

FASD PREVENTION:

An Annotated Bibliography of Articles Published in 2019

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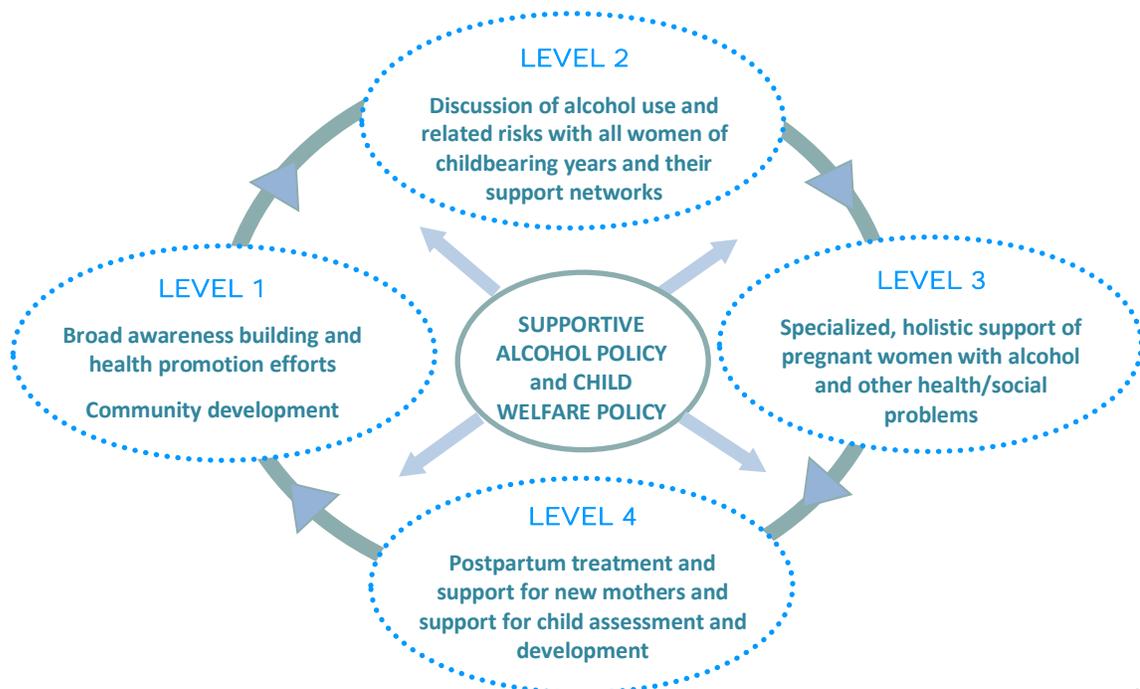
FASD Prevention Literature Search 2019

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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 web meetings 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 2019:

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

Searches of each database were conducted using the following search terms: 1) Fetal alcohol syndrome OR Fetal Alcohol Spectrum Disorder OR FASD OR feotal alcohol spectrum disorder OR alcohol related fetal damage; 2) [FASD OR fetal alcohol OR feotal alcohol OR alcohol exposed pregnancy OR alcohol] + [pregnancy] + [prevention OR preventing OR preventative]; 3) [Fetal OR fetus OR feotus OR foetal] + alcohol; 4) [Alcohol OR drink*] + [pregnancy OR pregnant OR prenatal OR antenatal OR perinatal or maternal] + prevention; 5) [Pregnan* OR conception OR preconception OR post-partum] + [alcohol OR drink*]; 6) [Alcohol OR drink*] + prevention + [women OR girls OR youth OR teen* OR Aboriginal OR First Nation*]; 7) [Alcohol OR drink*] + awareness; 8) FASD + awareness; 9) [Alcohol OR drink*] + intervention* + [women OR girls OR female]; 10) [Alcohol OR drink*] + [motivational interviewing OR Screening OR brief intervention OR SBIR OR SBIRT] + [women OR girls OR gender OR female]; 11) [Alcohol or drink*] + [home visit* OR NICU OR neonatal intensive care unit OR midwives or midwife or midwifery]; 12) [Parent child assistance program OR PCAP]; 13) [Pregnan* OR conception OR preconception OR post-partum] + [substance use treatment OR harm reduction].

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

One hundred ($n = 100$) articles were included from our searches. Five ($n = 5$) articles were assigned to more than one category, one was attributed to more than one country, and one was published by an international group of authors. 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 of America (USA), the United Kingdom (UK) or Canada.

Table 1: Studies identified by topic and country

Country	Number of Studies								Total
	Prevalence	Influences	Level 1	Level 2	Preconception	Level 3	Level 4	Other	
Argentina	0	1	0	0	0	0	0	0	1
Australia	0	1	1	2	3	2	0	0	9
Brazil	0	2	0	0	0	0	0	0	2
Canada	1	0	2	3	0	3	2	3	14
Denmark	1	0	0	0	0	0	0	0	1
Ethiopia	1	1	0	0	0	0	0	0	2
France	0	1	0	0	0	0	0	0	1
International	0	0	0	1	0	1	0	0	2
Ireland	1	1	0	0	0	0	0	0	2
Korea	1	1	0	0	0	0	0	0	2
New Zealand	0	0	1	2	0	0	0	0	3
Russia	1	0	0	0	0	0	0	0	1
South Africa	0	2	2	0	0	0	1	0	5
Spain	1	0	0	1	0	0	0	0	2
Sweden	0	1	0	1	0	0	0	0	2
Switzerland	0	2	0	0	0	0	0	0	2
UK	1	2	2	5	1	0	2	1	14
USA	6	5	3	18	2	5	0	2	41
	14	20	11	33	6	11	5	6	106

A. Prevalence of drinking in pregnancy

1. **Agrawal, A., Rogers, C. E., Lessov-Schlaggar, C. N., Carter, E. B., Lenze, S. N., & Gruzca, R. A. (2019). Alcohol, cigarette, and cannabis use between 2002 and 2016 in pregnant women from a nationally representative sample. *JAMA Pediatrics*, 173(1), 95-96. doi:10.1001/jamapediatrics.2018.3096**

In this brief report, the authors report on the changes in alcohol, cigarette, and cannabis use during pregnancy among women aged 18 to 44 years old in the United States of America (USA). Using the National Survey of Drug Use and Health data from 2002 to 2016, they conducted generalized linear models that included data from 12,058 pregnant women. In 2002, 10% of women consumed alcohol, 18% smoked cigarettes and 3% used cannabis during pregnancy. By 2016, the rates for alcohol use and cigarettes had significantly decreased, to 8% and 10% respectively, but the rate of cannabis use had significantly increased to 5%. The greatest decrease in alcohol use was among women aged 18 to 25 years ($OR = 0.98$, 95% CI 0.95-1.00; $p = .02$).

2. **Bakhireva, L. N., Kane, M. A., Bearer, C. F., Bautista, A., Jones, J. W., Garrison, L., . . . Lewis, J. (2019). Prenatal alcohol exposure prevalence as measured by direct ethanol metabolites in meconium in a Native American tribe of the southwest. *Birth Defects Research*, 111(2), 53-61. doi:10.1002/bdr2.1427**

This study assessed the prevalence of prenatal alcohol exposure (PAE) among newborns in the Navajo Nation in Arizona and New Mexico. The study used data collected through the Navajo Birth Cohort Study (NBCS) and PAE of $n = 333$ NBCS participants was assessed using biomarkers. Samples were analyzed for nine individual fatty acid ethyl ester (FAEE) species, ethyl glucuronide (EtG), and ethyl sulfate (EtS) by LC-MS/MS. All participants identified as Native American; most reported a personal income of $< \$20,000$ per year (71%), and \leq high school education (55%). Five percent of the sample tested positive for at least two biomarkers; the most prevalent were EtS (8%) and ethyl oleate (7%). The authors concluded that rates of PAE in the NBCS are comparable to national US survey estimates. Their findings emphasize that drinking behaviors among Native American communities in the United States can vary, and generalization across all Native American populations is not warranted.

