alcohol (any); 14) Foetal (any) + Alcohol (any); 15) Drink* (SU) + Pregnancy (SU) + Prevention (any); 16) Pregnan* (SU) + Alcohol (SU); 17) Conception (SU) + Alcohol (SU); 18) Conception (any) + Drink* (any); 19) Preconception (any) + Alcohol (any); 20) Preconception (any) + Drink* (any); 21) Post-partum (any) + Alcohol (any); 22) Post-partum (any) + Drink* (any); 23) Alcohol (SU) + Prevention (any) + Women (any); 24) Alcohol (SU) + Prevention (any) + Girls (any); 25) Alcohol (SU) + Prevention (any) + Youth (any); 26) Alcohol (SU) + Prevention (any) + Teen* (any); 27) Alcohol (any) + Prevention (any) + Aboriginal (any); 28) Alcohol (any) + Prevention (any) + First nation* (any); 29) Alcohol (SU) + Awareness (any); 30) FASD (SU) + Awareness (any); 31) Alcohol (SU) + Intervention* (any) + women (SU); 32) Alcohol (SU) + motivational interviewing (any); 33) Alcohol (SU) + screening (any) + women (any); 34) Alcohol (SU) + brief intervention (any) + women (any); 35) Alcohol (SU) + Home visits (any); 36) Parent child assistance program (any); 37) PCAP (any); 38) Alcohol (SU) + midwives (any); 39) Alcohol (SU) + community based (any); 40) Alcohol (SU)+ NICU (Settings); 41) Pregnancy (SU) + substance use treatment (any); 42) Pregnancy (SU) + harm reduction (any).

All searches were limited to articles published in the English language. Articles were further screened for relevance to the FASD NAT, and non-relevant articles (e.g. diagnosis of FASD) were removed from the list. Articles were then categorized into one or more theme, as presented below.

Search Results

Eighty-eight articles were identified. Fifteen articles were assigned to more than one category. Table 1 provides an overview of the number of articles found in each topic area by country. It can be seen that research on FASD prevention, published in English is most often being generated in the United States and Canada.

Table 1: Studies identified by topic and country

					Number of	Studies					
Country	Prevalence	Influences	Level 1	Level 2	Preconception	Level 3	Level 4	Indigenous women	Young women	Other	Total
Australia	2	1	3	3	1	1	1			1	13
Canada	5	3	1			2	1	1		2	15
Denmark	1		•				•				1
France	1		•			•	•				1
Italy	1	1	1				•				3
Malaysia			•		1		•				1
Nigeria	1										1
Norway	1		•	1		•	•				2
Russia			•	1		•	•				1
South Africa		1	•	2		2	1				6
Spain	1		•			•	•				1
Sweden			•	1	1	•	•				2
Tanzania	1										1
The Netherlands	1	1									2
Uganda	1										1
UK (England, Ireland and/or Scotland)	3	1	1	2		2				1	10
USA	7	4	4	5	7	3	1	5	2	4	41
	26	12	10	15	10	10	4	6	2	8	103

Prevalence of drinking in pregnancy

1. Blaauw Isaksen, A., Østbye, T., Theophil Mmbaga, B., & Kjersti Daltveit, A. (2015). Alcohol consumption among pregnant women in Northern Tanzania 2000-2010: a registry-based study. *BMC Pregnancy & Childbirth*, 15(1), 1-10. doi: 10.1186/s12884-015-0630-0

The authors conducted a study using birth records from Northern Tanzania to determine the prevalence of drinking during pregnancy, the socio-demographic predictors of such alcohol use and to describe the relationship between using alcohol and maternal and fetal outcomes. Between 2000 and 2010 the proportion of women reporting alcohol use during pregnancy decreased from 49.5 to 21.5%. The results of a Poisson regression analysis indicated that both religion (Catholics 53.6 %, Protestants 25.9 %, Muslims 14.8 %) and tribe (Chaggas 45.2 %, Pares 17.3 %, Maasais 6.6 %) were significantly associated with alcohol use. Additionally women who were older, taller, had a higher pre-pregnancy body mass and were less likely to have anemia at their last antenatal visit were more likely to consume alcohol. Unexpectedly, maternal alcohol use was associated with decreased risk of being small for gestational age (Adjusted risk ratio (ARR) 0.87 (0.80–0.94)) and a decreased risk of gestational age less than 37 weeks (ARR 0.89 (0.81–0.99)). The authors conclude that additional information on lifestyle factors, including diet, are required to gain insight into these unexpected outcomes.

2. Cannon, M. J., Guo, J., Denny, C. H., Green, P. P., Miracle, H., Sniezek, J. E., & Floyd, R. L. (2015). Prevalence and characteristics of women at risk for an alcoholexposed pregnancy (AEP) in the United States: Estimates from the National Survey of Family Growth. *Maternal and Child Health Journal*, 19(4), 776-782. doi: 10.1007/s10995-014-1563-3

Using in-person interviews with a nationally representative sample of reproductive aged women, the authors determined the number of women in the US at risk for alcohol-exposed pregnancy (AEP), and the associated demographic characteristics. They estimated that over a one-month period nearly two million women (95 % confidence interval (CI) 1,760,079–2,288,104) were at risk for AEP (3.4% of non-pregnant women), and more than 600,000 American women were binge drinking. Although most characteristics were not strongly associated with risk of AEP, pregnancy intention was strongly associated (prevalence ratio = 12.0, P <0.001), as many women continue to consume alcohol even after they discontinue contraceptive use.

3. Dunney, C., Muldoon, K., & Murphy, D. J. (2015). Alcohol consumption in pregnancy and its implications for breastfeeding. *British Journal of Midwifery*, 23(2), 126-134.

A prospective cohort of Irish women was used to explore the rates of maternal alcohol consumption during pregnancy among women who reported planning to exclusively breastfeed. Women who planned to breastfeed exclusively continued to drink at similar rates to those who did not (30.2% compared with 27.5%; Odds Ratio (OR) 1.13; 95% CI; 0.84–1.53). Alcohol consumption was associated with increased maternal age, Irish nationality and private health care. The authors discuss how challenging it is in a context of widespread alcohol consumption, for midwives and other health professionals to encourage

women not to drink in pregnancy and while breastfeeding, without discouraging breastfeeding.

4. English, L., Mugyenyi, G. R., Ngonzi, J., Kiwanuka, G., Nightingale, I., Koren, G., . . . Wiens, M. O. (2015). Prevalence of ethanol use among pregnant women in Southwestern Uganda. *Journal Of Obstetrics And Gynaecology Canada: JOGC, 37(10)*, 901-902.

The authors surveyed all women attending a maternity ward in Southwestern Uganda over two months in 2013 to determine current alcohol use, attitudes about alcohol use and self reported alcohol use throughout their pregnancy, they also compared these results with meconium test results. Of the 505 women who contented to participate, 16% reported any alcohol consumption during pregnancy (95% CI 12.9% to 19.4%). Three percent (3.2%) and 6.3% of mothers reported moderate and heavy consumption during all three trimesters, respectively. Women who used alcohol prior to pregnancy were more likely to use alcohol during pregnancy (OR 16.5; 95% CI 9.5 to 28.9), use during all three trimesters (OR 48.8; 95% CI 11.1 to 214.9), and have moderate or heavy consumption during any trimester (OR 10.6; 95% CI 4.9 to 22.8). Higher education was negatively associated with alcohol use, and partner use of alcohol and low perception of risk were positively associated with alcohol use during pregnancy. The meconium testing results did not align with the self reports, with both under and over reporting cited.

5. Esposito, G., Ambrosio, R., Napolitano, F., & Di Giuseppe, G. (2015). Women's knowledge, attitudes and behavior about maternal risk factors in pregnancy. *PLoS ONE*, *10*(*12*), 1-12. doi: 10.1371/journal.pone.0145873

The authors conducted a cross sectional survey with 513 randomly selected pregnant women from gynaecological ambulatory services in five hospitals in Italy to determine the levels of knowledge, attitudes and behaviours of women about the main maternal risk factors (e.g. alcohol, smoking, passive smoking and obesity). Only 42% could identify all four main risk factors, and only 22% were worried about causing harm to their fetus with their behaviour. Less than one third (29%) reported regularly drinking before pregnancy and 75% of these women reported stopping alcohol use during pregnancy. Of the women who were drinking during pregnancy only 27% had the intention to stop. Less than half (44%) reported receiving information from their physicians about the possible damage resulting from all the main risk factors in pregnancy.

6. Fitzpatrick, J. P., Latimer, J., Ferreira, M. L., Carter, M., Oscar, J., Martiniuk, A. L. C., . . . Elliott, E. J. (2015). Prevalence and patterns of alcohol use in pregnancy in remote Western Australian communities: The Lililwan project. *Drug and Alcohol Review*, 34(3), 329-339. doi: 10.1111/dar.12232

To determine the prevalence and patterns of alcohol use during pregnancy in a remote community in Western Australia, the authors conducted a cross sectional study with the caregivers of all children born in 2002/2003 and living in the Fitzroy Valley in 2010/2011 (n = 134). Alcohol use was categorized using the Alcohol Use Disorders Identification Test consumption subset (AUDIT-C) and birth outcomes were identified from interviews, medical record reviews and physical examinations. Participation in the study was very high (95%). The majority of the participants were Aboriginal (95%). Over half (55%) reported alcohol use during the pregnancy, with 88% using alcohol in the first trimester and 53%

drinking in all trimesters. Of the women who drank, the mean AUDIT-C score was 8.5 ± 2.3 (range 2–12), and the most common drinking pattern was consuming ≥ 10 standard drinks either 2–4 times per month (27%) or 2–3 times per week (27%). The authors concluded that prevention strategies to reduce prenatal alcohol use are urgently needed in remote Australian communities.

7. Forray, A., Merry, B., Lin, H., Ruger, J. P., & Yonkers, K. A. (2015). Perinatal substance use: A prospective evaluation of abstinence and relapse. *Drug and Alcohol Dependence*, *150*, 147-155. doi: 10.1016/j.drugalcdep.2015.02.027

To determine the rates of abstinence during pregnancy and rates of postpartum relapse for alcohol, cigarettes, marijuana and cocaine the authors collected self reported substance use and urine toxicology during pregnancy and at 3 months, 12 month and 24 months post delivery from a sample of 152 pregnant women attending psychological treatment for substance use in Connecticut. They used a multivariate Cox model to compare rates of abstinence and relapse across substances. During pregnancy 83% of the women obtained abstinence from at least one substance, with participants being most likely to abstain from alcohol (Hazard ratio (HR) 7.24; 95% CI 4.47–11.72), marijuana (HR 4.06; 95% CI 1.87–6.22), and cocaine (HR 3.41; 95% CI 2.53–6.51), than cigarettes. Post partum relapse was common. Of the women who were abstinent during their last month of pregnancy, 80% relapsed to at least one substance. The mean days to relapse was longest for cocaine (287.6 days), and shortest for cigarettes (109.7 days). It was 127.7 days for relapse to alcohol.

8. Fortin, M., Muckle, G., Anassour-Laouan-Sidi, E., Jacobson, S. W., Jacobson, J. L., & Bélanger, R. E. (2015b). Trajectories of alcohol use and binge drinking among pregnant Inuit women. *Alcohol and Alcoholism*, *51*(3), 339-346.

The authors engaged 248 pregnant Inuit women in a prospective cohort to investigate trajectories of alcohol use and binge drinking from a year before pregnancy until a year post partum. They used a Markov model to explore drinking trajectories across time periods. Almost three quarters of the women (73%) drank alcohol in the year prior to their pregnancy, with 54% reporting binge drinking. Postpartum 62% reported drinking and 33% reported binging. Although there was a significant drop in the prevalence of alcohol use during pregnancy, 60% of women continued to drink some alcohol during pregnancy. They found that both alcohol use and binge drinking status were more likely to change in the conception period, making this period an important one to focus on in prevention efforts. Women who were in couples and those who did not use marijuana were more likely to decrease their binge drinking at conception.

9. Frankenberger, D. J., Clements-Nolle, K., & Yang, W. (2015). The association between adverse childhood experiences and alcohol use during pregnancy in a representative sample of adult women. *Women's Health Issues, 25*(6), 688-695. doi: 10.1016/j.whi.2015.06.013

To assess the relationship between adverse childhood experiences (ACE) and alcohol use during pregnancy, the authors used a weighted logistic regression with data from 1,987 women in the 2010 Nevada Behavioral Risk Factor Surveillance System. There was evidence of a dose-response relationship between ACEs and alcohol use during pregnancy (1 ACE: adjusted odds ratio [AOR], 2.92; 95% CI, 1.08–7.87; 2–3 ACEs: AOR, 3.52; 95% CI, 1.46–8.48; and ≥4 ACEs: AOR, 4.79; 95% CI, 2.14–10.72), which was significant after controlling for

pre-pregnancy drinking and other covariates such as age, race, employment status and smoking.

10. González-Mesa, E., Blasco-Alonso, M., Gálvez Montes, M., Lozano Bravo, I., Merino-Galdón, F., Cuenca-Campos, F., . . . Bellido-Estévez, I. (2015). High levels of alcohol consumption in pregnant women from a touristic area of Southern Spain. *Journal of Obstetrics & Gynaecology, 35(8)*, 821-824. doi: 10.3109/01443615.2015.1022139

To determine the prevalence of alcohol use during pregnancy in Málaga, a tourist region of Spain, the authors used a self-reported questionnaire with 451 pregnant women in their first, second or third trimester of pregnancy. Alcohol use during each trimester was reported to be 40.7%, 25.5% and 17.1%, respectively. Higher education was associated with greater exposure to alcohol (Risk ratio, 1.87 [1.30–2.69]).