3. **Balachova, T., Zander, R., Bonner, B., Isurina, G., Kyler, K., Tsvetkova, L., & Volkova, E. (2019). Smoking and alcohol use among women in Russia: Dual risk for prenatal exposure. *Journal of Ethnicity in Substance Abuse*, 18(2), 167-182. doi:10.1080/15332640.2017.1328325**

This study examined prevalence of smoking and its associations with alcohol use among Russian women of childbearing age ($n = 648$). Smoking was reported by 35% of nonpregnant and 14% of pregnant women. Rates of smoking were higher among those whose alcohol consumption was defined as 'at-risk' (≥ 4 drinks on one occasion or ≥ 8 drinks per week), and those at risk for an alcohol-exposed pregnancy (AEP). Smoking status and city of residence significantly predicted AEP risk; pregnant women in urban locations were more likely to smoke. The authors concluded that smoking and alcohol misuse often co-occur among Russian women, which presents a risk for dual prenatal exposure.

4. **Delano, K., Koren, G., Zack, M., & Kapur, B. M. (2019). Prevalence of fetal alcohol exposure by analysis of meconium fatty acid ethyl esters: A national Canadian study. *Scientific Reports*, 9(1), 2298-2296. doi:10.1038/s41598-019-38856-5**

This Canadian study aimed to estimate the prevalence of significant fetal exposure to alcohol through the analysis of meconium FAEEs. Meconium samples were collected on a national level through the Maternal-Infant Research on Environmental Chemicals (MIREC) Study Group. Out of $n = 1315$ samples collected in 10 Canadian obstetric units between 2008-2011, the estimated prevalence of positive meconium FAEE ranged between 1% and 2%, translating into an estimated 1,800 new cases of FASD in Canada each year. Positive maternal self-reports of heavy alcohol use were tenfold lower than rates reported by meconium tests (0.2%). The authors concluded that the use of biomarkers of maternal alcohol exposure is critical to estimate risks and in monitoring effective prevention of FASD.

5. **Jawad, A., Patel, D., Brima, N., & Stephenson, J. (2019). Alcohol, smoking, folic acid and multivitamin use among women attending maternity care in London: A cross-sectional study. *Sexual & Reproductive HealthCare, 22*. doi:10.1016/j.srhc.2019.100461**

Using a cross-sectional survey of $n = 1,173$ pregnant women, the authors of this study explored the patterns of change in various health behaviours that pregnant women in London adopt both before and during pregnancy. Health behaviours included smoking, alcohol consumption, folic acid and multivitamin/supplement intake, and recall of health care professional advice. The results indicated that most women embraced one or more healthy behaviour during pregnancy, with a small proportion of women continuing to smoke (5%) or consume alcohol (9%). The results of this study provide further evidence for the need for tailored approaches for women who may continue to use substances during pregnancy.

6. **Kesmodel, U. S., & Urbute, A. (2019). Changes in drinking patterns, and attitudes toward and knowledge about alcohol consumption during pregnancy in a population of pregnant Danish women. *Alcoholism: Clinical and Experimental Research, 43(6)*, 1213-1219. doi:10.1111/acer.14031**

This study evaluated the impact of a new national alcohol use recommendations in Denmark by measuring drinking patterns, knowledge and attitudes toward alcohol consumption during pregnancy before and after changes. The authors used a cross-sectional interview study design with a representative sample of women from Aarhus, Denmark. In 2000 they interviewed $n = 1,418$ women attending antenatal care and compared these results to a comparable sample of $n = 439$ pregnant women from 1998. Participants were asked about their average level of alcohol consumption, binge drinking, attitudes toward alcohol consumption during pregnancy, and knowledge of alcohol consumption during pregnancy. Most pregnant women indicated that they had not been informed or advised about alcohol consumption during pregnancy, but would like this information from their health care provider. Despite expanded national recommendations in Denmark in 1999, this did not translate into changes in knowledge as well in behaviours and attitudes among pregnant women.

7. **Keyes, K. M., Jager, J., Mal-Sarkar, T., Patrick, M. E., Rutherford, C., & Hasin, D. (2019). Is there a recent epidemic of women's drinking? A critical review of national studies. *Alcoholism: Clinical and Experimental Research, 43(7)*, 1344-1359. doi:10.1111/acer.14082**

The authors review the time and developmental trends of gender differences in alcohol use using data from nationally representative studies conducted in the USA since 2008. Across all age groups examined, the authors identified a trend that the gendered rates of alcohol use, binge drinking, and alcohol-related hospitalizations are converging. Among adolescents and young adults up to 25 years of age, rates of alcohol use decreased in both gender groups, but decreased faster among boys and men. Among young adults 26 to 29, rates of drinking increased among both men and women, but the rates increased faster for women over time leading to the current convergence. In middle and older adulthood, the patterns of alcohol use among men have not changed since 2008, however consumption among women is increasing, again leading to a convergence in drinking rates. The authors conclude that these patterns appear to be cohort effects, rather than related to specific age brackets, and that women born in the 1970's and 80's tend to have higher levels of lifetime drinking than other cohorts of women. The authors present potential mechanisms for these trends as well as implications for alcohol policy.

8. **Kim, E. G. (2019). Overall health and drinking behavior among pregnant and breastfeeding women in Korea. *Epidemiology and Health, 41*, e2019036. doi:10.4178/epih.e2019036**

Using data obtained from $n = 2,156$ Korean women in the 2015 Korean Community Health Survey, the authors conducted a comparative assessment of drinking behaviours and overall health among pregnant and breastfeeding women. Reported alcohol consumption was higher among pregnant women compared to breastfeeding women. However, among breastfeeding women, rates of depression and stress were higher compared to pregnant women. Breastfeeding women also reported lower subjective dental health and more unmet medical needs compared to pregnant women. The results point to areas of need for action on various health issues, including alcohol use during pregnancy and while breastfeeding, among women in Korea.

9. **Palmer, R., Layte, R., & Kearney, J. (2019). The maternal health behaviours of non-Irish nationals during pregnancy and the effect of time living in Ireland. *Public Health, 170*, 95-102. doi:10.1016/j.puhe.2019.02.023**

Using a cross-sectional study design, the authors examined the maternal health behaviours during pregnancy of non-Irish nationals living in Ireland. The authors examined the effect of time in Ireland on alcohol use, smoking and folic acid

supplementation. An overall association was found between time spent in Ireland and increased rates of alcohol consumption during pregnancy and a decreased likelihood of taking folic acid before conception. Women who reported smoking during pregnancy were also more likely to drink. The results of this study have policy and intervention implications for women in Ireland.

- 10. Qato, D. M., Zhang, C., Gandhi, A. B., Simoni-Wastila, L., & Coleman-Cowger, V. H. (2020). Co-use of alcohol, tobacco, and licit and illicit controlled substances among pregnant and non-pregnant women in the United States: Findings from 2006 to 2014 National Survey on Drug Use and Health (NSDUH) data. *Drug and Alcohol Dependence, 206*, 107729. doi:10.1016/j.drugalcdep.2019.107729**

This study described the patterns and correlates of co-use of alcohol, tobacco, and controlled substances in a nationally-representative sample of women 18-49 years ($n = 160,371$) in the USA using data from the 2006-2014 National Survey on Drug Use and Health. The authors used weighted proportions to report differences in substance use patterns in pregnant and non-pregnant women. Multivariate logistic regression models were used to assess the association between characteristics and type of substance use pattern. The prevalence of substance co-use among pregnant women was 5% and 24% among non-pregnant women. The most frequent co-use patterns included alcohol, cannabis, or tobacco. Determinants of co-use among pregnant women included: younger age (18-25 years) compared to ≥ 26 years ($AOR= 1.81$, 95% CI: 1.18-2.80); and past year history of substance use ($AOR= 5.42$, 95% CI: 3.59-8.20). The authors concluded that the co-use multiple substances during pregnancy, especially of tobacco, alcohol and cannabis, indicates a need for efforts that aim to improve maternal and child health by addressing the complexity of substance use during pregnancy, including and beyond opioids.

- 11. Roberts, S. C. M., & Thompson, K. M. (2019). Estimating the prevalence of United States women with alcohol-exposed pregnancies and births. *Women's Health Issues, 29*(2), 188-193. doi:10.1016/j.whi.2018.11.001**

Researchers at the US Centers for Disease Control and Prevention (CDC) recently estimated the of the number of women at risk for AEPs to be 3.3 million per month. The authors of this study wanted to estimate the number of alcohol exposed pregnancies (AEPs), not just those at risk for AEP. Using data about women aged 15-44 years old who were neither pregnant nor sterile from the 2011-2013 National Survey of Family Growth, the authors estimated both the expected actual number of AEPs, and the expected actual number of alcohol-exposed births (AEBs). They identified the number of women who had had sex without contraception in the last four weeks who also reported binge drinking or drinking on more than seven of the last 30 days. To estimate the actual number of AEPs and AEBs, they accounted for the chances of becoming pregnant and for pregnancy outcomes (birth, miscarriage, and abortion) and conducted sensitivity analyses with varying assumptions. They estimate the prevalence of AEPs at 1% (95% CI: 0.9-1.7) and AEBs at 0.8% (95% CI: 0.5-1.2). For a one-month period, this translates to 731,000 women having AEPs and 481,000 resulting in AEBs in the USA. Sensitivity analyses indicate expected actual AEP estimates ranging from 104,000 to 1,242,000 and AEBs from 79,000 to 816,000. The authors conclude the expected number of AEPs is 2.5 million less than the CDC estimate of the number at risk of an AEP. The authors recommend that the evidence-informed assumptions used in this study should inform future efforts to estimate expected actual numbers of AEPs and AEBs.

- 12. Romero-Rodríguez, E., Cuevas, L., Simón, L., Bermejo-Sánchez, E., & Galán, I. (2019). Changes in alcohol intake during pregnancy in Spain, 1980 to 2014. *Alcoholism: Clinical & Experimental Research, 43*(11), 2367-2373. doi:10.1111/acer.14193**

The authors determined the change in alcohol intake among pregnant women in Spain between 1980 and 2014, and identified factors associated with alcohol use, including co-use of tobacco. The study population included $n = 40,268$ pregnant women from all regions of Spain who were control mothers in the Spanish Collaborative Study of Congenital Malformations (ECEMC). Three categories of alcohol consumption during pregnancy were considered: no consumption; sporadic consumption of small amounts of alcohol; and regular consumption, or sporadic but in large quantities including drunkenness. Independent variables included sociodemographic factors, planned/unplanned pregnancy, maternal chronic diseases, gestational diabetes, and tobacco and illegal drug use during pregnancy. Trend analyses were performed using data from 1980 to 2014, differentiated between two periods: 1994 to 2004 and 2005 to 2014. They found that prevalence of alcohol consumption declined from 30% (95% CI: 27.1-32.2) in 1980, to 5% (95% CI: 3.7-7.6) in 2014, mostly due to the reduction in regular intake. This decline was especially acute between 1980 and 1994. Sporadic and regular consumption increased among women working outside the home, born outside Spain, those whose pregnancy was unplanned, and those

reporting using tobacco or other drugs. A stronger association was observed between regular alcohol consumption and tobacco consumption in the 2005-2014 period (interaction $p = 0.003$). The authors note that alcohol consumption among expectant mothers has declined substantially in the last 35 years, and the associations between alcohol use and consumption of tobacco have become stronger in the most recent years.

13. Tung, I., Beardslee, J., Pardini, D., Chung, T., Keenan, K., & Hipwell, A. E. (2019). Adolescent childbirth, miscarriage, and abortion: Associations with changes in alcohol, marijuana, and cigarette use. *Journal of Child Psychology and Psychiatry*, 61(1). doi:10.1111/jcpp.13112

This study examined associations between adolescent pregnancy outcomes and within-person changes in substance use from pre-pregnancy to post-pregnancy, and how pregnancy outcomes (childbirth, miscarriage, abortion) differentially influence substance use. Girls ($n = 2,450$, 52% Black) from Pittsburgh, PA self-reported pregnancy outcomes and substance use frequency (alcohol, cigarette, marijuana) annually from ages 11-20. Using fixed effects regressions on first births, first miscarriages, and first abortions the authors tested the associations between pregnancy outcomes and within-individual changes in substance use from pre-pregnancy to post-pregnancy. Girls who became pregnant reported greater early risk for substance use than never-pregnant adolescents, including earlier age of onset and more regular marijuana and cigarette use. Childbirth predicted 26%-51% of the within-individual reduction in alcohol, marijuana, and cigarette use, which remained significantly lower than pre-pregnancy levels after childbirth. Alcohol and marijuana use decreased after miscarriage. Abortion was not associated with long-term changes in substance use; however, marijuana and cigarette use gradually increased in the year of and after an abortion, but after one year returned to pre-pregnancy levels. These findings highlight important differences in adolescent substance use patterns based on pregnancy outcome. The authors note the potential opportunity for screening and intervention with pregnant adolescents with heightened pre-existing risk for substance use.

14. Wubetu, A. D., Habte, S., & Dagne, K. (2019). Prevalence of risky alcohol use behavior and associated factors in pregnant antenatal care attendees in Debre Berhan, Ethiopia, 2018. *BMC Psychiatry*, 19.

This study assessed the prevalence of risky alcohol use among mothers in Ethiopia who have used alcohol at least once in the current pregnancy. A total of $n = 380$ mothers who used alcohol at least once (any amount) in the current pregnancy were included in the study and interviewed about their risky alcohol use behavior. The participants were selected using a systematic random sampling technique. Both bivariable and multivariable binary logistic regression models were conducted. The authors found the overall prevalence of risky alcohol use behavior was 16% (95% CI: 12.1-19.7). Having poor social support, moderate to severe depression and anxiety, diagnosed family history of mental illness, and a history of abortion were significantly associated with risky alcohol use behavior. Given that a significant number of pregnant women who use alcohol were found to be risky drinkers, the authors recommend screening for any amount of alcohol use during pregnancy and providing health education (about the risk of alcohol use) for all pregnant women who attend antenatal care follow up.

B. Influences and factors associated with drinking in pregnancy

1. Association of Women's Health Obstetric and Neonatal Nurses. (2019). Optimizing outcomes for women with substance use disorders in pregnancy and the postpartum period. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 48(5), 583-585. doi:10.1016/j.jogn.2019.06.001

This US policy statement describes the role of nurses in supporting pregnant and postpartum women with substance use problems, and discusses the influences on women's substance use in pregnancy as well as state policies related to testing and reporting. The Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) opposes laws and other reporting requirements that result in incarceration or other punitive legal actions against women because of a substance use disorder (SUD) in pregnancy and the postpartum period. AWHONN supports universal verbal screening for substance use during pregnancy using a validated tool that should begin at entry into prenatal care and continue periodically throughout pregnancy. Early identification and treatment of women with SUD and/or dependence is a critical component of preconception and prenatal care and is important to support healthy birth outcomes. Treatment for SUD should be family focused and non-stigmatizing. Nurses and other health care professionals should be familiar with laws on

mandatory reporting and/or referral in their states and comply as applicable. They also offer policy recommendations at the institutional level, the local and state policy level and the federal policy level.

- 2. Bhengu, B. S., Tomita, A., Mashaphu, S., & Paruk, S. (2019). The role of adverse childhood experiences on perinatal substance use behaviour in kwazulu-natal province, South Africa. *AIDS and Behavior*. doi:10.1007/s10461-019-02661-y**

To examine the role of adverse childhood experiences (ACE) on perinatal substance use outcomes in KwaZulu-Natal Province, South Africa, $n = 223$ women were interviewed within one-week post-partum at a general hospital. Study results suggest that the most common perinatal substance use was alcohol ($n = 27$, 12%), followed by tobacco ($n = 18$, 8%). Regression analyses indicated higher ACE scores (using the WHO ACE International Questionnaire) were significantly associated with perinatal alcohol use ($AOR = 1.45$, 95% CI: 1.22-1.72), tobacco use ($AOR = 1.56$, 95% CI: 1.23-1.97) and preterm birth delivery ($AOR = 1.21$, 95% CI: 1.03-1.43), independent of socioeconomic status. The study concludes that risk-behaviour reduction strategies should address the role of adverse childhood experiences on substance use.