11. Iversen, M. L., Sørensen, N. O., Broberg, L., Damm, P., Hedegaard, M., Tabor, A., & Hegaard, H. K. (2015). Alcohol consumption and binge drinking in early pregnancy. A cross-sectional study with data from the Copenhagen Pregnancy Cohort. *BMC Pregnancy & Childbirth*, *15*, 1-10. doi: 10.1186/s12884-015-0757-z

The rate of drinking during pregnancy among Danish women has been reported to be 48%. In 2007 the Danish Health and Medicines Authority recommended total abstinence during pregnancy; however, no studies have examined the risk factors associated with drinking behaviours since the introduction of these recommendations. The authors used questionnaire and medical record data from 3,238 pregnant women in Copenhagen, Denmark to determine the prevalence of drinking alcohol during early pregnancy and to identify pre-pregnancy lifestyle and reproductive risk factors associated with binge drinking during early pregnancy using multivariate logistic regression. Most women (70%) reported *weekly* alcohol consumption prior to pregnancy, and this *weekly drinking* prevalence decreased to 3% during early pregnancy. The overall proportion of women reporting *binge drinking* during early pregnancy was 35%, linked to the independent risk factors of: lower degree of planned pregnancy, smoking and alcohol habits before pregnancy.

12. Kingsbury, A. M., Hayatbakhsh, R., Gibbons, K., Flenady, V., & Najman, J. M. (2015). Women's frequency of alcohol consumption prior to pregnancy and at their pregnancy-booking visit 2001–2006: A cohort study. *Women & Birth, 28(2),* 160-165 166p. doi: 10.1016/j.wombi.2014.11.005

The authors examined alcohol use among pregnant women, and prior to pregnancy using a sample of routine data collected by midwives from 19,699 women between 2001 and 2006. A quarter (25.4%) of women reported *at least weekly* alcohol use prior to pregnancy, and there was a significant linear increase over time in the rate of women aged 20 years and older reporting alcohol use prior to pregnancy. Women with post secondary education (tertiary-educated) were more likely to report *at least weekly* alcohol use prior to pregnancy. Only 5.9% of women reported they used alcohol *at least weekly* during their pregnancy. The authors concluded that most women reduce their alcohol use during pregnancy, and that there is some evidence that this trend has increased in recent years.

13. Kitsantas, P., Gaffney, K. F., & Wu, H. (2015). Identifying high-risk subgroups for alcohol consumption among younger and older pregnant women. *Journal of Perinatal Medicine*, 43(1), 43-52 10p. doi: 10.1515/jpm-2013-0323

It has been reported that older women are more likely to use alcohol during pregnancy, but specific groups at higher risk by maternal age have not been identified. Using 311,428 records from the 2002–2009 Pregnancy Risk Assessment Monitoring System (PRAMS) dataset (collected from 37 states in the US), the authors conducted logistic regression and classification trees for age groups, ≤ 24 , 25–29, and ≥ 30 years to determine subgroups at highest risk for alcohol consumption during pregnancy within maternal age groups. Overall, 6.5% of women reported using alcohol during pregnancy (3.7% for ≤ 24 , 5.7% for 25–29, and 10.1% for ≥ 30 years of age). The youngest women were at greatest risk if they also smoked, and among non-smokers, higher levels of education and being Hispanic were associated with a 35% increase in alcohol use. Among the middle age group, non-obese women who reported experiencing abuse during pregnancy were at most likely to use alcohol during pregnancy. In women over 30, those with at least 16 years of education, who were White or Hispanic and normal or underweight were more likely to drink during pregnancy.

14. Lange, S., Probst, C., Quere, M., Rehm, J., & Popova, S. (2015a). Alcohol use, smoking and their co-occurrence during pregnancy among Canadian women, 2003 to 2011/12. *Addictive Behaviors*, *50*, 102-109. doi: 10.1016/j.addbeh.2015.06.01

To determine the prevalence of smoking during pregnancy and the relationship to drinking alcohol during pregnancy, the authors conducted a secondary analysis of data from 22,962 women from the Canadian Community Health Survey. Between 2003 and 2011 the pooled prevalence of smoking while pregnant in Canada was 14.3%. Smoking in any capacity increased the likelihood that a woman consumed alcohol during pregnancy. Women who smoked daily during pregnancy were 2.54 (95% CI: 2.11–3.06, p< 0.0001) times more likely to have consumed alcohol, women who smoked occasionally during pregnancy were 2.71 times more likely (95% CI: 2.25–3.27, p <0.0001), and women who had a lifetime history of smoking but did not smoke while pregnant were 2.09 times more likely (95% CI: 1.85–2.37, p<0.0001) to drink alcohol during their pregnancy than lifelong abstainers from tobacco.

15. Lange, S., Quere, M., Shield, K., Rehm, J., & Popova, S. (2015b). Alcohol use and self-perceived mental health status among pregnant and breastfeeding women in Canada: a secondary data analysis. *BJOG: An International Journal Of Obstetrics And Gynaecology*. doi: 10.1111/1471-0528.13525

The authors conducted a secondary analysis of data from 18,612 pregnant and 15,836 breastfeeding women from the Canadian Community Health Survey to examine self-reported rates of alcohol use during pregnancy and breastfeeding, and their relationship with self-perceived mental health during pregnancy. Between 2003 and 2010 10% of Canadian pregnant women (95%CI 9.2–10.5%) and 20% of breastfeeding women (95%CI 19.4–21.2%) consumed alcohol. Women with 'good' self-perceived mental health were 1.40 times more likely to have consumed alcohol in pregnancy (95%CI 1.18–1.67) than women with 'excellent' self- perceived mental health. There were no differences between mental health status and alcohol consumption while breastfeeding.

16. Lanting, C. I., van Dommelen, P., van der Pal-de Bruin, K. M., Gravenhorst, J. B., & van Wouwe, J. P. (2015). Prevalence and pattern of alcohol consumption during pregnancy in the Netherlands. *BMC Public Health*, *15(1)*, 1-5. doi: 10.1186/s12889-015-2070-1

The authors estimated the prevalence of alcohol use during pregnancy among mothers who attended a Well-Baby Clinic in the Netherlands in 2008 and 2010 by using a questionnaire. Data were collected from 2,715 women in 2007, and 1,410 in 2010. In 2007, 22% and in 2010 19% of women reported consuming alcohol during pregnancy. Alcohol use was primarily reported as one drink, less than once per month. More women consumed 1-3 or >3 drinks per occasion in 2010, compared with 2007. Older women, women with higher education and women who smoked consumed more alcohol. Birth weight, gestational age and weight for gestational age were not found to be associated with alcohol consumption.

17. Liu, W., Mumford, E. A., & Petras, H. (2015). Maternal alcohol consumption during the perinatal and early parenting period: A longitudinal analysis. *Maternal and Child Health Journal, 20,* 376–385. doi: 10.1007/s10995-015-1836-5

To inform the creation of prevention materials, the authors examined the longitudinal patterns of women's alcohol use before pregnancy, during pregnancy and post delivery, as well as the role of maternal characteristics. Using general growth mixture models, they modeled weekly drinking at six points in time, with data from 9,100 mothers from the 2001 US Early Childhood Longitudinal Study. Over half of the women drank in the preconception period (61%), but almost all did not consume alcohol in their last trimester of pregnancy (97%). The results identify four patterns of behaviour: Low Probability Drinkers (50.3 %), Escalating Risk Drinkers (12.0 %), Escalating Low Risk Drinkers (27.4 %), and Early Parenting Quitters (10.2 %). The authors also identified characteristics that were associated with these patterns, for example mothers giving birth after age 36 were twice as likely to be Escalating Risk Drinkers and Escalating Low Risk Drinkers (vs Low Probability Drinkers), but not more likely to be Early Parenting Quitters, when compared to mothers who gave birth between the ages of 26 and 35. The authors conclude that these patterns could be synthesized to tailor pre- and postnatal clinical counseling protocols.

18. Melchior, M., Chollet, A., Glangeaud-Freudenthal, N., Saurel-Cubizolles, M.-J., Dufourg, M.-N., van der Waerden, J., & Sutter-Dallay, A.-L. (2015). Tobacco and alcohol use in pregnancy in France: The role of migrant status: The nationally representative ELFE study. *Addictive Behaviors*, *51*, 65-71. doi: 10.1016/j.addbeh.2015.07.015

The authors compared the rates of smoking and drinking alcohol during pregnancy among a representative sample of 18,014 native-born (French) and migrant women (35% North African- primarily Algeria and Morocco, 27% Sub- Saharan African- primarily Senegal, Ivory Coast, the Congo and Cameroon, 20% other European- primarily Portugal and Germany and 10% Asian- primarily Turkey) who gave birth to a child in France in 2011. Migrant women had lower levels of tobacco smoking (8.8% compared with 21.9%) and alcohol use (23.4% compared with 40.7%), but not binge drinking (2.9% compared with 3.3%). Lower socioeconomic status was associated with smoking only among native-born women, and the co-occurrence of another substance and psychological difficulties were more strongly

associated with tobacco, alcohol and binge drinking among native women. Single parenthood was associated with alcohol use in migrant women.

19. O'Keeffe, L. M., Kearney, P. M., McCarthy, F. P., Khashan, A. S., Greene, R. A., North, R. A., . . . Kenny, L. C. (2015). Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies. *BMJ Open, 5*(7), e006323-e006323. doi: 10.1136/bmjopen-2014-006323

A cross comparison of three data sets was conducted to compare the prevalence and predictors of alcohol use in multiple cohorts. The data from 17, 244 women was collected as part of two Irish retrospective studies (Growing up in Ireland (GUI) and Pregnancy Risk Assessment Monitoring System Ireland (PRAMS Ireland)), and one multicentre prospective international cohort, Screening for Pregnancy Endpoints (SCOPE) study that included women from the UK, Australia and New Zealand. The rates of alcohol use during pregnancy ranged from 20% in GUI to 82% in SCOPE, with 46% in PRAMS. The most consistent predictor of alcohol use was smoking during pregnancy in all three cohorts (SCOPE: smokers were 17% more likely to drink during pregnancy, relative risk (RR) =1.17 (95% CI 1.12 to 1.22), GUI: 50% more likely, RR=1.50 (95% CI 1.36 to 1.65), and PRAMS: 42% more likely, RR=1.42 (95% CI 1.18 to 1.70)). Given the high prevalence of alcohol use in pregnancy found, the authors note the need for new policies and interventions both prior to and during pregnancy, as well as further investigation of methods of measuring alcohol use in pregnancy.

20. Ordinioha, B., & Brisibe, S. (2015). Alcohol consumption among pregnant women attending the antenatal clinic of a tertiary hospital in South-South Nigeria. *Nigerian Journal Of Clinical Practice, 18(1),* 13-17. doi: 10.4103/1119-3077.146966

The authors used a cross sectional survey with 221 women attending the antenatal clinic of the University of Port Harcourt Teaching Hospital in Nigeria to determine level of alcohol use, knowledge of the harmful effects of alcohol on a fetus, and attitudes towards alcohol use by pregnant women. The women in the sample had a mean age of 29.5 years, were mostly married (97%), Christian (95%) and had post-secondary education (tertiary education 74%). Slightly more than half (52%) of women were able to report the harmful effect of alcohol on a fetus, 63% of these women had received this information from a health professional. Over half (59%) had used alcohol during the index pregnancy, 39% consumed alcohol regularly and 26% binge drank. These rates did not vary significantly by marital or education status; however, younger women were more likely to have consumed alcohol.

21. Oulman, E., Kim, T. H. M., Yunis, K., & Tamim, H. (2015). Prevalence and predictors of unintended pregnancy among women: an analysis of the Canadian Maternity Experiences Survey. *BMC Pregnancy & Childbirth, 15,* 1-8. doi: 10.1186/s12884-015-0663-4

The authors used data from the 2006 Canadian Maternity Experiences Survey to determine the prevalence of unintended pregnancy, and used a logistic regression to determine which socio-demographic, maternal and pregnancy related variables were associated with unintended pregnancy. The overall prevalence of unintended pregnancy in Canada in 2006 was 27%. The odds of unintended pregnancy were higher if the woman was under 20 years

of age, immigrated to Canada, had an equivalent of a high school education or less, no partner, experienced violence or abuse and had one or more previous pregnancies. Smoking, drinking alcohol and using drugs prior to becoming pregnant were all also associated with increased likelihood of unintended pregnancy.

22. Petersen, I., McCrea, R. L., Lupattelli, A., & Nordeng, H. (2015). Women's perception of risks of adverse fetal pregnancy outcomes: a large-scale multinational survey. *BMJ Open*, *5*(*6*), e007390-e007390. doi: 10.1136/bmjopen-2014-007390

The authors conduced a large multisite survey with 9,113 pregnant women and new mothers from 18 countries in Europe, North America and Australia to determine women's perceptions of harms to the fetus from medicines (over-the-counter medicine and prescribed medicine), foods (eggs and blue veined cheese), herbal substances (ginger and cranberries), and alcohol and tobacco, and thalidomide. Thalidomide, tobacco and alcohol were considered the most harmful with an average score of 9.4 and 9.2 and 8.6 out of 10 respectively.

23. Popova, S., Lange, S., Burd, L., & Rehm, J. (2015). The economic burden of Fetal Alcohol Spectrum Disorder in Canada in 2013. *Alcohol And Alcoholism*, *51(3)*, 367-375.

The authors conducted a cost-of-illness study to determine the cost of FASD. Their analysis accounted for direct costs related to "resources expended on health care, law enforcement, children and youth in care, special education, supportive housing, long-term care, prevention and research" and the indirect costs of productivity loss caused by FASD through increased morbidity and premature mortality. The results of their analysis estimated the cost of FASD to be approximately \$1.8 billion (\$1.3 billion to \$2.3 billion), with 41% of the costs attributed to productivity losses. Costs related to the correctional system was the second highest contributor, accounting for 29%. Notably costs associated with boys in systems such as corrections and special education were much higher than for girls.

24. Salas-Wright, C. P., Vaughn, M. G., & Ugalde, J. (2015). A typology of substance use among pregnant teens in the United States. *Maternal and Child Health Journal*, *20*(3). doi: 10.1007/s10995-015-1864-1

To identify subgroups of pregnant adolescent's substance use, the authors examined a sample of 810 pregnant adolescents (aged 12-17) from the US National Survey on Drug Use and Health. They identified four classes of behaviour: Abstainers (n = 344, 42.5%), Drinkers (n = 303, 37.4%), Alcohol and Cannabis Users (n = 77, 9.5%), and Polydrug Users (n = 86, 10.6%). Abstainers had very low levels of past 12-month and 30-day drug and alcohol use and had the highest proportion of pregnant adolescents living in households earning less than \$20,000 per year (44.2%). Polydrug users had used, primarily alcohol and cannabis with other drugs reported to a lesser extent, in the previous 12-months and past 30-days, and had the highest proportion of older pregnant adolescents (75.6%), white adolescent women (54.7%), and adolescent women from high-income families (14%).

25. Skreden, M., Bere, E., Sagedal, L. R., Vistad, I., & Øverby, N. C. (2015). Changes in beverage consumption from pre-pregnancy to early pregnancy in the Norwegian Fit for Delivery study. *Public Health Nutrition, 18(7),* 1187-1196. doi: 10.1017/S136898001400189X

To determine if beverage consumption (e.g. alcohol, coffee, artificially sweetened beverages, milk, water etc.) changed from pre-pregnancy to pregnancy, the authors analyzed survey data from 575 pregnant women recruited from eight antenatal clinics in southern Norway between 2009 and 2013. Before pregnant 27% of the women reported drinking alcohol at least once a week, compared with 0% during early pregnancy (P<0.001).

26. Tan, C. H., Denny, C. H., Cheal, N. E., Sniezek, J. E., & Kanny, D. (2015). Alcohol use and binge drinking among women of childbearing age - United States, 2011-2013. *MMWR: Morbidity & Mortality Weekly Report, 64(37)*, 1042-1046 1045p. doi: 10.15585/mmwr.mm6437a3

The authors compared the prevalence of alcohol use and binge drinking among pregnant and non-pregnant American women using a sample of 206,481 women (aged 18–44 years) from the Behavioral Risk Factor Surveillance System in the US, of whom 8,383 (4.0%) were pregnant at the time of interview. The self-reported prevalence of alcohol use in the last 30 days during pregnancy was 10.2% and binge drinking was 3.1%, compared with 53.6% and 18.2% respectively among non-pregnant women. Although the rates of binge drinking were lower among pregnant women, those that did binge drink reported a higher frequency of binge drinking (4.6 episodes reported by pregnant women who binge drank compared with 3.1 episodes reported by non-pregnant women who binge drank) and a higher largest amount of alcohol consumed during binges (7.5 drinks compared with 6 drinks).

Influences and factors associated with drinking in pregnancy

1. Benoit, C., Magnus, S., Phillips, R., Marcellus, L., & Charbonneau, S. (2015). Complicating the dominant morality discourse: mothers and fathers' constructions of substance use during pregnancy and early parenthood. *International Journal for Equity in Health, 14(1),* 1-11. doi: 10.1186/s12939-015-0206-7

The authors conducted interviews with 34 biological mothers and fathers to examine the perception of problematic substance use during pregnancy. Two main discourses emerged; the first was that many mothers and fathers hold abstinence as the ideal during pregnancy, and the second was they also recognized women's autonomy to judge the risk of substance use for themselves. Social structural factors were described that may increase and decrease the harms associated with substance use. These two views were not always reconcilable, and the authors suggest are a reflection of the "dissonance between dominant moral codes regarding motherhood and the lived experiences of people who use substances." The authors conclude that health care providers who are aware of these conflicting discourses are more likely to be effective in delivering health care services to vulnerable families, and that increased holistic and nuanced perspectives of health, substance use and parenting could help providers better meet the needs of supporting mothers and fathers to achieve well being in the context of their problematic substance use.

2. Esposito, G., Ambrosio, R., Napolitano, F., & Di Giuseppe, G. (2015). Women's Knowledge, Attitudes and Behavior about Maternal Risk Factors in Pregnancy. *PLoS ONE, 10(12),* 1-12. doi: 10.1371/journal.pone.0145873

(See abstract above.)

3. Frankenberger, D. J., Clements-Nolle, K., & Yang, W. (2015). The association between adverse childhood experiences and alcohol use during pregnancy in a representative sample of adult women. *Women's Health Issues, 25(6),* 688-695. doi: 10.1016/j.whi.2015.06.013

(See abstract above.)

4. Lange, S., Probst, C., Quere, M., Rehm, J., & Popova, S. (2015a). Alcohol use, smoking and their co-occurrence during pregnancy among Canadian women, 2003 to 2011/12. *Addictive Behaviors, 50,* 102-109. doi: 10.1016/j.addbeh.2015.06.018

(See abstract above)

5. Lange, S., Quere, M., Shield, K., Rehm, J., & Popova, S. (2015b). Alcohol use and self-perceived mental health status among pregnant and breastfeeding women in Canada: a secondary data analysis. *BJOG: An International Journal Of Obstetrics And Gynaecology.* doi: 10.1111/1471-0528.13525

(See abstract above)

Lepper, L. E. T., Lluka, A., Mayer, A., Patel, N., Salas, J., Xaverius, P. K., & Kramer, B. (2015). Socioeconomic status, alcohol use, and pregnancy intention in a national sample of women. *Prevention Science*, 17, 24-31. doi: 10.1007/s11121-015-0578-3

To explore the role of socioeconomic status as a modifier between woman's intention to become pregnant and her drinking behaviour, the authors analyzed data from a sample of 37,777 fertile women (aged 18–44 year) from the 2004 and 2006 Behavioral Risk Factor Surveillance System from the US. Women who were planning a pregnancy were less likely to drink heavily (OR = 0.68, CI = 0.50, 0.93) or to binge (OR = 0.80, CI = 0.67, 0.96). Results of a multivariable logistic regression indicated that both education level and income modified the relationship between pregnancy intention and any drinking and binge drinking. Women with more than a high school education were 28% less likely to binge drink if they were intending to become pregnant, compared with those not planning a pregnancy (OR= 0.72, CI = 0.57, 0.90). Women intending to become pregnant in the middle income categories were less likely to drink any alcohol, compared with those not planning a pregnancy.

7. Liu, W., Mumford, E. A., & Petras, H. (2015). Maternal alcohol consumption during the perinatal and early parenting period: A longitudinal analysis. *Maternal and Child Health Journal, 20,* 376–385. doi: 10.1007/s10995-015-1836-51

(See abstract above.)

8. O'Keeffe, L. M., Kearney, P. M., McCarthy, F. P., Khashan, A. S., Greene, R. A., North, R. A., . . . Kenny, L. C. (2015). Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies. *BMJ Open, 5*(7), *e006323-e006323*. doi: 10.1136/bmjopen-2014-006323

(See abstract above.)

9. Tran, N. T., Najman, J. M., & Hayatbakhsh, R. (2015). Predictors of maternal drinking trajectories before and after pregnancy: evidence from a longitudinal study. *The Australian & New Zealand Journal Of Obstetrics & Gynaecology*, 55(2), 123-130. doi: 10.1111/ajo.12294

The authors conducted a longitudinal study with 6597 Australian women to examine drinking patterns from preconception to post conception (6 months), including early and late pregnancy. They identified three patterns: 53% abstainers/ minimal consumption, 39% light consumption and 7% heavy consumption. Although the heavy consumption group significantly reduced their alcohol use during pregnancy, they increased consumption after the baby was born, even though 80% of this group reported breastfeeding. The light consumption group made only minor changes to their drinking patters over the course of the study. Factors associated with abstaining included: lower family income, being married, high frequency of church attendance, low level of adversity, poor health lifestyle, remaining married to original partner and having multiple children. Heavy consumption was associated with: being unmarried, having only one child, poor health lifestyle and never attending church.

10. Watt, M. H., Eaton, L. A., Dennis, A. C., Choi, K. W., Kalichman, S. C., Skinner, D., & Sikkema, K. J. (2015). Alcohol use during pregnancy in a South African community: Reconciling knowledge, norms, and personal experience. *Maternal and Child Health Journal*. doi: 10.1007/s10995-015-1800-4

The authors conducted interviews with nine pregnant women and 15 women who were within 12 months post partum from Cape Town South Africa, who self reported alcohol use during pregnancy, to explore knowledge and attitudes about alcohol use during pregnancy. Although women received anti-drinking messages from a few sources, they did not value these messages as they often contradicted social norms. The women were mostly unfamiliar with FASD, and often had inaccurate information regarding the effects of fetal alcohol exposure. These attitudes about the effect of alcohol during pregnancy were influenced by the participant's personal experiences and lead to an "internalization of misinformation." Women felt "judged, ambivalent, or defensive about their behaviors". The authors note the need for FASD prevention information through sources trusted by women, sources who can help women examine attitudes and motivations and resolve ambivalence.

11. Witt, W. P., Mandell, K. C., Wisk, L. E., Cheng, E. R., Chatterjee, D., Wakeel, F., . . . Zarak, D. (2015). Predictors of alcohol and tobacco use prior to and during pregnancy in the US: the role of maternal stressors. *Archives Of Women's Mental Health*, *18*(3), 523-537. doi: 10.1007/s00737-014-0477-9

To investigate the relationship between stressful life events prior to conception and alcohol and tobacco use prior to and during pregnancy, the authors analyzed survey data from the Early Childhood Longitudinal Study-Birth Cohort (n=9,350), a nationally representative cohort of children born in 2001 in the US. Stressful life events were defined as death of a parent, spouse, or child; divorce or marital separation; or fertility problems prior to conception. Results of a regression analysis indicated that stressful life events were associated with smoking prior to pregnancy, and smoking and drinking during pregnancy. Experiencing any stressful life event increased the odds of tobacco use prior to (AOR 1.52, 95% CI 1.23–1.87) and during pregnancy (AOR 1.57, 95% CI 1.19–2.07). Women who had experienced stressful life events (compared to those who had not) drank 0.31 additional alcoholic drinks over the course of the final 3 months of pregnancy.

12. van der Wulp, N. Y., Hoving, C., & de Vries, H. (2015). Correlates of partner support to abstain from prenatal alcohol use: a cross-sectional survey among Dutch partners of pregnant women. *Health & Social Care In The Community*. doi: 10.1111/hsc.12235

Although partner support can play an important role in prenatal alcohol use, partners are not often included in prevention efforts. The authors examined data from 237 partners of Dutch pregnant women to investigate differences between partners who reported a low versus a high support for their partner's abstinence from alcohol. Partners who had a high level of support were more likely to desire their partner to abstain from drinking, have received advise from their partner or midwife that abstinence was desired, and have a stronger perception that alcohol could cause fetal harm. They also perceived the potential harm from prenatal alcohol use as more severe and saw more advantages to providing support, compared with those with a low level of support. Partners providing a high level of support also reported more social influences that encourage support, had greater self-efficacy and stronger intentions to support their partner for the rest of her pregnancy. The authors concluded that health providers can improve their discussions with partners by discussing the advantages of supporting their partners and encouraging couples to "discuss and propose solutions for the situations in which partners find it difficult not to support alcohol abstinence."

Level 1 Prevention

1. Barreca, A., & Page, M. (2015). A pint for a pound? Minimum drinking age laws and birth outcomes. *Health Economics*, 24(4), 400-418. doi: 10.1002/hec.3026

Evidence suggests that minimum legal drinking age laws (MLDA) affect young women's drinking and risky sexual activity. To examine the effect of MLDA on infant health the authors compared birth outcomes of infants born to mothers 14-20 years old (who had been exposed to different MLDAs because of where or when they gave birth) to a control group mothers aged 21-24. The sample pertained to American infants born between 1978

and 1988. The authors employed a 'triple-differences' estimation strategy and used the variation in laws that occurred across states in the 1970s and 1980s. Their results indicated a very small association of low MLDAs with low birth weight, but the laws had little relationship with other traditional measures of infant health including APGAR score and congenital effects.

2. Bazzo, S., Battistella, G., Riscica, P., Moino, G., Marini, F., Bottarel, M., . . . Padovan, M. (2015). Evaluation of a multilevel and integrated program to raise awareness of the harmful effects of prenatal alcohol exposure in a local community. *Alcohol & Alcoholism*, *50*(6), 708-715 708p. doi: 10.1093/alcalc/agv051

This article reports on the results of a multilevel evaluation of the campaign "Mamma Beve Bimbo Beve," an awareness campaign on the effects of prenatal alcohol exposure in Treviso Italy. Semi structured questionnaires were completed by health care professionals and pregnant women in Treviso, and with participants in a control community who had not received the campaign (Verona). Health care providers in the study community were more aware of the risks of consuming alcohol during pregnancy. Pregnant women in Treviso reported receiving more information about alcohol from health professionals than pregnant women in the control community, and had a higher probability of receiving only correct information. The authors concluded that the multi level campaign (that included both information, and interventions that support attitudinal change and self –efficacy) was successful in increasing health care provider and pregnant women's knowledge and perceptions of the risks of alcohol use during pregnancy. The authors are continuing to analyse determinants of change among professionals and women at cognitive and emotive levels.

3. Bell, E., Zizzo, N., & Racine, E. (2015). Caution! Warning labels about alcohol and pregnancy: Unintended consequences and questionable effectiveness. *American Journal of Bioethics*, 15(3), 18-20. doi: 10.1080/15265161.2014.998376

In this commentary, the authors address two ethical concerns related to alcohol warning labels in the context of FASD prevention: 1) the potential for unintended impacts, and 2) the evidence of their effectiveness for behaviour change. They introduce their article by referring to a recently published paper by Louise et al. (2015), which discussed ethical issues related to alcohol warning labels in the context of cancer prevention. In the context of FASD, unintended consequences of public awareness campaigns can include increased blame toward pregnant women and birth mothers of children with FASD. The authors suggest awareness campaigns can increase stigma attached to alcohol use during pregnancy, which is already a significant barrier for women to access support for their alcohol use and dependence. They also highlight that simple public health messages often focus on individual behaviours and fail to acknowledge the roles of social determinants on these behaviour and the systemic and social factors that influence women's alcohol consumption. Additionally, there is limited evidence to suggest that alcohol warning labels reduce alcohol consumption during pregnancy. The authors conclude labels should only be a small part of multilevel public health strategies and that these messages need to be consistent, sensitive to social and cultural factors, as well as targeted to local needs and attitudes, focused on reducing stigma and coupled with other services for women and families.