- 3. Deutsch, A. R. (2019). The importance of intimate partner violence in within-relationship and between-person risk for alcohol-exposed pregnancy. *Alcoholism: Clinical & Experimental Research*, 43(4), 679-689. doi:10.1111/acer.13968**

This study examined if intimate partner violence (IPV) was an indicator of prospective alcohol-exposed pregnancy (AEP) risk, as both a main effect and an influence on alcohol use or birth control, using data from the USA National Longitudinal Study of Adolescent to Adult Health. IPV related to higher odds of AEP alongside higher alcohol use and lower birth control use. Experiencing IPV had a direct influence on AEP, compared to nonpregnancy and non-alcohol exposed pregnancies (non-AEP). Infrequent adolescent drinkers had higher odds of AEP if they experienced IPV during their relationships. The authors conclude that IPV is a substantial predictor for AEP as both a direct influence within relationships and across relationships over time. The authors cite that intervention and prevention programs focused on reducing AEP may benefit from including IPV-specific curricula. They also discuss the very complex possible explanations for the relationships among IPV, use of birth control and alcohol use; and cite the benefit of comprehensive prevention programming, such as longer term case management interventions, that address not only these three topics but also the influences of intersecting determinants of health such as resource-scarce environments and social support.

- 4. Edwards, A. C., Ohlsson, H., Svikis, D. S., Sundquist, J., Sundquist, K., & Kendler, K. S. (2019). Protective effects of pregnancy on risk of alcohol use disorder. *The American Journal of Psychiatry*, 176(2), 138-145. doi:10.1176/appi.ajp.2018.18050632**

This Swedish-based study used longitudinal medical, pharmacy, and criminal registry population wide-data to investigate if pregnancy may play a direct role in reducing the incidence of alcohol use disorder (AUD). The authors compared pregnant women born between 1975 and 1992 ($n = 322,029$) with: 1) matched population controls; 2) female relatives who were not pregnant; and 3) pre- and post-pregnancy periods within individuals. They also compared rates of AUD between pregnant women and their partners. Pregnancy was not associated with AUD across all analyses, particularly for closely related relatives. Within individuals, rates of AUD substantially decreased during the preconception period ($AOR = 0.26$, 95% CI: 0.23-0.31), and they remained reduced during postpartum period ($AOR = 0.17$, 95% CI: 0.13-0.21). Results were similar for second pregnancies ($OR = 0.23$, 95% CI: 0.15-0.35). The partners of pregnant women also showed reductions in AUD ($AOR = 0.15$ 95% CI: 0.05-0.49). The negative association between AUD and pregnancy was particularly strong among women who were pregnant at younger ages or if they experienced a history of criminal behavior. The authors suggest their findings demonstrate pregnancy has a critical, and likely causal, motivational role in reducing AUD risk among women and their partners.

- 5. Esper, L. H., & Furtado, E. F. (2019). Stressful life events and alcohol consumption in pregnant women: A cross-sectional survey. *Midwifery*, 71, 27-32. doi:10.1016/j.midw.2018.12.019**

To verify the association between stressful life events and alcohol consumption among pregnant women living in Brazil, the authors examined a convenience sample of $n = 449$ women in the third trimester of pregnancy, recruited from a public maternity hospital. Semi-structured interviews were conducted which included a socio-demographic questionnaire, an inventory for the evaluation of the stressful life events (IRLE), a screening questionnaire for the use of alcohol (T-ACE), the International Classification of Diseases (ICD-10) criteria for alcohol-related disorders, and evaluation of consumption before

and during each trimester. Pregnant women diagnosed with alcohol abuse and alcohol dependence according to ICD-10 and with risk consumption, according to T-ACE screener, had a higher occurrence of stressful life events than the group without this diagnosis ($p < 0.001$). The following stressful life events were more frequent among women with alcohol problems: "Major financial difficulties," "Loss or theft of objects", "Serious argument with non-resident/close family member", "Serious argument with family members," and "Marital separation" with the latter about eight times more common in this group. The authors note the association between stressful life events and dependence or risk consumption of alcohol in pregnant women. They recommend that though identifying stressful life events, nursing teams can help pregnant women identify or strengthen healthy coping styles in the face of stress and avoid alcohol consumption during pregnancy.

- 6. Gouilhers, S., Meyer, Y., Inglin, S., Pfister Boulenaz, S., Schnegg, C., & Hammer, R. (2019). Pregnancy as a transition: First-time expectant couples' experience with alcohol consumption. *Drug and Alcohol Review*. doi:10.1111/dar.12973**

The authors investigated the experiences of alcohol consumption during pregnancy among Swiss couples as a transitional process. Thirty semi-directive joint interviews were conducted with couples expecting their first child. Couples endorsed the imperative of changing drinking habits and all the women reduced their alcohol consumption, although some reported difficulties. Three themes described how couples experienced the woman's change of drinking habits as a smooth transition: internalization of risk discourses, abstinence as a social norm, and embodiment of alcohol aversion. There were four types of difficulties that couples encountered in their everyday lives: burden of risk discourses, conflicting advice, social occasions, and desire for alcohol. This paper highlights the change of alcohol consumption as a relational process that is shaped by multiple changes and social norms. The authors conclude that health professionals should be aware of the multifaceted difficulties women experience when they abstain from alcohol during pregnancy. Second, they suggest the importance of a patient-centred approach that considers the role of the partner in supporting a pregnant woman's change of alcohol consumption.

- 7. Hammer, R. (2019). 'i can tell when you're staring at my glass ...': Self- or co-surveillance? Couples' management of risks related to alcohol use during pregnancy. *Health, Risk & Society*, 21(7), 335–351. doi:10.1080/13698575.2019.1682126**

The author explores how women and their partners manage of the risks of alcohol consumption during pregnancy as a relational process of self-surveillance and co-surveillance. This study draws on joint interviews with $n = 30$ first-time expectant couples conducted Switzerland in 2014. Findings indicate that changes women make in their drinking behaviours were personal choices, seldom discussed with their partners. While women's responses to risk discourses reflected their engagement in self-surveillance, most men were actively involved in their partners' self-regulation, in terms of support for the transition to abstinence, endorsement of maternal responsibility, and monitoring the woman's behaviour. The author concludes that the management of risks related to alcohol consumption was a matter of co-surveillance, rather than of self-surveillance. Although co-surveillance was most often experienced as shared responsibility, some couples experienced conflicts emphasizing the moral meaning of risk related to alcohol consumption during pregnancy.

- 8. Jawad, A., Patel, D., Brima, N., & Stephenson, J. (2019). Alcohol, smoking, folic acid and multivitamin use among women attending maternity care in London: A cross-sectional study. *Sexual & Reproductive HealthCare*, 22, doi:10.1016/j.srhc.2019.100461**

See abstract above (Prevalence).

- 9. Kim, E. G. (2019). Overall health and drinking behavior among pregnant and breastfeeding women in Korea. *Epidemiology and Health*, 41, e2019036. doi:10.4178/epih.e2019036**

See abstract above (Prevalence).

- 10. Lamy, S., Houivet, E., Marret, S., Hennart, B., Delavenne, H., Benichou, J., . . . Thibaut, F. (2019). Risk factors associated to tobacco and alcohol use in a large French cohort of pregnant women. *Archives of Women's Mental Health, 22*(2), 267-277.**

This study identified risk factors associated to maternal alcohol and tobacco use among women in France ($n = 645$) by a combination of maternal self-reports and biological measurements in meconium samples of cotinine and ethylglucuronide, which reflect fetal exposure to tobacco and alcohol, respectively, during the 3rd trimester of pregnancy. The authors conducted a prospective study in three maternity hospitals in a large urban area in 2010 and 2011. Maternal sociodemographic and clinical characteristics were assessed after delivery, using the French version of the Addiction Severity Index. The risk for alcohol use increased when the mother had been in conflict with any relative or her partner for a long time throughout her life, as well as in the case of previous treatment for any mental or emotional disorder. The authors recommend that community education and prevention programs should urgently be improved for all women of childbearing age with a special focus on those with past histories of mental or emotional disorders and addictive disorders. They also recommend smoking cessation be offered to both parents.

- 11. Lopez, M. B., & Lichtenberger, A. (2019). Predictors of alcohol use disorders in Argentinean pregnant women. *Journal of Fetal Alcohol Spectrum Risk and Prevention, 2*(1), e23-e28. doi:<https://doi.org/10.22374/jfasrp.v2i1.4>**

The goal of this study was to identify the risk factors for Alcohol Use Disorder (AUD) among pregnant women in Argentina ($n = 641$), including alcohol use, other substance use, and associated motivational and sociocultural characteristics. Women were interviewed approximately six weeks after childbirth. The overall prevalence of AUD was 8%, and among current drinkers was slightly higher at 10%. A multitude of factors, including participants' age, age of alcohol consumption onset, tobacco use during pregnancy, any illegal substance use, number of health checkups during pregnancy, and general attitudes regarding alcohol use during pregnancy, all showed a significant relationship with an AUD. Overall, the results of this study identify that interventions in Argentina should target younger women, those who consume or have consumed illegal substances, and those who hold more lenient attitudes about alcohol use during pregnancy.

- 12. Martinelli, J. L., Germano, C. M. R., de Avo, L. R. d. S., Fontanella, B. J. B., & Melo, D. G. (2019). Motivation for alcohol consumption or abstinence during pregnancy: A clinical-qualitative study in Brazil. *PLoS ONE, 14*(10), e0223351. doi:10.1371/journal.pone.0223351**

The authors conducted qualitative interviews with $n = 14$ Brazilian women who were identified as risk-drinkers during pregnancy by the T-ACE screening tool. The interviews were thematically analyzed and three main themes were identified: General motives for alcohol use; specific motives for alcohol use; and Reasons for partly or fully abstaining from drinking during pregnancy. Most frequently the women reported social motives for drinking during pregnancy including cultural and familial values. Alcohol had frequently been used since adolescence and had become a naturalized habit that was difficult to stop during pregnancy. Perceptions that pregnancy was associated with a period of sadness, irritability and social isolation was also associated with drinking during pregnancy as a means of coping. Among women who abstained during pregnancy, concerns about fetal growth and development were frequently cited.

- 13. Mathunjwa-Dlamini, T. R., Ndlangamandla, C. C., Kaplan, L., Mhlongo-Manana, Z. C., Khumalo, P. P., Nxumalo-Magagula, N., & Gary, F. A. (2019). Swazi pregnant women's knowledge on consuming alcoholic beverages. *Journal of National Black Nurses Association, 30*(1), 7-13.**

The purpose of this study was to assess the knowledge and practices of pregnant women in Swaziland, South Africa. Participants in this study lacked knowledge on the effects of alcohol use during pregnancy on both the woman and the fetus. While a small sample size, 17% of participants reported consuming alcohol. The results of this study indicate a need for increased health education about the risks of alcohol use during pregnancy for both the fetus and the mother in the region.

- 14. McQuire, C., Daniel, R., Hurt, L., Kemp, A., & Paranjothy, S. (2019). The causal web of foetal alcohol spectrum disorders: A review and causal diagram. *European Child & Adolescent Psychiatry*. doi:10.1007/s00787-018-1264-3**

This study from the UK sought to describe the causal pathways to FASD and to create a diagram of these pathways, given that much of the FASD risk factor literature has been limited to discussions of association, rather than causation. The authors conducted a systematic search and narrative synthesis of the evidence and used this to create a causal diagram

(directed acyclic graph; DAG) to describe the causal pathways to FASD. Their results show that the aetiology of FASD is multifaceted and complex. FASD risk is determined by a range of lifestyle, sociodemographic, maternal, social, gestational, and genetic factors. The causal diagram presented in this review provides a comprehensive summary of causal risk factors for FASD, which the authors note can be used as a tool to inform data collection and statistical modelling strategies to minimise bias in future studies of FASD

15. Montag, A. C., Calac, D. J., & Chambers, C. D. (2019). Community-specific risk and protective factors for risky alcohol consumption in American Indian Women of reproductive potential: Informing interventions. *International Journal of Indigenous Health*, 14(1), 8-28. doi:10.32799/ijih.v14i1.31944

Using a mixed method design, including a questionnaire and focus group-derived questions, the purpose of this study was to investigate the effect of community-specific risk and protective factors of risky drinking and having an alcohol-exposed pregnancy in a sample of 343 American Indian women within a Southern California American Indian community. Identified factors that influenced risk and protection included: depression; perception of other women's drinking; children and family; perceptions of risk; and feeling pressured to drink. Interventions are needed that include community-specific risk and protective factors.

16. Palmer, R., Layte, R., & Kearney, J. (2019). The maternal health behaviours of non-Irish nationals during pregnancy and the effect of time living in Ireland. *Public Health*, 170, 95-102. doi:10.1016/j.puhe.2019.02.023

See abstract above (Prevalence).

17. Reid, N., Chen, C.-C., Bernard, A., & O'Callaghan, O. (2019). Understanding contraceptive behaviour to prevent unintended alcohol-exposed pregnancies. *Journal of Fetal Alcohol Spectrum Risk & Prevention*, 2(1). doi:e13-e22. doi:10.22374/jfasrp.v2i1.6

The authors sought to understand use of contraception in Australia among first year college students who use alcohol, to contribute to needed action on FASD prevention. They recruited $n = 106$ participants through a university research website where a link to an online survey was made available to first year undergraduate psychology students. The online questionnaire included questions on contraceptive and alcohol consumption behaviours in the past month, and questions that assessed participants' knowledge and attitudes. The majority of participants reported using contraception when having sex in the past month. The most common form of contraceptive used was male condoms (~60%), followed by the oral contraceptive pill (~46%). Participants who reported Never/Sometimes using contraception had higher knowledge of reproduction compared to those who reported using contraception more often.

18. Salameh, T. N., Hall, L. A., Crawford, T. N., Staten, R. R., & Hall, M. T. (2019). Trends in mental health and substance use disorders and treatment receipt among pregnant and nonpregnant women in the United States, 2008–2014. *Journal of Psychosomatic Obstetrics & Gynecology*. doi:10.1080/0167482X.2019.1689949

This study compared trends in mental health and substance use disorders and treatment received by pregnant and non-pregnant women in the USA from 2008 to 2014. Data from the 2008-2014 National Survey on Drug Use and Health, for pregnant ($n = 5520$) and non-pregnant women ($n = 11,040$) was used. The authors conducted logistic regression to compare trends in mental health and substance use disorders and treatment received for mental health and substance use disorders. A matched sample who met criteria for at least one mental illness, trends in mental health treatment receipt of pregnant ($n = 1,003$) and non-pregnant women ($n = 2,634$) were compared. The authors found no differences in the trends by pregnancy status from 2008 to 2014. Past-year anxiety disorder, past-month psychological distress and illicit drug use disorder increased in the total sample from 2008 to 2014, yet trends in mental health treatment and unmet need for substance use treatment did not change over time. Pregnant women had lower odds of mental illness, but those who had mental illness were less likely to receive mental health treatment than their nonpregnant counterparts. The authors conclude that there is a need for preventive strategies addressing anxiety disorder, psychological distress and illicit drug use among women of childbearing age as well as initiatives to increase access to mental health treatment among pregnant women.

19. Tung, I., Beardslee, J., Pardini, D., Chung, T., Keenan, K., & Hipwell, A. E. (2019). Adolescent childbirth, miscarriage, and abortion: Associations with changes in alcohol, marijuana, and cigarette use. *Journal of Child Psychology and Psychiatry*, 61(1). doi:10.1111/jcpp.13112

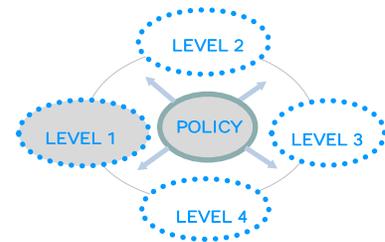
See abstract above (Prevalence).

20. Wubetu, A. D., Habte, S., & Dagne, K. (2019). Prevalence of risky alcohol use behavior and associated factors in pregnant antenatal care attendees in Debre Berhan, Ethiopia, 2018. *BMC Psychiatry*, 19.

See abstract above (Prevalence).