4. Burton, A. (2015). Message on a bottle. *Lancet Neurology*, *14*(*4*), 354-355 352p. doi: 10.1016/S1474-4422(15)70055-4

In this commentary, the author overviews international recommendations for alcohol use during pregnancy and related warning labels on alcohol bottles. The author highlights the challenges in developing recommendations given inconsistent evidence about safe levels of alcohol consumption. Despite the challenges, most of North America, Australasia and Europe are converging upon the message of abstinence as the safest choice in public health recommendations. The author concludes that although it is not an easy task to produce a unified message at the national and international level, "The bottom line appears to be, however, that to reduce the prevalence of FASD we need to be sending consistent, clear, continuous, and creative warnings."

5. Crawford-Williams, F., Fielder, A., Mikocka-Walus, A., & Esterman, A. (2015a). A critical review of public health interventions aimed at reducing alcohol consumption and/or increasing knowledge among pregnant women. *Drug & Alcohol Review*, *34*(2), 154-161. doi: 10.1111/dar.12152

The authors conducted a critical literature review of public health interventions aimed at increasing awareness of the effects of alcohol on pregnancy and reduce alcohol consumption during pregnancy. They included seven studies in their review (published from 1994 to 2014): two RCTs, two repeat measure cross-sectional studies, and three retrospective cross-sectional cohort design. The primary outcome of all the studies was knowledge; however four studies also measured alcohol use. All of the studies used a multimedia-based educational intervention, although they varied greatly in method. For example, one RCT used a prenatal health message delivered by mobile phone text and the other used a combination TV commercial, 10 min DVD and printed pamphlet; the other studies all used mass media including posters, pamphlets, radio and television adds and other community advertising. Increased knowledge about the effects of alcohol on pregnancy was found in six studies, but one found contradictory effects. Although alcohol reduction was found in the four studies that measured it, none of these reductions were statistically significant. The authors conclude that evidence is lacking regarding the effects of multimedia education campaigns on women's' alcohol consumption during pregnancy, and more high quality research is needed.

6. Crawford-Williams, F., Fielder, A., Mikocka-Walus, A., Esterman, A., & Steen-Greaves, M. (2015b). Does the poor quality of Australian health education documentation undermine the message? A review of documents informing pregnant women about alcohol. *Evidence Based Midwifery*, 13(2), 40-46 47p.

The authors conducted a review of the content and design of Australian health education materials about alcohol consumption during pregnancy using a modified version of the DISCERN instrument. They reviewed 32 documents that were located through targeted and general Internet searches. The majority of the documents were poor quality (28% received a score of less than 2 (low quality), 69% received a score between 2 and 4 (moderate quality) and no document received a score of 5 (high quality)). They concluded that although there is a good number and variety of documents available in Australia, they are not of high quality and could be improved by: including publication dates, using simple language, and providing sources of information.

7. Garcia, T. A., Bacio, G. A., Tomlinson, K., Ladd, B. O., & Anderson, K. G. (2015). Effects of sex composition on group processes in alcohol prevention groups for teens. *Experimental and Clinical Psychopharmacology*, *23*(4), 275-283. doi: 10.1037/pha0000032

To investigate the impact of sex composition in a group substance use prevention program for US adolescents, the authors used the Group Actor–Partner Interdependence Model framework with Project Options groups. They examined how sex composition of the groups impacted satisfaction, engagement and reported behaviour intentions (n=379, 61.8% girls). Personal satisfaction, group satisfaction and group level engagement were increased among girls in groups comprised of more girl participants. However, supportive statements of healthy alcohol related behaviours (change talk) were unrelated to sex composition.

8. Miller, A. R. (2015). Studying public knowledge of risk of prenatal alcohol exposure is not the same as knowledge of fetal alcohol spectrum disorder (FASD). *Child: Care, Health and Development, 41(4), 634-635.* doi: 10.1111/cch.12226

This paper is a letter to the editor in response to Mukherjee et al. (2015). The author suggests that in both study design and reporting the results, Mukherjee has conflated knowledge about possible harm to the fetus from exposure to alcohol during pregnancy, with knowledge about fetal alcohol spectrum disorder. The author further suggests that studying exposure-outcome relationships is different than studying health conditions that are diagnosed in an individual. The author recommends that research and public health campaigns should continue to focus on potential harms caused by prenatal alcohol exposure, rather than FASD.

9. Mukherjee, R., Wray, E., Hollins, S., & Curfs, L. (2015). What does the general public in the UK know about the risk to a developing foetus if exposed to alcohol in pregnancy? Findings from a UK mixed methodology study. *Child: Care, Health & Development, 41(3), 467-474 468p.* doi: 10.1111/cch.12187

The authors conducted a mixed methods study to determine the current level of knowledge about FASD in the general public in UK. The study consisted of a questionnaire (n=674) and four focus groups with approximately 10 participants each. Most of the survey respondents (86.7%) had heard about FASD, and most received the information from the media (26.2%) or from their work (27.7%). The authors report on four themes from the focus groups: a general lack of knowledge about the FASD; information about the FASD needs to be personally relevant; there is a need for further education; and there is a lack of clarity in the current guidance on alcohol use in pregnancy. The authors conclude that there is only a superficial knowledge of FASD in the general public and that further study is required to be able to properly tailor public health messages to subgroups including young women.

10. Thomas, S., Cannon, C., & French, J. (2015). The effects of state alcohol and pregnancy policies on women's health and healthy pregnancies. *Journal of Women, Politics & Policy, 36(1),* 68-94. doi: 10.1080/1554477X.2015.985153

In the United States various laws have been used to address alcohol use during pregnancy; punitive approaches attempt to control women's behaviour through civil commitment, reporting mechanisms and enforcement of policies such as child apprehension, while

supportive approaches are aimed at improving women's health and supporting healthy pregnancies through the provision of information, early intervention and treatment services. In this policy review, the authors use qualitative interviews and focus groups to investigate the effects of mixed-use laws (supportive and punitive policies both operating simultaneously in the same jurisdiction) on multiple groups, including pregnant and postpartum women. Overall more states have adopted supportive policies than punitive policies, and 15 states have both types, including California (the focus of the study). The authors describe in depth the effects of governmental policy responses to pregnancy and alcohol on women, on systems of care and enforcement and on the public. They describe how existing laws are not well known, the inconsistency of their application, the effects and effectiveness of the laws from the perspective of lawmakers and those who administer laws and the conflicts in in public opinion. The authors note the challenges of developing public health policy on complex issues such as pregnancy and alcohol. However, improvements in the approach can be achieved through analysing the effectiveness and consistency of the various responses, and enacting approaches that improve outcomes for women, fetuses and children.

Level 2 Prevention

1. Balachova, T., Sobell, L. C., Agrawal, S., Isurina, G., Tsvetkova, L., Volkova, E., & Bohora, S. (2015). Using a single binge drinking question to identify Russian women at risk for an alcohol-exposed pregnancy. *Addictive Behaviors, 46*, 53-57. doi: 10.1016/j.addbeh.2015.03.003

A recent US study found that a single question about binge drinking served to identify almost all women who were at risk for AEP, and in this study the authors replicate the US study to determine if the single question is effective in identifying Russian women at risk for alcohol exposed pregnancy (AEP). The authors asked 689 non-pregnant women of childbearing age the question "During the previous three months, how often did you have four or more drinks on one occasion," and compared these results to their reports of binge drinking on a 90-day Timeline Followback (TLFB) calendar. Similar to the US study, the single question identified 99% of at-risk women as binge drinkers. The authors conclude that their results suggest health care practitioners can successfully screen women for AEP risk using this one question.

2. Crawford-Williams, F., Steen, M., Esterman, A., Fielder, A., & Mikocka-Walus, A. (2015c). "If you can have one glass of wine now and then, why are you denying that to a woman with no evidence": Knowledge and practices of health professionals concerning alcohol consumption during pregnancy. *Women and Birth: Journal of The Australian College of Midwives*, 28(4), 329-335. doi: 10.1016/j.wombi.2015.04.003

In order to explore the advice that Australian health professionals give to pregnant women, their knowledge of the effects of alcohol consumption, and their consistency with following the Australian guidelines, the authors conducted 10 interviews with midwives, obstetricians and physicians who routinely provide antenatal care. Although the health care providers knew alcohol use was associated with lifelong physical and mental difficulties in children exposed to alcohol during pregnancy, their knowledge of the term FASD and the broad

range of outcomes associated with alcohol use during pregnancy was limited. The practitioners were willing to discuss alcohol use with their patients, but many did not as a routine part of their practice, with several practitioners citing judgement as a concern. The authors highlight that the 2012 Australian Clinical Practice Guidelines for antenatal care include information on how to communicate with pregnant women on alcohol use; and given practitioners are still expressing discomfort with these conversations the guidelines need further distribution.

3. Fitzgerald, N., Platt, L., Heywood, S., & McCambridge, J. (2015). Large-scale implementation of alcohol brief interventions in new settings in Scotland: a qualitative interview study of a national programme. *BMC Public Health*, *15*, 289-289. doi: 10.1186/s12889-015-1527-6

To investigate the experience of implementing alcohol brief interventions (ABI) in Scotland within settings outside of primary care, the authors conducted interviews with senior implementation leaders in antenatal, accident and emergency settings (n=14). Their results indicated that large-scale implementation of ABI was challenging for all the sectors. The participants identified five helpful strategies for implementation: 1) Setting a high-profile target for the number of ABIs delivered in a specific time frame, including a clear chain of responsibility, 2) Support from the senior staff from implementation, 3) Adapting the intervention using collaborative approaches to fit into current practices, 4) Developing practical monitoring and reporting systems, prior to implementation, 5) Establish close relationships with frontline staff including flexible approaches for training and ongoing support. The authors conclude that even with significant support, funding and specific targets, implementing ABI is not straightforward. However, the five strategies identified are relevant for supporting future initiatives.

4. Hettema, J., Cockrell, S., Russo, J., Corder-Mabe, J., Yowell-Many, A., Chisholm, C., & Ingersoll, K. (2015). Missed opportunities: Screening and brief intervention for risky alcohol use in women's health settings. *Journal of Women's Health*, 24(8), 648-654. doi: 10.1089/jwh.2014.4961

The authors conducted a cross-section, self-reported survey with a convenience sample of women attending public clinics for family planning or sexually transmitted infections (n=199). They found that 44% of the women reported risky drinking behaviour, and 17% were at risk for AEP. Despite these high rates, many women reported they did not receive screening, brief intervention and referral to treatment (SBIRT) services. More than half of women who reported risky drinking indicated that they were not advised about safe drinking limits (59%), and 53% of women at risk for AEP indicated that they had not discussed risk factors for AEP with their service provider. The women had a positive view toward receiving SBIRT, and 90% agreed that if drinking was affecting their health, that their women's health provider should advise them to cut down.

5. Montag, A. C., Brodine, S. K., Alcaraz, J. E., Clapp, J. D., Allison, M. A., Calac, D. J., . . . Chambers, C. D. (2015a). Preventing alcohol-exposed pregnancy among an American Indian/Alaska Native population: Effect of a screening, brief intervention, and referral to treatment intervention. *Alcoholism: Clinical and Experimental Research*, 39(1), 126-135. doi: 10.1111/acer.12607

In this randomized control trial, the authors evaluate the effectiveness of an online, culturally tailored screening, brief intervention and referral intervention for reducing alcohol exposed pregnancies among American Indian/Alaska Native (AIAN) women in Southern California. After completing a questionnaire, 263 eligible women of childbearing age (18-45 years) were randomly assigned to the intervention or treatment as usual. At baseline, one third of the women were at high risk for AEP. After the intervention, both groups decreased their self-reported risky drinking behaviours, both drinks per week (p<0.001) and binge drinking episodes per two weeks (p=0.017). Both groups had also reduced their risk of AEP at six months post-intervention. Factors associated with decreased risk of AEP included: baseline perception that other women in their peer group consumed a greater number of drinks per week, reporting a greater number of binge episodes and depression at baseline. The authors conclude that assessment and completing a questionnaire about drinking behaviours may be sufficient to encourage a behaviour change without the intervention, as those in the SBIR intervention and standard treatment groups did not differ significantly in change of risky drinking. The findings highlight the potential role of denormalization in interventions, given that perception of other's drinking influenced women's risky drinking

6. Montag, A. C., Brodine, S. K., Alcaraz, J. E., Clapp, J. D., Allison, M. A., Calac, D. J., . . . Chambers, C. D. (2015b). Effect of depression on risky drinking and response to a screening, brief intervention, and referral to treatment intervention. *American Journal of Public Health*, 105(8), 1572-1576. doi: 10.2105/AJPH.2015.302688

This article presents further results from the RCT reported in Montag et al. (2015a). In the sample of AIAN women from Southern California, 36% were identified as depressed on their baseline questionnaire, which far exceeds the national rate of 14%. Results also indicate that depression was associated with riskier alcohol use and contraceptive practices. They did not find any main effect of their SBIR intervention, above that of the benefits of assessment. Depressed participants in the intervention group showed a greater reduction in risky behavior, compared with non-depressed women (p < 0.001), which the authors hypothesize could be linked to the greater self-awareness and more "realistic understanding of personal risk" experienced by depressed individuals. The authors note that screening for depression may be particularly important in FASD prevention, given how common depression is in women of childbearing years and its relationship to historical trauma and ongoing discrimination experienced by AIAN women.

7. Muggli, E., Cook, B., O'Leary, C., Forster, D., & Halliday, J. (2015). Increasing accurate self-report in surveys of pregnancy alcohol use. *Midwifery*, *31*(3), e23-28 21p. doi: 10.1016/j.midw.2014.11.003

Since most pregnancy research relies on self-reported behavioural measures, reporting bias may contribute to the "ambiguous and conflicting" finding of research on low to moderate alcohol use. In an effort to identify determinants that would allow women to more

accurately report alcohol use on a survey, the authors conducted six focus groups with a total of 26 Australian pregnant women and new mothers. Women's emotional response to the questionnaires was generally favourable; however, they noted a potential for anxiety and fear of judgement with detailed questioning about alcohol. Accurate self-reports were limited by: women's ability to recall drinking for specific time periods, by the complex way in which questions were asked and the language used in questions, requiring interpretation (e.g. moderately). The women thought that using drink guides, linking drinking to occasions, introducing/contextualizing the questions, and guaranteeing confidentially could improve accurate reports. The women also stated a preference for methods other than face-to-face, including web-based surveys away from the judgment of health care providers.