C. Level 1 Prevention

1. Adebiji, B. O., Mukumbang, F. C., & Beytell, A.-M. (2019). A guideline for the prevention and management of Fetal Alcohol Spectrum Disorder in South Africa. *BMC Health Services Research*, 19(1), 1-13. doi:10.1186/s12913-019-4677-x



The authors present a guideline to inform policy on the prevention and management of FASD in South Africa. Modeled by the World Health Organization's approach to guideline development, the authors used three phases to develop a guideline prototype. In phase one, they used in-depth interviews with relevant policy makers and focus groups, reviewed current policies on FASD, and conducted a scoping review of FASD interventions. In phase two, the prototype was refined with the assistance of experts on FASD. In phase three, the prototype was refined again using a modified Delphi approach with 85% acceptable consensus. The guideline covers approaches and guiding principles, prevention measures and management measures. Key components of FASD prevention policy include: awareness and education, access to treatment, and training of service providers. Key components of management include: capacity building, education of parents, appropriate referral pathways, teacher training and support for parents/individuals with FASD. The guideline also proposes that FASD policy should consider lifespan needs, be culturally diverse, collaborative, evidence-based, multi-sectoral and address social determinants of health contributing to FASD.

2. Adebiji, B. O., Mukumbang, F. C., & Erasmus, C. (2019). The distribution of available prevention and management interventions for Fetal Alcohol Spectrum Disorder (2007 to 2017): Implications for collaborative actions. *International Journal of Environmental Research and Public Health*, 16(12), 2244. doi:10.3390/ijerph16122244

The aim of this scoping review was to identify and classify prevention and management interventions of FASD reported globally across the life span and to map the concentration of these interventions across the globe. Thirty-two prevention intervention studies and 41 management interventions studies were identified. All the interventions were reported to be effective or showed promising outcomes for the prevention and management of FASD, except four. Although Europe and Africa have a relatively higher prevalence of FASD, the lowest number of interventions to address FASD were identified in these regions. Most of the interventions for FASD were reported in North America with comparatively lower FASD prevalence. The authors call for a concerted effort for knowledge and intervention sharing between regions.

3. Choate, P., Badry, D., MacLaurin, B., Ariyo, K., & Sobhani, D. (2019). Fetal alcohol spectrum disorder: What does public awareness tell us about prevention programming? *International Journal of Environmental Research and Public Health*, 16(21), 4229. doi:10.3390/ijerph1621422

The authors conducted a secondary analysis of two studies conducted in 2011 and 2017 in Alberta that had aimed to measure the level of FASD awareness in the province. In the secondary analysis, they analyzed how awareness of FASD and attitudes about bystander responsibility were related to the sociodemographic characteristics of the respondents and differed by survey year. In 2011, 18% of men and 10% of women did not know about FASD, and this decreased with 15% of men and 6% of women unaware of FASD in 2017. The authors conclude that in addition to targeting women in prevention messages that formal (health care providers for examples) and informal (partner, spouse, family, and friends) support could improve prevention. In the surveys both informal and formal support were reported as sources of encouragement, and ensuring they understand risks, as well as effective ways to encourage abstinence or harm reduction, may be beneficial for both the woman and the pregnancy.

4. **Giglia, R. C., & Reibel, T. (2019). Has a national policy guideline influenced the practice of raising the topic of alcohol and breastfeeding by maternal healthcare practitioners? *Australian Journal of Primary Health, 25(3), 275-280.* doi:10.1071/PY18103**

The purpose of this study was to assess maternal healthcare practitioners (MHP) knowledge of a national guideline on alcohol and breastfeeding in Australia. Semi-structured telephone interviews ($n = 19$) were used to gain their understanding of the guideline, confidence to provide information on this topic, and if they were routinely incorporating conversations on alcohol and breastfeeding into their practice. The results showed that the majority of MHP were not aware of the national policy providing direction for safely consuming alcohol during lactation and were not incorporating this information into their practice. This study suggests having a national policy guideline for safe alcohol consumption during lactation has not promoted awareness of this topic among MHP as a potential strategy to support long-term breastfeeding duration.

5. **Lim, A. W. Y., Van Schalkwyk, M. C. I., Maani Hessari, N., & Petticrew, M. P. (2019). Pregnancy, fertility, breastfeeding, and alcohol consumption: An analysis of framing and completeness of information disseminated by alcohol industry-funded organizations. *Journal of Studies on Alcohol and Drugs, 80(5), 524-533.* doi:10.15288/jsad.2019.80.524**

This study analysed the information posted on websites of alcohol-industry-funded bodies and public health organizations in several countries, to assess the accuracy of the guidance provided related to alcohol use and fertility, pregnancy and breastfeeding. Comparative qualitative and quantitative analysis of the framing and completeness of this information was undertaken for 23 alcohol industry-funded bodies and 19 public health organizations. The authors found that alcohol industry-funded organizations were statistically significantly less likely than public health websites to provide information on Fetal Alcohol Spectrum Disorder and less likely to advise that no amount of alcohol is safe during pregnancy. They were significantly more likely to emphasize uncertainties and less likely to use direct language (e.g., "don't drink"). Some alcohol industry-funded (and no public health) websites appear to use "alternate causation" arguments, similar to those used by the tobacco industry, to argue for causes of alcohol harms in pregnancy other than alcohol. The authors conclude that since alcohol industry-funded websites omit and misrepresent the evidence on key risks of alcohol consumption during pregnancy, the public should be made widely aware of the risks of obtaining health information from these sources.

6. **Maani Hessari, N., van Schalkwyk, M. C., Thomas, S., & Petticrew, M. (2019). Alcohol industry CSR organizations: What can their Twitter activity tell us about their independence and their priorities? A comparative analysis. *International Journal of Environmental Research and Public Health, 16(5), 892.* doi:10.3390/ijerph16050892**

The authors compared all the Twitter tweets in 2016 from three alcohol industry organizations with the tweets from three non-alcohol industry funded charities. The results indicated that industry funded organizations were less likely to tweet about alcohol pricing and physical health harms, including risk during pregnancy, and were significantly more likely to tweet about behavioral aspects of drinking. The authors conclude that the actions of such organizations are aimed at protecting the alcohol market and the alcohol industry's reputation.

7. **Parackal, M., & Parackal, S. (2019). A renewed media-mix, based on the dynamic transactional model, for communicating the harms of alcohol to women in New Zealand. *Health Promotion International, 34(5), 921-930.* doi:10.1093/heapro/day033**

The authors of this study describe a mixed methods research project that recognized the sources that women of childbearing age in New Zealand prefer when seeking out information about alcohol use and pregnancy. Using in-depth interviews and a telephone survey, information was collected to recommend a media-mix for communicating about the risks of alcohol use during pregnancy. The authors identify 13 information sources that included one-way (e.g., from the sender to the target audience) and two-way (e.g., social media, where the message is disseminated via user-generated content) modes of communication. They offer and discuss a theoretical foundation for a recommended complementarity approach (using a media-mix of these sources). The results of this study have implications for public health messaging that incorporates new technologies with traditional communication approaches, and fits specific national contexts and available funding .

8. **Popova, S., Dozet, D., Burd, L., & Rehm, J. (2019). Alcohol industry-funded websites contribute to ambiguity regarding the harmful effects of alcohol consumption during pregnancy: A commentary on Lim et al. (2019). *Journal of Studies on Alcohol and Drugs*, 80(5), 534-536. doi:10.15288/jsad.2019.80.534**

In this commentary, the authors respond to Lim et al.'s (2019) review on the content of alcohol industry-funded organization websites regarding alcohol use and pregnancy. The authors provide agreement with the arguments made by Lim et al., which suggest that the alcohol industry contributes to ambiguity and misinformation about the risks of alcohol consumption during pregnancy. The authors reiterate the need for public health organization websites, and other sources of public health information, to clearly identify that there is no known amount, time, or type of alcohol that can be safely used during pregnancy.

9. **Roberts, S., Berglas, N.F., Subbaraman, M.S., Mericle, A., Thomas, S. & Kerr, W.C. (2019). Racial differences in the relationship between alcohol/pregnancy policies and birth outcomes and prenatal care utilization: A legal epidemiology study. *Drug and Alcohol Dependence*, 201, 244-252.**

The authors examine whether effects of alcohol and pregnancy policies vary by race in the USA using 1972-2015 Vital Statistics data and policy data from NIAAA's Alcohol Policy Information System and original legal research. The dataset included more than 150 million singleton births. They looked for the outcomes of preterm birth (PTB), low birthweight (LBW), and prenatal care utilization. Their logistic regression models included a race and policy interaction terms as main predictors, adjusting for individual- and state-level controls, including fixed effects for state, year and state-specific time trends, and accounting for clustering by state. They found that the impact of alcohol/pregnancy policies varied by race for preterm birth, varied in a few cases for low birthweight, and generally did not vary for prenatal care utilization. For white women six policies had an adverse impact on PTB and/or LBW. For Black women, four policies had a beneficial impact for PTB and one had an adverse impact for LBW, and thus the hypothesis regarding the direction of differential effects was not supported. The authors conclude that the impact of alcohol/pregnancy policies on birth outcomes varies by race and that future research should explore why some policies appear to have opposite effects for White v. Black women.