8. Ondersma, S. J., Beatty, J. R., Svikis, D. S., Strickler, R. C., Tzilos, G. K., Chang, G., . . . Sokol, R. J. (2015). Computer-delivered screening and brief intervention for alcohol use in pregnancy: A pilot randomized trial. *Alcoholism: Clinical & Experimental Research*, *39*(7), 1219-1226 1218p. doi: 10.1111/acer.12747

The authors tested the feasibility and acceptability of a computer delivered SBIR intervention (that included three tailored mailings) with 48 pregnant women from Detroit Michigan who had screened positive for alcohol use. Participants were randomly assigned to either the intervention or a control group who participated in sessions on infant nutrition. Alcohol abstinence was measured at delivery, by a 90-day Timeline Follow-Back interview. The intervention was rated by participants as "easy to use" and "helpful" and had a medium-sized effect on 90-day prevalence abstinence (OR=3.4). The intervention was also moderately associated with a combined healthy pregnancy outcome variable (including live birth, normal birth weight, and no neonatal intensive care unit stay) (OR = 3.3). However, these effects were not significant, which is to be expected from a pilot with a small sample.

9. Petersen Williams, P., Petersen, Z., Sorsdahl, K., Mathews, C., Everett-Murphy, K., & Parry, C. D. H. (2015). Screening and brief interventions for alcohol and other drug use among pregnant women attending midwife obstetric units in Cape Town, South Africa: A qualitative study of the views of health care professionals. *Journal of Midwifery & Women's Health, 60(4),* 401-409. doi: 10.1111/jmwh.12328

The authors conducted 43 interviews to investigate the feasibility and acceptability from the perspective of health care workers, of a SBIR intervention in a primary care setting in South Africa. The participants identified a substantial need for SBIR, and believed that this could be incorporated into routine care. Potential barriers for implementation were identified and included: women not disclosing alcohol use, the intervention being considered an add-on service and additional work, negative staff attitudes towards implementing an intervention, poor communication skills of the staff (e.g. berating women), time and staff limits, lack of interest on behalf of the staff and language barriers. The authors conclude that there is a need for SBIR to be implemented in primary care in South Africa, but for it to be successful the intervention will need to address identified barriers.

10. Pollick, S. A., Beatty, J. R., Sokol, R. J., Strickler, R. C., Chang, G., Svikis, D. S., . . . Ondersma, S. J. (2015). Acceptability of a computerized brief intervention for alcohol among abstinent but at-risk pregnant women. *Substance Abuse, 36(1),* 13-20 18p. doi: 10.1080/08897077.2013.857631

The authors pilot tested the Computerized Brief Intervention for Alcohol Use in Pregnancy (C-BIAP) with 18 African American pregnant women who had a positive score on the T-ACE (Tolerance, Annoyance, Cut Down, and Eye Opener) alcohol screener. C-BIAP is based on a modified brief intervention and is implemented on a handheld device at prenatal clinics. The intervention was designed for use with women who screen at-risk, but currently do not report drinking. Participants rated C-BIAP as highly acceptable via a survey. Qualitative feedback was also generally positive and indicated that women accepted the theme of abstinence.

11. Skagerström, J., Häggström-Nordin, E., & Alehagen, S. (2015). The voice of non-pregnant women on alcohol consumption during pregnancy: a focus group study among women in Sweden. *BMC Public Health*, *15*, 1-9. doi: 10.1186/s12889-015-2519-2

Many women continue to consume alcohol around conception until pregnancy recognition. To investigate the perception of non-pregnant women concerning alcohol use during pregnancy, the authors conduced seven focus groups (n=34) with fertile, non-pregnant women who had never given birth. Three main themes emerged from their analysis: 1) the issue is important and should not be ignored; 2) there is uncertainty around alcohol and pregnancy; and 3) pregnancy is a transition into a new way of life. Alcohol was described as an integral part of women's lives, as there is a societal expectation that young women drink alcohol. The majority of the women agreed that they would not drink during pregnancy, and thought that women who did were irresponsible. However, participants had limited knowledge about the specific consequences of alcohol use during pregnancy. The authors conclude that there is a need for public health initiatives to provide more information about alcohol and pregnancy.

12. Sorsdahl, K. (2015). Feasibility and preliminary responses to a screening and brief intervention program for maternal mental disorders within the context of primary care. *Community Mental Health Journal*, *51*(8), 962-969.

This paper reports on the results of a process evaluation of a pilot SBIR intervention (for depression, alcohol, tobacco, and other drug use) implemented at a large midwife obstetric service in a disadvantaged community in South Africa. Data was obtained from: a review of program records; a questionnaire with women (n=70); interviews with health care providers (n=5); and three month follow-up interviews with participants (n=70). Document review indicated that 43% of the 1468 eligible women had been screened, with 21% screening at risk for depression, 26% screening positive for tobacco use, and 2% disclosing alcohol or other drug use. After the intervention, depression scores decreased significantly (t (69)= 8.51, p<0.001) as did tobacco use (t (73)= 3.45, p<0.001), but alcohol and other drug use was not affected. Barriers to implementation cited by service providers included a lack of referral pathways, particularly for women at risk for depression, and patient reluctance to disclose alcohol and drug use.

13. Wangberg, S. C. (2015). Norwegian midwives' use of screening for and brief interventions on alcohol use in pregnancy. *Sexual & Reproductive HealthCare, 6(3)*, 186-190 185p. doi: 10.1016/j.srhc.2015.03.001

To assess the current SBIR practices among Norwegian midwives, the authors conducted a web and telephone survey with all registered municipal midwives. The response rate was 52% (n=103). The vast majority (97%) of the respondents stated that they asked pregnant women about alcohol use during their first consultation. However, only 42% reported using a screening instrument, with use of the AUDIT or TWEAK tools being mentioned by only 16% of the midwives. Two thirds (66%) reported they needed more training on screening tools. The use of Motivational Interviewing (MI) was common among the midwives, but they had a low perceived competence for brief interventions and found it difficult to talk about alcohol use with clients of a different ethnicity. Other identified barriers included a lack of time and limited organized support.

14. Watkins, R. E., Reibel, T., Payne, J. M., Jones, H. M., Wilkins, A., Mutch, R., & Bower, C. (2015). Development of a scale to evaluate midwives' beliefs about assessing alcohol use during pregnancy. *BMC Pregnancy & Childbirth*, *15*, 1-13. doi: 10.1186/s12884-015-0779-6

A survey on midwives beliefs about assessing for alcohol use was sent to 245 midwives in Western Australia who were employed by a state wide country health service. The survey asked about positive and negative consequences, and opinions about capacity to ask women about alcohol use. Sixty-seven percent of the midwives completed the survey. The authors used an exploratory factor analysis to provide initial construct validation for the Asking About Alcohol (AAA) Scale. Six subscales were identified that assessed beliefs about: discomfort, capacity, effectiveness, role, trust and knowledge. The belief that it was their role to ask and a belief that asking about alcohol was effective were most strongly associated with an intention to ask all pregnant women about alcohol use (r = -0.59, p < 0.001 and r = -0.52, p < 0.001). The AAA Scale supported conceptualisation and measurement of midwives' beliefs and intentions.

15. Winstone, A. M., & Verity, C. (2015). Antenatal alcohol exposure: An East Anglian study of midwives' knowledge and practice. *British Journal of Midwifery, 23(3),* 180-186.

To investigate midwives knowledge, practice and opinions about screening pregnant women for alcohol use, the authors sent a questionnaire to midwives who worked at the NHS Trusts in East Anglia UK (n=1862). The response rate was low, with only 34% of the midwives responding. The majority of the midwives who responded (98%) indicated that abstinence from alcohol during pregnancy was their preferred advice, and 34% of the respondent had seen an infant with FASD. However, less than 2% of the respondents felt very prepared to deal with FASD, with only 10% being able to identify all four classic features (CNS abnormality/dysfunction, abnormal facial appearance, growth restriction, confirmed prenatal alcohol intake). The authors conclude that midwives require more knowledge of FASD in order to improve the quality of antenatal care and to prevent future cases of FASD.

Preconception interventions

1. Claesson, I., Hultgren, E., & Blomberg, M. (2015). Lifestyle habits and women's attitudes towards discussing them at a visit for contraceptive advice. *Sexual & Reproductive HealthCare*, *6*(3), 114-118 115p. doi: 10.1016/j.srhc.2014.08.002

The authors conducted a survey with Swedish women attending contraceptive counselling appointments with a midwife (which is free of charge in Sweden) to investigate women's perceptions of discussing lifestyle habits at these appointments, including alcohol and tobacco use and weight status. Generally women found discussing alcohol important (86%), not intrusive (86%) nor embarrassing (82%) and a good thing to be brought up by the midwife. Women with high-risk drinking habits were younger, more likely to be tobacco users and more often planning to be mothers in the future. These high-risk drinkers were significantly more likely to think discussing alcohol was intrusive (11%) and embarrassing (47%). The majority of the women (73%) said that they had not discussed alcohol with any other caregiver in the previous year, other than the midwife.

2. Hanson, J., & Jensen, J. (2015). Importance of social support in preventing alcohol-exposed pregnancies with American Indian communities. *Journal of Community Health*, 40(1), 138-146 139p. doi: 10.1007/s10900-014-9911-1

Focus groups with community members and key informant interviews with health and social service providers were conducted to evaluate the impact of social support on encouraging behavior change in the context of the Oglala Sioux Tribe (OST) CHOICES Program in South Dakota. The authors conducted eight focus groups (n=58) with American Indian community members (Three with women of childbearing age, two with elder women and three with adult men), and interviews with 25 health and social service professionals. Several themes emerged from the content analysis including: "the role of family (especially elders), the impact community can have, and the important function of culture." The results highlight the importance of social support for influencing alcohol exposed pregnancy (AEP) prevention particularly among this American Indian population with strong cultural and historical significance of social support.

3. Hanson, J. D., Ingersoll, K., & Pourier, S. (2015). Development and implementation of CHOICES group to reduce drinking, improve contraception, and prevent alcohol-exposed pregnancies in American Indian women. *Journal of Substance Abuse Treatment*. doi: 10.1016/j.jsat.2015.07.006

This article describes the results of a pilot evaluation of a modified version of the Project CHOICES Group Intervention with the Oglala Sioux Tribe in South Dakota. Over ten months, twelve groups of non-pregnant women aged 18-44 were recruited (n=40) for the pilot. Participants were not using contraception or using it inconsistently or incorrectly; and reported an average number of standard drinks per day as 14.9. In terms of changes in birth control use, women appeared more likely to choose birth control methods such as Depo Provera or oral contraceptives as opposed to the more reliable long-acting reversible contraceptives (LARCs). From a Group Climate questionnaire, it was found that the groups had low levels of anger and tension, average levels of avoidance of personal responsibility by group members, and that participants were generally positively engaged. Changes in alcohol use will be recorded at planned 3 and 6 month post intervention periods. CHOICES

staff evaluations indicated strengths in certain MI skills; however, improvement was needed in some core MI and leadership skills. The group leaders felt the group discussions may be more fruitful when the groups were organized by age.

4. Hanson, J. D., & Pourier, S. (2015). The Oglala Sioux Tribe CHOICES Program: Modifying an existing alcohol-exposed pregnancy intervention for use in an American Indian community. *International Journal Of Environmental Research And Public Health*, *13(1)*. doi: 10.3390/ijerph13010001

The authors describe the modifications made to the original CHOICES program through extensive community input to create the Oglala Sioux Tribe (OST) CHOICES Program. They also report preliminary feasibility and acceptability outcomes, and implementation outcomes, such as number of participants and sessions delivered. Evaluations have indicated that the intervention is acceptable to non-pregnant OST women in the study community. While data collection is ongoing, the program has shown initial success in changing behaviour and changing how women and practitioners view the prevention of AEP.

5. Hussein, N., Kai, J., & Qureshi, N. (2015). The effects of preconception interventions on improving reproductive health and pregnancy outcomes in primary care: A systematic review. *The European Journal Of General Practice*, 1-11.

This systematic review summarizes the effectiveness of preconception interventions for improving reproductive health and pregnancy outcomes in primary care. The authors located eight studies (published in English) to review: half included multifactorial risks, and half focused on a single risk (e.g. folate or alcohol). Regardless of level of intervention (brief or intensive) there was some evidence that both single and multifaceted interventions increased knowledge, self-efficacy, health locus of control and risk behaviours. However, there was no evidence to suggest that the interventions reduced adverse pregnancy outcomes (e.g. prevalence of congenital abnormalities). The authors indicate that more research is needed, as the quality of the reviewed studies was moderate to poor.

6. Johnson, S. K., Velasquez, M. M., & von Sternberg, K. (2015). CHOICES: An empirically supported intervention for preventing alcohol-exposed pregnancy in community settings. *Research on Social Work Practice*, *25*(4), 488-492. doi: 10.1177/1049731514543668

In this article, the authors discuss the successes and challenges of disseminating the evidence supported CHIOCES intervention, into "real-world" settings such as primary care, jails, and substance use treatment. The authors begin by describing the rationale for creating CHOICES, and the feasibility and efficacy results that were demonstrated through preliminary research. Next they describe the development of CHOICES including the theoretical basis for MI and a detailed description of the dually focussed (contraception and alcohol use) four-session intervention. They conclude by highlighting elements of the dissemination that led to increased feasibility and fidelity including manualization of the intervention, providing materials free of charge and employing a train-the-trainer model. The authors also briefly discuss questions related to flexibility of the intervention which have arisen during implementation - such as shortening the intervention, offering it in a

group model, spending additional time on contraceptive options in locations where access to contraceptive counselling and services are limited, working with pregnant women and women with co-occurring health and substance use issues.

7. Landeen, L. B., Bogue, R., & Schuneman, M. (2015). Preconception and prenatal care--useful tools for providers of women's health. *South Dakota Medicine: The Journal Of The South Dakota State Medical Association, Spec No.*, 36-43.

In this narrative review, the authors summarize available evidence on preconception care and prenatal counselling and education on four modifiable risk factors (alcohol, tobacco, sexually transmitted infections and obesity) for a medical audience. In their discussion of alcohol, they highlight CHOICES as an effective intervention for reducing AEP. They also highlight increasing contraception effectiveness, particularly the use of long-acting reversible contraception (LARC) as a strategy for reducing AEP, by reducing unintended pregnancy. They conclude the article by introducing the fetal origin of disease theory, and suggest that it is a "compelling and powerful" reason to engage women in behaviour modification before and during their pregnancy.

8. McBride, N. (2015). Paternal involvement in alcohol exposure during preconception and pregnancy. *Australian Nursing & Midwifery Journal, 22(10)*, 51-51.

In this brief commentary, the author highlights paternal involvement in alcohol exposure during conception and pregnancy. The author indicates that since factors such as high life stress, current drug use in the home, drinking in the company of partners, and exposure to violence are associated with alcohol use during pregnancy, the decisions about alcohol use during pregnancy are not exclusively made by women. Recent American research has suggested that 75-80% of men want male-oriented preconception information and involving men in preconception health supports female partners' change. The author concludes that prospective fathers should be involved in preconception care as a strategy to prevent FASD.

9. Mitra, M., Clements, K. M., Zhang, J., & Smith, L. D. (2015). Disparities in adverse preconception risk factors between women with and without disabilities. *Maternal and Child Health Journal*. doi: 10.1007/s10995-015-1848-1

The authors compared the preconception risk factors of non-pregnant women (age 18-44) with (n= 8370) and without (n= 48,036) disabilities using data from the 2010 Behavioral Risk Factor Surveillance System in the US. Women with disabilities were more likely to smoke (31% compared with 15%, p<0.0001), but rates of heavy drinking were similar between the groups (4.4% compared with 4.5%, p=0.9). Women with disabilities were more likely to rate their health as fair or poor (35% compared with 6.7% good or very good), and they also indicated more frequent mental distress, obesity, and lack of emotional support. These differences remained even after adjusting for socio-demographic factors. The authors conclude that there is a need for targeted preconception care for women with disabilities.

10. Oza-Frank, R., Kachoria, R., Keim, S. A., & Klebanoff, M. A. (2015). Provision of specific preconception care messages and associated maternal health behaviors before and during pregnancy. *American Journal of Obstetrics & Gynecology*, 212(3), 372.e371-372.e378. doi: 10.1016/j.ajog.2014.10.027

To investigate if receiving specific preconception messages was associated with maternal behaviour during pregnancy, the authors analyzed data from the 2009-2010 Pregnancy Risk Assessment Monitoring System in the US. Women who indicated they had received preconception care (32%, n=10,267) were asked questions about what specific messages they received about: taking vitamins with folic acid before pregnancy, dieting to lose weight or exercising before pregnancy, and smoking and drinking alcohol during pregnancy. The results indicate that only counselling on folic acid was associated with behaviour change. However, counselling on dieting, exercise, drinking and smoking did not change the behaviour of women who were at high risk.

Level 3 Prevention

1. Bhat, A., & Hadley, A. (2015). The management of alcohol withdrawal in pregnancy — case report, literature review and preliminary recommendations. *General Hospital Psychiatry, 37(3),* 273.e271-273 271p. doi: 10.1016/j.genhosppsych.2015.02.001

The authors use a case report from the US to describe the currently available evidence for managing alcohol withdrawal during pregnancy and to summarize available information on assessment and treatment. The authors summarize available evidence on the effects of alcohol withdrawal on pregnancy (e.g. placental abruption, preterm delivery and fetal distress or demise), and describe the available evidence on benzodiazepine use for managing withdrawal, monitoring alcohol withdrawal, and alternative withdrawal strategies (including tapering use). They conclude that while the association between alcohol use during pregnancy and neurodevelopmental abnormalities in the child is well established, the risk of teratogenicity and neonatal complications with available treatments for alcohol withdrawal is still unclear.

2. Crawford-Williams, F., Steen, M., Esterman, A., Fielder, A., & Mikocka-Walus, A. (2015d). "My midwife said that having a glass of red wine was actually better for the baby": a focus group study of women and their partner's knowledge and experiences relating to alcohol consumption in pregnancy. *BMC Pregnancy & Childbirth*, 15(1), 1-11. doi: 10.1186/s12884-015-0506-3

To gain insight into the view and experience of pregnant women, new mothers and their partners about alcohol use during pregnancy, the authors recruited participants from Women's and Children's Hospital and University of South Australia and conducted five small focus groups (n=21, 17 female). Although most participants knew that they should not drink during pregnancy, they were unable to identify specific harmful effects. They indicated that health care providers did not routinely ask them about alcohol use and provide them information. Based on their findings, the authors recommend that public health messages need to more clearly and consistently articulate the effects of alcohol on fetal development. The authors discuss the complexity of providing comprehensive and

helpful information about alcohol and pregnancy given the complexity of the issue, including the perception of alcohol as a stress reliever, differing views about alcohol on the part of women and their partners, and related issues identified using this in-depth qualitative method.

3. de Vries, M. M., Joubert, B., Cloete, M., Roux, S., Baca, B. A., Hasken, J. M., . . . May, P. A. (2015). Indicated prevention of Fetal Alcohol Spectrum Disorders in South Africa: Effectiveness of case management. *International Journal Of Environmental Research And Public Health*, *13(1)*. doi: 10.3390/ijerph13010076

The authors investigated the effectiveness of a case management intervention for reducing heavy drinking during pregnancy, with the goal of cessation or reduction, with 67 pregnant women in South Africa. The intervention included Motivational Interviewing techniques, life management and the Community Reinforcement Approach. The authors collected data by interviews at baseline (the start of case management), 6, 12 and 18 months. At the six month measurement mean drinking had decreased significantly; however, alcohol consumption increased significantly over time to levels higher than baseline by 12 and 18 months, which may be explained by the trend that most women decrease their alcohol use prior to pregnancy and during the second and third trimester. The intervention successfully reduced heavy drinking during pregnancy. The intervention also served to increase scores on a Happiness Scale that measured women's well being, which was correlated with lower weekend drinking.

The authors overviews the conflicting evidence about the risks posed by alcohol, and the controversy surrounding the volume of alcohol consumed that correlates with these consequences. They then summarize evidence for screening for alcohol use during pregnancy, indicating that the T-ACE/T-ACER-3, TWEAK, and SURP-P screening tests have all been validated among pregnant women. They conclude by summarizing available evidence for treatment and management of withdrawal in pregnancy including pharmacological and behavioural interventions. They highlight that there is very limited evidence to support pharmacologic interventions or to guide the management of alcohol detoxification with pregnant women. Using benzodiazepines (commonly used in alcohol detoxification) with pregnant women is controversial. The authors indicate that benzodiazepine use should be weighed against the risk of continued alcohol use, and decisions regarding behavioural and pharmaceutical interventions should be made on a case-by-case basis.

5. Doi, L., Jepson, R., & Cheyne, H. (2015). A realist evaluation of an antenatal programme to change drinking behaviour of pregnant women. *Midwifery*, *31(10)*, 965-972. doi: 10.1016/j.midw.2015.06.007

The authors conducted a realist evaluation to investigate how and in what circumstances screening and brief interventions (SBI) for alcohol use work in routine antenatal care in a health board in Scotland. In the first phase of the study, the authors conducted two systematic reviews and interviewed four participants who were responsible for policy

implementation. In the second phase, they interviewed pregnant women (n=17) and midwives (n=15), and conducted a focus group with midwifery team leaders (n=6). Midwives indicated the training and resources they received as part of the program facilitated their skills and confidence to deliver SBI. Results indicated that receiving a SBI as part of program changed the attitudes of pregnant women about drinking during pregnancy. The intervention may have also been related to changes in drinking behaviour during pregnancy, but the small number of women who received the intervention and used alcohol made it difficult to determine. The authors conclude that training for midwives is required for improving person-centred communication skills, to overcome the barriers associated with discussing alcohol use in the first antenatal appointment and to enhance the effectiveness of SBI on alcohol use.

6. Kramlich, D., & Kronk, R. (2015). Relational care for perinatal substance use: A systematic review. *MCN*, the American Journal of Maternal Child Nursing, 40(5), 320-326.

The authors conducted a systematic review of multidisciplinary programs for substance using pregnant women. They included quantitative, qualitative, and mixed-methods studies that had been published in English, in the past 10 years, that included some measure of relational variables, such as healthcare provider engagement or facilitation of maternal bonding. They identified six studies: Three qualitative studies explored women's perspectives of the impact of services, one of which included retrospective clinical data to confirm the clinical successes reported by the women; one retrospective analysis of medical records; and two studies of prospective cohorts of women, one of which followed women through their pregnancy, combined with a retrospective analysis of hospital records. The authors note that it is difficult to compare results as the programs structure and location, model of delivery, client demographics, and evaluation methods varied greatly across the studies. However, they conclude that "comprehensive, integrated multidisciplinary services for pregnant women with substance use disorder aimed at harm reduction are showing positive results." They note the evidence for caring relational approaches by health care providers as women engage with comprehensive services. They call for future studies to improve the description of the services offered and for work on standardizing measurements and outcome variables to strengthen the quality of evidence to support these types of programs.

7. Marcellus, L., MacKinnon, K., Benoit, C., Phillips, R., & Stengel, C. (2015). Reenvisioning success for programs supporting pregnant women with problematic substance use. *Qualitative Health Research*, *25(4)*, 500-512. doi: 10.1177/1049732314551058

This study addressed how new definitions of program success are required in services working with people with problematic substance use issues, beyond achieving abstinence. The authors conducted a mixed methods study to identify key process and outcome indicators for HerWay Home, a community-based, integrated, primary care maternity program in Victoria, British Columbia, Canada in the formative development stage. They collected data through field observations of community team meetings and program planning work sessions, document analysis, and individual semi-structured interviews and individual questionnaires with program participants, service providers, community partners and system leaders. A range of nuanced and incremental indicators of success for infants and mothers served, as well as for the service providers and programs overall are

identified.

8. Rotheram-Borus, M. J., Tomlinson, M., Roux, I. L., & Stein, J. A. (2015). Alcohol use, partner violence, and depression: A cluster randomized controlled trial among urban South African mothers over 3 years. *American Journal of Preventive Medicine*, *49*(*5*), 715-725. doi: 10.1016/j.amepre.2015.05.004

To investigate a home visitation intervention, the authors conducted a cluster RCT with all pregnant women in 24 low income, urban neighbourhoods in Cape Town South Africa. Neighbourhoods were randomized to standard care (n=12 neighbourhoods, n=594 mothers), or a home-visiting intervention condition that focused on maternal and child health, HIV/tuberculosis, alcohol use, and nutrition (n=12 neighbourhoods, n=644 mothers). Mothers were assessed during pregnancy, and at 18 and 36 months post partum. The authors used a longitudinal structural equation modeling to assess if alcohol use, partner violence and depression at baseline were predictors of maternal outcomes at 36 months post partum. Compared with standard care, women who received the intervention were significantly less likely to report symptoms of depression and had a more positive quality of life at 36 months. Women who drank during pregnancy continued to use alcohol over time, and although the intervention did decrease alcohol use during pregnancy, use among these women resumed after birth. The authors suggest therefore that alcohol use is a stable behaviour, likely requiring more intensive and sustained intervention. Alcohol use was related to HIV status and depression at each assessment, and with partner violence at 36 months. It appears from this study that alcohol use, IPV and depression are quite stable from pregnancy through the first 36 months of children's lives (with depression most amenable to change) requiring integrated intervention.

9. Torchalla, I., Linden, I. A., Strehlau, V., Neilson, E. K., & Krausz, M. (2015). "Like a lots happened with my whole childhood": violence, trauma, and addiction in pregnant and postpartum women from Vancouver's Downtown Eastside. *Harm Reduction Journal*, *12*(1), 1-10. doi: 10.1186/1477-7517-12-1

The authors interviewed 27 women accessing harm reduction services for pregnant and postpartum women in the Downtown Eastside of Vancouver, to explore the impacts of trauma and gender-based violence in their lives. Key themes from the interviews highlighted the ubiquity of multiple and continuing experience of trauma throughout the women's lives. These adversities included both individual level events and environmental and structural conditions that reinforced these experiences. Although the women expressed concern of passing their trauma to the next generation, they also expressed reluctance around trauma specific support. The authors conclude that understandings of trauma must be integrated into delivering harm reduction services for poor and marginalized women, and recommend these services integrate trauma-informed approaches. They also note that it is necessary to make a shift from focusing on individual health status to needed systemic policy interventions; and from issues of drug use/ harm reduction only, to those related to gendered vulnerabilities and rights.

10. Whittaker, A. (2015). Guidelines for the identification and management of substance use and substance use disorders in pregnancy. *Drug & Alcohol Review, 34(3),* 340-341. doi: 10.1111/dar.1221

This commentary highlights the new WHO guidelines on substance use in pregnancy. The author provides an overview of the content related to screening and brief interventions, psychosocial interventions, detoxification, management of dependence, infant feeding and management of infant withdrawal. A significant limitation of the guidance is that it is based on systematic review of only 93 articles, and considerable gaps in knowledge exist, particularly regarding detoxification and infant feeding. The included outcome measures were narrow in scope and the author notes that as a result questions about the effectiveness of different treatment approaches on quality of life, family relationships and the long-term health and wellbeing of mother and child are unanswered. Ethical issues surrounding the treatment and care of pregnant women are also not addressed in the guidance, and the topics of mandatory reporting to social services and caring for women in the criminal justice system are overlooked. The author concludes that despite these very significant limitations, the guidance should be essential reading for all practitioners who work with women, children and families where substance use is involved.