10. **Roberts, S. C. M., et al. (2019). State policies targeting alcohol use during pregnancy and alcohol use among pregnant women 1985–2016: Evidence from the Behavioral Risk Factor Surveillance System. *Women's Health Issues*, 29(3), 213-221.**

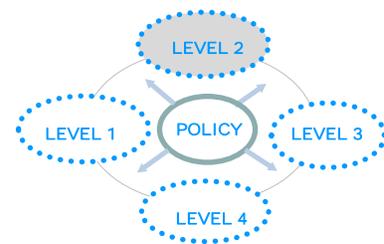
This study examined the relationship between state-level policies targeting alcohol use during pregnancy and alcohol use among pregnant women, using state-level alcohol and pregnancy policy data and individual-level Behavioral Risk Factor Surveillance System data about pregnant women's alcohol use from 1985 to 2016 ($n = 57,194$) in the USA. They identified supportive policies as: mandatory warning signs, priority substance abuse treatment, reporting requirements for data and treatment purposes, and prohibitions on criminal prosecution. They identified punitive policies as: civil commitment, Child Protective Services reporting requirements, and legal implications linking alcohol use with child abuse/neglect. They used logistic regression models that adjusted for individual- and state-level controls, included fixed effects for state and year, accounted for clustering by state, and weight by probability of selection. Relative to having no policies, supportive policy environments were associated with more any drinking, but not binge or heavy drinking. Of individual supportive policies, only the following relationships were statistically significant: mandatory warning signs was associated with lower odds of binge drinking, and priority treatment for pregnant women and women with children was associated with higher odds of any drinking. Relative to no policies, punitive policy environments were also associated with more drinking, but not with binge or heavy drinking. Of individual punitive policies, only child abuse/neglect was associated with lower odds of binge and heavy drinking. Mixed policy environments were not associated with any alcohol outcome. The authors conclude that most policies targeting alcohol use during pregnancy do not seem to be associated with less alcohol consumption during pregnancy.

11. **Woodruff, K., & Roberts, S. C. M. (2019). "Alcohol During Pregnancy? Nobody Does That Anymore": State Legislators' Use of Evidence in Making Policy on Alcohol Use in Pregnancy. *Journal of Studies on Alcohol and Drugs*, 80(3), 380-388. doi:10.15288/jsad.2019.80.380**

In recent years, states in the USA have passed many laws addressing alcohol use in pregnancy, despite limited evidence on the impact of such policies. This study explores how state legislators use evidence when making policy on alcohol use in pregnancy. Study data are drawn from semi structured interviews with 29 state lawmakers and their aides in Maryland, North Carolina, and Virginia, conducted in March through July 2017. Interview transcripts were coded and analyzed by

inductive and deductive methods. Despite evidence on the harms of alcohol use in pregnancy, most lawmakers did not express concern about this topic. Instead, they expressed concern about opioid use in pregnancy. Personal experiences, anecdotes, and known contacts influenced legislators' views on substance use in pregnancy, whereas evidence, for the most part, did not. The intermediaries who typically bring evidence about problems and solutions to legislators did not appear to be raising the issue of alcohol use in pregnancy on legislators' agenda. Basic evidence on the prevalence and harms of alcohol use in pregnancy did not appear to influence state lawmakers' policy priorities. Concern over opioid use in general may provide a window of opportunity to educate legislators on the relative scope and harms of alcohol and opioid use in pregnancy. It remains unclear why states are passing alcohol-in-pregnancy policies. More research is needed to explore how state lawmakers form their understanding of substance use in pregnancy and related policies.

D. Level 2 Prevention



1. **Ahankari, A. S., Wray, J., Jomeen, J., & Hayter, M. (2019). The effectiveness of combined alcohol and sexual risk taking reduction interventions on the sexual behaviour of teenagers and young adults: a systematic review. *Public Health, 173*, 83-96. doi:10.1016/j.puhe.2019.05.023**

This systematic review summarizes current interventions and their effectiveness in reducing alcohol use and sexual risk-taking behaviour in teenagers and young adults. In total 18 studies were included, 15 were randomized control trials, and 3 were intervention studies that included pre/post analyses. Study durations ranged from 6 months to 24 months and the retention rate decreased with an increase in study duration, ranging from 60% to 80% for most studies (shorter studies had higher retention rates of $\geq 90\%$). Study sites varied and were as follows: in schools/college = 5, at family level/home environment = 3, web based = 2, sexual health clinics = 2, mental health clinics = 1, community level = 1 and juvenile detention facility = 4. The study quality assessment showed that most studies were of medium to high quality. From the review, authors conclude that: cultural norms, acceptability of casual sex, and binge drinking trends in the teenage and young adult communities are the major influencers for harmful drinking in adolescence and early adulthood; and young people are less likely to engage in risky sexual behaviour and choose harmful drinking after interventions. Study setting and target population also determine the type of intervention required and impact on outcomes. Appropriate intervention type/design, delivery methods and follow-up plans are key elements to ensure both uptake and success of interventions.

2. **Albrecht, S. A., Kameg, B. N., Puskar, K. R., Lewis, E. L., & Mitchell, A. M. (2019). Fetal Alcohol Spectrum Disorders: Implications for Primary Care Nurse Practitioners. *The Journal for Nurse Practitioners, 15*(8), 550-552. doi:10.1016/j.nurpra.2019.05.012**

This article directed to nurse practitioners in the US describes in detail, and recommends, alcohol screening and brief intervention as an evidence-based practice that identifies those pregnant women who may be consuming alcohol at risky levels and provides a brief motivation-enhancing intervention. The authors further identify the importance of identification and early intervention with children who have FASD. They conclude that nurse practitioners who provide patient-centered primary care to women are ideally positioned to help in the prevention FASDs.

3. **Bagley, K., & Badry, D. (2019). How personal perspectives shape health professionals' perceptions of Fetal Alcohol Spectrum Disorder and risk. *International Journal of Environmental Research and Public Health, 16*(11), 1936. doi:10.3390/ijerph16111936**

The authors report on four themes related to New Zealand health care professionals' perception of the risk of drinking alcohol during pregnancy, that emerged as part of larger ethnographic study of participants experiences of FASD training, their knowledge of FASD and their professional practices. Participants reflected on their personal experience of alcohol use during pregnancy, as well as others they knew, the social construction of alcohol use and how this compared to the construction of other substance use. The authors conclude that health care professional's perceptions of drinking during pregnancy are impacted by social norms, as well as their own experiences of alcohol use and pregnancy which may contribute to a reluctance to consider FASD in their professional practice.

4. Celio, M. A., Mastroleo, N. R., Barnett, N. P., Colby, S. M., Kahler, C. W., Operario, D., & Monti, P. M. (2019). Mechanisms of behavior change in a brief dual-target motivational intervention: Reduction in alcohol use mediates intervention effects on risky sex. *Psychology of Addictive Behaviors*, 33(4), 349-359. doi:10.1037/adb0000461

This US study examined the efficacy of a dual-target motivational intervention (MI) to reduce heavy drinking and risky sex. Patients in Emergency Departments in two community hospitals in Rhode Island, who screened positive for heavy drinking and risky sex were randomly assigned to receive MI (1 hour open ended exploration of issues and feedback) or brief advice (5-minute advice provision plus pamphlet). Alcohol-related readiness to change and self-efficacy were assessed at baseline and immediately postintervention. Alcohol use and sexual behavior was assessed at baseline, 3-, 6-, and 9-month follow up. Patients who received MI had higher post-intervention readiness to change and self-efficacy, they were not related to subsequent behaviour change in heavy drinking or condom less sex. Reduced heavy drinking mediated the effect of MI on frequency of sex under the influence (SUI). Further, the effect of MI on condom less sex was mediated by reductions in heavy drinking at 3 months which predicted less SUI at 6 months, which in turn predicted reduction in condom less sex at 9-months. Authors conclude that although some effect of dual-target MI on risky sex is independent of drinking, treatment-related reduced heavy drinking does account for a significant portion of reduction in risky sex, providing support for the utility of this intervention in patient populations where heavy drinking and risky sex co-occur.