Level 4 Prevention

1. Fowler, C., Rossiter, C., Sherwood, J., & Day, C. (2015). New understandings of mothering: Mothers in an abstinence-based drug treatment program. *International Journal of Mental Health & Addiction, 13(2),* 173-184. doi: 10.1007/s11469-014-9518-x

This paper examines a small innovative program in Australia that integrates parenting support with rehabilitation for substance-dependent mothers with young children. This paper reports the results of semi-structured interviews with participants (n=4), which were conducted as part of a larger evaluation. Four main themes emerged from the interviews: rethinking mothering; enhancing maternal capacity and competence; providing motherand child-centred care; and managing child behaviour. The mothers report a substantive change in their understanding of motherhood and of parenting. The multidisciplinary program was able to facilitate a more accepting and realistic view among the women of themselves as mothers and development of practical parenting skills and confidence. The authors indicated that interventions delivered jointly by service providers working in substance use and parenting services that are able to acknowledge the role of parenting and its complex relationship with substance dependence are essential for substance using women and for their children.

2. Rotheram-Borus, M. J., Tomlinson, M., Roux, I. L., & Stein, J. A. (2015). Alcohol use, partner violence, and depression: A cluster randomized controlled trial among urban South African mothers over 3 years. *American Journal of Preventive Medicine*, 49(5), 715-725. doi: 10.1016/j.amepre.2015.05.004

(See abstract above).

3. Shaw, M. R., Grant, T., Barbosa-Leiker, C., Fleming, S. E., Henley, S., & Graham, J. C. (2015). Intervention with substance-abusing mothers: Are there rural-urban differences? *American Journal on Addictions, 24(2),* 144-152 149p. doi: 10.1111/ajad.12155

To examine urban and rural differences among substance using women, the authors examined data reports of all women (n=773) enrolled in the Parent-Child Assistance Program (PCAP) from 1998 to 2008 in Washington State. Rural participants reported higher rates of alcohol use (both use and binge drinking) at intake and at the 3-year program exit, and rural participants reported more suicidal thoughts at the end of the program. Rural women were also less likely to complete outpatient treatment for their substance use, and less likely to have used services for alcohol/drug support and mental health. The authors cite concern with their results; and highlight the important differences and barriers substance-using women in rural and remote areas may face. They conclude by calling for the identification of community-specific needs of substance using pregnant and parenting women in both rural and urban settings to ensure the development and improvement of successful treatment and interventions for these women.

4. Thanh, N. X., Jonsson, E., Moffatt, J., Dennett, L., Chuck, A. W., & Birchard, S. (2015). An economic evaluation of the Parent–Child Assistance Program for preventing fetal alcohol spectrum disorder in Alberta, Canada. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(1), 10-18. doi: 10.1007/s10488-014-0537-5

The authors determined the cost-effectiveness and the net monetary benefit of the Parent–Child Assistance Program (P-CAP) in Alberta's Fetal Alcohol Spectrum Disorder Service Networks using a decision analytic modeling technique. Their model estimated that the program prevented 31 cases of FASD (range 20-43 cases), with a cost per prevented case of \$97,000 (range \$72,000 to \$153,000). The net benefit of P-CAP was \$22 million (range \$13 million to \$31 million). When compared with the incremental lifetime cost of an FASD case (\$800,000), the results indicate that the program is cost–effective. The effectiveness of P-CAP was not only related to reducing alcohol use during pregnancy, but also to providing effective measures for family planning.

Other articles with relevance to FASD prevention

1. Bingham, R. J. (2015). Latest evidence on alcohol and pregnancy. *Nursing For Women's Health*, 19(4), 338-344. doi: 10.1111/1751-486X.12219

This article provides an overview of the history of attention to alcohol and pregnancy and current evidence on prevalence and consequences of alcohol use during pregnancy directed to a nursing audience. The article concludes with implications for nursing practice. The author recommends that nurses have conversations about alcohol during health care visits with all adult and adolescent clients, particularly women of child bearing age, pregnant women, and women trying to conceive, and where needed offer brief counselling.

2. Braillon, A., & Bewley, S. (2015). Impartial information about alcohol during pregnancy or another modern day witch hunt? *BMJ (Clinical Research Ed.)*, 351, h5680-h5680. doi: 10.1136/bmj.h5680

In this letter to the editor, the authors respond to O'Brien commentary in "Should women abstain from alcohol throughout pregnancy?" (see Mather, M., Wiles, K., & O'Brien, P. (2015) below). While the authors agrees that medical professionals should respect women's autonomy, they believe O'Brien missed the impact the alcohol industry has on deliberately misleading women. The alcohol industry actively markets a carcinogen and teratogen as a healthy lifestyle choice. The authors recommend that good advise should not be stigmatizing, and that it is unreasonable to ask pregnant women to completely go against the social norms of consuming alcohol. Instead they propose a societal view where governments address reducing overall alcohol use as a public health challenge and provide effective interventions instead of pointing a blaming finger at pregnant women who drink.

3. Cherry, A. L. (2015). Shifting our focus from retribution to social justice: An alternative vision for the treatment of pregnant women who harm their fetuses. *Journal of Law and Health*, *28*(1), 5-61.

In this article the author describes the legal and social treatment of pregnant women who's behaviour can harm their fetus, arguing that society should approach these behaviours from the vantage point of pregnant women's social location. As the social location of women who harm their fetuses during pregnancy often includes poverty, violence, need and despair, placing blame and "exacting retribution on an individual woman, absent an understanding of the social context, makes the provision of justice in these cases difficult if not impossible." The author presents three case studies of criminal prosecution of pregnant women (depression and attempted suicide, drug and alcohol use, and self-induced abortion), then explores two contemporary rhetorical devices regarding fetal personhood and maternal deviance, and concludes by proposing that both law and society shift their focus to include social context thereby focusing on the lives of pregnant women.

4. Elliott, E. J. (2015). Fetal alcohol spectrum disorders in Australia--the future is prevention. *Public Health Research & Practice, 25(2),* e2521516-e2521516. doi: 10.17061/phrp2521516

Alcohol use is common among pregnant women in Australia, and in this paper the author provides an overview of FASD prevention in Australia. In 2011 the federal parliament conducted an inquiry into FASD and in June 2014 they funded the creation of the National FASD Technical Network, both of which drew attention to the need for prevention efforts in Australia. The paper details epidemiological data of FASD in Australia and concludes with a description of a prevention framework that includes primary (raising individual and community awareness), secondary (screening, brief intervention, treatment and contraceptive counselling) and tertiary (early diagnosis and interventions with children who have FASD) prevention efforts.

5. Hubberstey, C., Rutman, D., Hume, S., Van Bibber, M., & Poole, N. (2015). Toward an evaluation framework for community-based FASD prevention programs. *Canadian Journal of Program Evaluation*, *30*(1), 79-89.

The authors identified existing gaps with respect to evaluating community based FASD

prevention programs. There are often limited opportunities for program managers, policy makers, and funders to collaboratively discuss relevant outcomes, indicators, and evaluation approaches. The goal of this project was to develop evaluation approaches that are responsive to the social, cultural, and geographic diversity of programs that serve women at risk for having a child with FASD, birth mothers and their children, and, youth and adults with FASD, including programs in Aboriginal communities. The authors worked with an Advisory Committee of researchers, service providers and program managers from across Canada to review current evidence on program evaluation and develop evaluation frameworks. Three evaluation 'maps' were developed which visually depict the philosophical/theoretical thinking that underpins a program, the program activities chosen, and the potential participant, program and community outcomes. This evaluation approach highlights the importance of understanding core theoretical bases of programming - such as being FASD-informed, culturally safe, holistic, respectful, relational, trauma-informed, harm reduction oriented, and outreach-based – when designing evaluation approaches. The evaluation maps are intended to support a common language, and common evaluation measurements which will allow program planners and managers to better understand what works best for whom.

6. Mather, M., Wiles, K., & O'Brien, P. (2015) Should women abstain from alcohol throughout pregnancy? *BMJ: British Medical Journal, 351(8028),* h5232-5232 5232p.

In this commentary two perspectives are presented on the current inconsistent guidance about alcohol use during pregnancy. Mary Mather (retired consultant paediatrician) and Kate Wiles (NIHR doctoral research fellow) present a case that yes, women should be advised to abstain from alcohol use during pregnancy. Mather and Wiles highlight how the current UK recommendations are at odds with international consensus that "there is no known safe amount of alcohol to drink while pregnant," and that currently available evidence is not strong enough to exclude risk. They conclude that the current UK guidance is confusing and instead "advice needs to be clear, unambiguous, and acknowledge that an absence of evidence of harm is not the same as safety." From a different perspective, Patrick O'Brien (consultant honorary senior lecturer in obstetrics and gynaecology) argues it is wrong to assume pregnant women cannot understand the nuanced evidence. O'Brien argues that the differing perspectives raise a fundamental issue about the relationship between patient and practitioner. He stresses the need to respect patient's autonomy, and highlights that other difficult and complex topics are routinely discussed in the context of perinatal visits, including the screening for Down's Syndrome. He concludes there is a need to clear up ambiguity in the current guidance without ignoring the uncertainty in the currently available evidence, because without doing so doctors are likely to lose the trust of their patients.

7. Rutman, D., Hubberstey, C., Poole, N., Hume, S., & Bibber, M. (2015). Developing and using a common framework to evaluate FASD programs: Results of a three-year Canadian project. *International Journal of Mental Health and Addiction*. doi: 10.1007/s11469-015-9597-3

This article describes the process and results of a three-year project to develop common evaluation frameworks for evaluating FASD programs. The project employed a mixed methods approach and consisted of an extensive evidence review and consultations with multi-disciplinary service providers, program funders, researchers, and evaluators across

Canada. The outcome of the project was the creation of three visual maps for evaluating: a) FASD support programs; b) FASD prevention programs; and c) FASD programming in Aboriginal communities. The maps are informed by a social determinants of health lens, and are depicted as concentric rings including theoretical foundations, activities, program outcomes, and holistic participant, community and systemic outcomes. The authors also share findings about the applicability and utility of these frameworks.

8. Warren, K. R. (2015). A review of the history of attitudes toward drinking in pregnancy. *Alcoholism: Clinical and Experimental Research, 39(7),* 1110-1117. doi: 10.1111/acer.12757

In this article, the authors overview the history and evolution of the field of studying alcohol use during pregnancy from prior to the 20^{th} century, through prohibition, to the health advisories in the late 70's, through prevention strategies such as bottle labelling and medical society recommendations, concluding with current rates and understandings of FASD. The authors highlight the impact of the National Institute on Alcohol Abuse and Alcoholism (NIAAA), founded in 1971, on the field of FASD research and awareness. For example, the NIAAA supported early research and called attention to FAS in the early 70's, This research was foundational for the first health advisories issued by the US government on drinking during pregnancy.

Summary of included studies by method and country of study

Table 2:

	Author	Title	Methods	Country	Page
Preval	lence of Drinking	During Pregnancy			
	Blaauw Isaksen et al. (2015)	Alcohol consumption among pregnant women in Northern Tanzania 2000-2010: a registrybased study	Cross sectional	Tanzania	4
	Cannon et al. (2015)	Prevalence and characteristics of women at risk for an alcohol- exposed pregnancy (AEP) in the United States: Estimates from the National Survey of Family Growth	Cross sectional	USA	4
n=26	Dunney, Muldoon, & Murphy (2015)	Alcohol consumption in pregnancy and its implications for breastfeeding	Prospective cohort	Ireland	4
n=26	English et al. (2015)	Prevalence of Ethanol Use Among Pregnant Women in Southwestern Uganda	Cross sectional	Uganda	5
	Esposito et al. (2015)	Women's Knowledge, Attitudes and Behavior about Maternal Risk Factors in Pregnancy	Cross sectional	Italy	5
	Fitzpatrick et al. (2015)	Prevalence and patterns of alcohol use in pregnancy in remote Western Australian communities: The Lililwan project.	Cross sectional	Australia	5
	Forray et al.	Perinatal substance use: A	Prospective	USA	6

Author	Title	Methods	Country	Page
(2015)	prospective evaluation of abstinence and relapse	Cohort		
Fortin et al. (2015)	Trajectories of Alcohol Use and Binge Drinking Among Pregnant Inuit Women	Prospective Cohort	Canada	6
Frankenberger, Clements-Nolle & Yang (2015)	The association between adverse childhood experiences and alcohol use during pregnancy in a representative sample of adult women.	Cross sectional	USA	6
González-Mesa et al. (2015)	High levels of alcohol consumption in pregnant women from a touristic area of Southern Spain	Cross sectional	Spain	7
Iversen et al. (2015)	Alcohol consumption and binge drinking in early pregnancy. A cross-sectional study with data from the Copenhagen Pregnancy Cohort.	Cross sectional	Denmark	7
Kingsbury et al. (2015)	Women's frequency of alcohol consumption prior to pregnancy and at their pregnancy-booking visit 2001–2006: A cohort study	Prospective cohort	Australia	7
Kitsantas, Gaffney, & Wu (2015)	Identifying high-risk subgroups for alcohol consumption among younger and older pregnant women	Cross sectional	USA	8
Lange et al. (2015a)	Alcohol use, smoking and their co-occurrence during pregnancy among Canadian women, 2003 to 2011/12.	Cross sectional	Canada	8
Lange et al. (2015b)	Alcohol use and self-perceived mental health status among pregnant and breastfeeding women in Canada: a secondary data analysis	Cross sectional	Canada	8
Lanting et al. (2015)	Prevalence and pattern of alcohol consumption during pregnancy in the Netherlands	Cross sectional	The Netherlands	9
Liu, Mumford & Petras (2015)	Maternal alcohol consumption during the perinatal and early parenting period: A longitudinal analysis.	Longitudinal	USA	9
Melchior et al. (2015)	Tobacco and alcohol use in pregnancy in France: The role of migrant status: The nationally representative ELFE study.	Cross sectional	France	9

	Author	Title	Methods	Country	Page
	O'Keeffe (2015)	Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies.	A cross comparison of retrospective and prospective cohorts	UK (Data from UK, Ireland, New Zealand and Australia)	10
	Ordinioha & Brisibe (2015)	Alcohol consumption among pregnant women attending the antenatal clinic of a tertiary hospital in South-South Nigeria.	Cross sectional	Nigeria	10
	Oulman et al. (2015)	Prevalence and predictors of unintended pregnancy among women: an analysis of the Canadian Maternity Experiences Survey.	Cross sectional	Canada	10
	Petersen et al. (2015)	Women's perception of risks of adverse fetal pregnancy outcomes: a large-scale multinational survey.	Cross sectional	First author is from UK (Data from 18 countries in Europe, North America and Australia)	11
	Popova et al. (2015)	The Economic Burden of Fetal Alcohol Spectrum Disorder in Canada in 2013.	Cost-of-illness study	Canada	11
	Salas-Wright, Vaughn & Ugalde (2015)	A typology of substance use among pregnant teens in the United States	Cross sectional	USA	11
	Skreden et al. (2015)	Changes in beverage consumption from pre-pregnancy to early pregnancy in the Norwegian Fit for Delivery study.	Cross sectional	Norway	12
	Tan et al. (2015)	Alcohol use and binge drinking among women of childbearing age - United States, 2011-2013.	Cross sectional	USA	12
Influe	nces and factors a	ssociated with drinking in pregna	ncy		
	Benoit et al. (2015)	Complicating the dominant morality discourse: mothers and fathers' constructions of substance use during pregnancy and early parenthood.	Qualitative	Canada	12
n=12	Esposito et al. (2015)	Women's Knowledge, Attitudes and Behavior about Maternal Risk Factors in Pregnancy.	Cross sectional	Italy	5
	Frankenberger, Clements-Nolle & Yang (2015)	The association between adverse childhood experiences and alcohol use during pregnancy in a representative sample of adult women.	Cross sectional	USA	6

	Author	Title	Methods	Country	Page
	Lange et al. (2015a)	Alcohol use, smoking and their co-occurrence during pregnancy among Canadian women, 2003 to 2011/12	Cross sectional	Canada	8
	Lange et al. (2015b)	Alcohol use and self-perceived mental health status among pregnant and breastfeeding women in Canada: a secondary data analysis	Cross sectional	Canada	8
	Lepper et al. (2015)	Socioeconomic status, alcohol use, and pregnancy intention in a national sample of women.	Cross sectional	USA	13
	Liu, Mumford & Petras (2015)	Maternal alcohol consumption during the perinatal and early parenting period: A longitudinal analysis.	Longitudinal	USA	9
	0'Keeffe (2015)	Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies.	A cross comparison of retrospective and prospective cohorts	UK (Data from UK, Ireland, New Zealand and Australia)	10
	Tran, Najman & Hayatbakhsh (2015)	Predictors of maternal drinking trajectories before and after pregnancy: evidence from a longitudinal study.	Longitudinal	Australia	14
	Watt et al. (2015)	Alcohol use during pregnancy in a South African community: Reconciling knowledge, norms, and personal experience.	Qualitative	South Africa	14
	Witt et al. (2015	Predictors of alcohol and tobacco use prior to and during pregnancy in the US: the role of maternal stressors.	Cross sectional	USA	15
	van der Wulp, Hoving & de Vries (2015)	Correlates of partner support to abstain from prenatal alcohol use: a cross-sectional survey among Dutch partners of pregnant women.	Cross sectional	The Netherlands	15
Level	1 Prevention				
	Barreca, & Page (2015)	Minimum drinking age laws and birth outcomes.	Cross sectional	USA	15
n=10	Bazzo et al. (2015)	Evaluation of a Multilevel and Integrated Program to Raise Awareness of the Harmful Effects of Prenatal Alcohol Exposure in a Local Community.	Cross sectional (with a control group)	Italy	16
	Bell et al. (2015)	Caution! Warning Labels About Alcohol and Pregnancy: Unintended Consequences and Questionable Effectiveness.	Commentary	USA	16

	Author	Title	Methods	Country	Page
	Burton (2015)	Message on a bottle.	Commentary	Australia	17
	Crawford- Williams (2015a)	A critical review of public health interventions aimed at reducing alcohol consumption and/or increasing knowledge among pregnant women.	Systematic review	Australia	17
	Crawford- Williams (2015b)	Does the poor quality of Australian health education documentation undermine the message? A review of documents informing pregnant women about alcohol.	Document review	Australia	17
	Garcia et al. (2015)	Effects of sex composition on group processes in alcohol prevention groups for teens.	Cross sectional	USA	18
	Miller (2015)	Studying public knowledge of risk of prenatal alcohol exposure is not the same as knowledge of fetal alcohol spectrum disorder (FASD).	Letter to the editor	Canada	18
	Mukherjee et al. (2015)	What does the general public in the UK know about the risk to a developing foetus if exposed to alcohol in pregnancy? Findings from a UK mixed methodology study.	Mixed methods (Survey and focus group)	UK	18
	Thomas, Cannon & French (2015)	The Effects of State Alcohol and Pregnancy Policies on Women's Health and Healthy Pregnancies	Qualitative	USA	18
Level	2 Prevention				
	Balachova et al. (2015)	Using a single binge drinking question to identify Russian women at risk for an alcoholexposed pregnancy.	Cross sectional	Russia	19
n=15	Crawford- Williams (2015c)	If you can have one glass of wine now and then, why are you denying that to a woman with no evidence": Knowledge and practices of health professionals concerning alcohol consumption during pregnancy,	Qualitative	Australia	19
	Fitzgerald et al. (2015)	Large-scale implementation of alcohol brief interventions in new settings in Scotland: a qualitative interview study of a national programme.	Qualitative	Scotland	20
	Hettema et al. (2015)	Missed opportunities: Screening and brief intervention for risky alcohol use in women's health settings.	Cross sectional	USA	20

	Author	Title	Methods	Country	Page
	Montag et al (2015a)	Preventing alcohol-exposed pregnancy among an American Indian/Alaska Native population: Effect of a screening, brief intervention, and referral to treatment intervention.	RCT	USA	21
	Montag et al (2015b)	Effect of depression on risky drinking and response to a screening, brief intervention, and referral to treatment intervention.	RCT	USA	21
	Muggli et al (2015)	Increasing accurate self-report in surveys of pregnancy alcohol use.	Qualitative	Australia	21
	Ondersma et al. (2015)	Computer-Delivered Screening and Brief Intervention for Alcohol Use in Pregnancy: A Pilot Randomized Trial.	RCT	USA	22
	Petersen Williams et al. (2015)	Screening and brief interventions for alcohol and other drug use among pregnant women attending midwife obstetric units in Cape Town, South Africa: A qualitative study of the views of health care professionals.	Qualitative	South Africa	22
	Pollick et al. (2015)	Acceptability of a Computerized Brief Intervention for Alcohol Among Abstinent But At-Risk Pregnant Women.	Mixed methods (Survey and interview)	USA	23
	Skagerström et al. (2015)	The voice of non-pregnant women on alcohol consumption during pregnancy: a focus group study among women in Sweden.	Qualitative	Sweden	23
	Sorsdahl (2015)	Feasibility and preliminary responses to a screening and brief intervention program for maternal mental disorders within the context of primary care.	Mixed methods (Record review, survey and interview)	South Africa	23
	Wangberg (2015)	Norwegian midwives' use of screening for and brief interventions on alcohol use in pregnancy.	Cross sectional	Norway	24
	Watkins et al. (2015)	Development of a scale to evaluate midwives' beliefs about assessing alcohol use during pregnancy.	Cross sectional	Australia	24
	Winstone & Verity (2015)	Antenatal alcohol exposure: An East Anglian study of midwives' knowledge and practice.	Cross sectional	UK	24
Precor	nception interven	tions		I	
n=10	Claesson, Hultgren, &	Lifestyle habits and women's attitudes towards discussing	Cross sectional	Sweden	25

	Author	Title	Methods	Country	Page
	Blomberg (2015)	them at a visit for contraceptive advice.			
	Hanson, & Jensen (2015)	Importance of Social Support in Preventing Alcohol-Exposed Pregnancies with American Indian Communities.	Qualitative	USA	25
	Hanson, Ingersoll & Pourier (2015)	Development and implementation of choices group to reduce drinking, improve contraception, and prevent alcohol-exposed pregnancies in American Indian women.	Pilot (Cross sectional)	USA	25
	Hanson & Pourier (2015)	The Oglala Sioux Tribe CHOICES Program: Modifying an Existing Alcohol-Exposed Pregnancy Intervention for Use in an American Indian Community.	Feasibility study	USA	26
	Hussein, Kai & Qureshi (2015)	The effects of preconception interventions on improving reproductive health and pregnancy outcomes in primary care: A systematic review.	Systematic review	Malaysia	26
	Johnson et al (2015)	CHOICES: An empirically supported intervention for preventing alcohol-exposed pregnancy in community settings	Commentary and description of intervention	USA	26
	Landeen, Bogue & Schuneman (2015)	Preconception and prenatal care- -useful tools for providers of women's health.	Narrative review	USA	27
	McBride et al. (2015)	Paternal involvement in alcohol exposure during pre-conception and pregnancy	Commentary	Australia	27
	Mitra et al. (2015)	Disparities in adverse preconception risk factors between women with and without disabilities.	Cross sectional	USA	27
	Oza-Frank et al. (2015)	Provision of specific preconception care messages and associated maternal health behaviors before and during pregnancy.	Cross sectional	USA	28
Level 3	3 Prevention				
	Bhat & Hadley (2015)	The management of alcohol withdrawal in pregnancy — case report, literature review and preliminary recommendations	Case report	USA	28
n=10	Crawford- Williams et al. (2015d)	"My midwife said that having a glass of red wine was actually better for the baby": a focus group study of women and their partner's knowledge and	Qualitative	Australia	28

	Author	Title	Methods	Country	Page
		experiences relating to alcohol consumption in pregnancy			
	de Vries et al. (2015)	Indicated Prevention of Fetal Alcohol Spectrum Disorders in South Africa: Effectiveness of Case Management	Longitudinal	South Africa	29
	DeVido, Bogunovic & Weiss (2015)	Alcohol Use Disorders in Pregnancy.	Narrative review	USA	29
	Doi, Jepson, & Cheyne (2015)	A realist evaluation of an antenatal programme to change drinking behaviour of pregnant women.	Realist evaluation (Systematic reviews and qualitative)	Scotland	29
	Kramlich & Kronk (2015)	Relational care for perinatal substance use: A systematic review.	Systematic review	USA	30
	Marcellus et al. (2015)	Reenvisioning success for programs supporting pregnant women with problematic substance use.	Mixed methods	Canada	30
	Rotheram- Borus et al. (2015)	Alcohol use, partner violence, and depression: A cluster randomized controlled trial among urban South African mothers over 3 years.	RCT	South Africa	31
	Torchalla et al. (2015)	"Like a lots happened with my whole childhood": violence, trauma, and addiction in pregnant and postpartum women from Vancouver's Downtown Eastside	Qualitative	Canada	31
	Whittaker (2015)	Guidelines for the Identification and Management of Substance Use and Substance Use Disorders in Pregnancy.	Commentary	UK	32
Level	4 Prevention				
	Fowler et al. (2015)	New Understandings of Mothering: Mothers in an Abstinence-Based Drug Treatment Program	Qualitative	Australia	32
n=4	Rotheram- Borus et al. (2015)	Alcohol use, partner violence, and depression: A cluster randomized controlled trial among urban South African mothers over 3 years.	RCT	South Africa	31
	Shaw et al. (2015)	Intervention with substance- abusing mothers: Are there rural- urban differences?	Longitudinal	USA	33

	Author	Title	Methods	Country	Page
	Thanh et al. (2015)	An economic evaluation of the Parent-Child Assistance Program for preventing fetal alcohol spectrum disorder in Alberta, Canada	Cost benefit analysis	Canada	33
Other					
	Bingham (2015)	Latest Evidence on Alcohol and Pregnancy	Narrative review	USA	33
	Braillon & Bewley (2015)	Impartial information about alcohol during pregnancy or another modern day witch hunt?	Commentary	USA	34
	Cherry (2015)	Shifting our Focus from Retribution to Social Justice: An Alternative Vision for the Treatment of Pregnant Women Who Harm Their Fetuses.	Law review	USA	34
	Elliott (2015)	Fetal alcohol spectrum disorders in Australiathe future is prevention.	Commentary and description of prevention framework	Australia	34
n=8	Hubberstey et al. (2015)	Toward an evaluation framework for community-based FASD prevention programs	Mixed-methods (included a literature review and consultations)	Canada	34
	Mather, M., Wiles, K., & O'Brien, P. (2015).	Should women abstain from alcohol throughout pregnancy?	Commentary	UK	35
	Rutman et al. (2015)	Developing and using a common framework to evaluate FASD programs: Results of a three-year Canadian project.	Mixed-methods (included a literature review and consultations)	Canada	35
	Warren (2015)	A review of the history of attitudes toward drinking in pregnancy	Historical review (primarily of US federal documents)	USA	36
Interv	entions reaching	Indigenous women			
	Fortin et al. (2015)	Trajectories of Alcohol Use and Binge Drinking Among Pregnant Inuit Women.	Longitudinal	Canada	6
n=6	Hanson, & Jensen (2015)	Importance of Social Support in Preventing Alcohol-Exposed Pregnancies with American Indian Communities.	Qualitative	USA	25
	Hanson, Ingersoll & Pourier (2015)	Development and implementation of choices group to reduce drinking, improve contraception, and prevent	Pilot (Cross sectional)	USA	25

	Author	Title	Methods	Country	Page
		alcohol-exposed pregnancies in American Indian women			
	Hanson & Pourier (2015)	The Oglala Sioux Tribe CHOICES Program: Modifying an Existing Alcohol-Exposed Pregnancy Intervention for Use in an American Indian Community.	Feasibility study	USA	26
	Montag et al (2015a)	Preventing alcohol-exposed pregnancy among an American Indian/Alaska Native population: Effect of a screening, brief intervention, and referral to treatment intervention	RCT	USA	21
	Montag et al (2015b)	Effect of depression on risky drinking and response to a screening, brief intervention, and referral to treatment intervention	RCT	USA	21
Interv	entions reaching	adolescent and young women			
n=2	Garcia et al. (2015)	Effects of sex composition on group processes in alcohol prevention groups for teens	Cross sectional	USA	18
11-2	Salas-Wright, Vaughn & Ugalde (2015)	A typology of substance use among pregnant teens in the United States.	Cross sectional	USA	11