5. Chiodo, L. M., Cosmian, C., Pereira, K., Kent, N., Sokol, R. J., & Hannigan, J. H. (2019). Prenatal Alcohol Screening During Pregnancy by Midwives and Nurses. *Alcoholism: Clinical & Experimental Research*, 43(8), 1747-1758. doi:10.1111/acer.14114

This study described self-reported knowledge of American midwives, nurse practitioners, and nurses who provide prenatal care on topics of the effects of prenatal alcohol exposure, the prevalence of alcohol use during pregnancy, and practices for screening patients' alcohol use. A survey was sent to about 6,000 participants recruited from the roster of the American College of Nurse-Midwives. Analyses showed that 38% of the respondents believe drinking alcohol is safe during at least one trimester of pregnancy. Only 35% of respondents reported screening to assess patient alcohol use. Only 23% reported using a specific screening tool, and few of those were validated screens recommended for use in pregnant women. Respondents who believe alcohol is safe at some point in pregnancy were significantly less likely to screen their patients. Respondents who reported that pregnancy alcohol use is unsafe felt more prepared to educate and intervene with patients regarding alcohol use during pregnancy and FASD than respondents who reported drinking in pregnancy was safe. Authors conclude that perceived alcohol safety and perceived barriers to screening appeared to influence screening practices, and that facilitating knowledge on these topics will improve detection of drinking during pregnancy and ultimately reduce incidence of FASD.

6. Coleman-Cowger, V. H., Oga, E. A., Peters, E. N., Trocin, K. E., Koszowski, B., & Mark, K. (2019). Accuracy of three screening tools for prenatal substance use. *Obstetrics & Gynecology*, 133(5), 952-961

The purpose of this study was to compare and evaluate the accuracy of three screening tools in identifying substance misuse among pregnant women in Baltimore, US. Pregnant women ($n = 500$) were administered the following index tests: 4P's Plus, NIDA Quick Screen-ASSIST (Modified Alcohol, Smoking and Substance Involvement Screening Test), and the SURP-P (Substance Use Risk Profile-Pregnancy) scale. They were also administered urine and hair substance use tests (reference tests). Screening tools were repeated one week later by telephone. Sensitivity was measured by the proportion of participants with a positive reference test who also had positive index tests. Specificity was the proportion with a negative reference test who also had negative index tests. For the 4P's Plus, sensitivity=90.2% (84.5, 93.8), and specificity=29.6% (24.4, 35.2). For the NIDA Quick Screen-ASSIST, sensitivity=79.7% (71.2, 84.2), and specificity=82.8% (78.1, 87.1). For the SURP-P, sensitivity=92.4% (87.6, 95.8) and specificity=21.8% (17.4, 27.2). Test-retest reliability (phi correlation coefficients) was 0.84, 0.77, and 0.79 for the 4P's Plus, NIDA Quick Screen-ASSIST and the SURP-P, respectively. For all screening tools, there were differences in validity indices by age and race, but no differences by trimester. The authors conclude that the SURP-P and 4P's Plus are preferred screening tools due to their high sensitivity across trimesters, races and age groups.

7. Doherty, E., Wiggers, J., Wolfenden, L., Anderson, A. E., Crooks, K., Tsang, T. W., . . . Kingsland, M. (2019). Antenatal care for alcohol consumption during pregnancy: pregnant women's reported receipt of care and associated characteristics. *BMC Pregnancy and Childbirth*, 19(1), 299.

The purpose of this study was to examine Australian pregnant women's reported receipt recommended care addressing alcohol consumption during pregnancy, characteristics associated with the receipt of care, and the pregnant

women's acceptability of care. From July 2017 - February 2018 a survey (telephone or online) was undertaken with $n = 1363$ pregnant women who had recently visited a public prenatal service. Receipt and acceptability of recommended care were assessed based on descriptive and logistic regression analyses. At the initial prenatal visit, less than two thirds (64%) of pregnant women reported that they received an assessment of their alcohol consumption and just over one third (35%) received advice and referral appropriate to their self-reported level of alcohol consumption since pregnancy recognition. Less than 10% of women received such care at subsequent prenatal visits. Characteristics that significantly increased the odds of receiving guidelines at the initial prenatal visit included: less than university attainment ($OR = 1.93$, 95% CI: 1.12-3.34), not residing in an advantaged area ($OR = 2.11$, 95% CI: 1.17-3.79), first pregnancy ($OR = 1.91$, 95% CI: 1.22-2.99) and regional/rural service location ($OR = 2.38$, 95% CI: 1.26-4.48); and at subsequent visits: younger age ($OR = 0.91$, 95% CI: 0.84-0.99) and Aboriginal origin ($OR = 3.17$, 95% CI: 1.22-8.24). Each of the recommended care elements were highly acceptable to pregnant women (88-99%). Although care for alcohol consumption is both recommended by clinical guidelines and highly acceptable to pregnant women, its receipt in public prenatal services is lacking. Authors conclude that there is a need and an opportunity for interventions to support prenatal care providers to routinely and consistently provide alcohol consumption care.

8. Elertson, K. M., & Schmitt, C. A. (2019). Ask them all: Self-report universal prenatal substance use screening in the United States. *Journal of Substance Use*. doi:10.1080/14659891.2019.1614233

This study evaluated the effectiveness of universal prenatal substance use screening in the US using a self-report approach. A retrospective review of de-identified data was used to evaluate women's willingness to self-report substance use through direct screening. Data obtained from 24 months of maternal self-report were analyzed to assess the overall effectiveness. Findings revealed maternal substance use disclosure rates of 10%, higher than the 5% United States national average. The authors conclude that findings suggest the direct method may support maternal self-report of substance use in universal prenatal screening, but that additional studies with diverse populations and clinical settings is needed.

9. Forray, A., Martino, S., Gilstad-Hayden, K., Kershaw, T., Ondersma, S., Olmstead, T., & Yonkers, K. A. (2019). Assessment of an electronic and clinician-delivered brief intervention on cigarette, alcohol and illicit drug use among women in a reproductive healthcare clinic. *Addictive Behaviors*, 96, 156-163. doi:10.1016/j.addbeh.2019.05.007

This study was a secondary analysis that assessed the impact of clinician-delivered Screening, Brief Intervention, and Referral to Treatment (SBIRT) interventions in comparison to an electronic version (e-SBIRT) and enhanced usual care (EUC) in a 3-group randomized control trial. Women were recruited from reproductive health clinics in the US within three primary substance subgroups: cigarettes, illicit substances, and alcohol. Participants ($n = 439$) were grouped according to their primary substance. Differences in substance use over time, and between treatment group differences were examined. Cigarettes were the most frequently reported primary substance ($n = 251$), followed by illicit substances ($n = 137$) and alcohol ($n = 51$). Results for primary cigarette use suggested greater reductions in cigarette use over the first 3 months following treatment with SBIRT compared to EUC. However, after month 3, monthly reductions in cigarette use were similar between groups. Results followed a similar pattern for primary illicit substance use among the e-SBIRT suggesting greater reductions in illicit substance use with e-SBIRT versus EUC. Neither intervention reduced primary alcohol use (compared to EUC). The authors conclude that reproductive-age women appear to respond differently to electronic- and clinician-delivered interventions, depending on their primary substance, and that there is a need for further testing of interventions with alcohol as a primary substance with a larger sample.

10. Gance-Cleveland, B., Leiferman, J., Aldrich, H., Nodine, P., Anderson, J., Nacht, A., . . . Ozkaynak, M. (2019). Using the technology acceptance model to develop StartSmart: mHealth for screening, brief intervention, and referral for risk and protective factors in pregnancy. *Journal of Midwifery & Women's Health*, 64(5), 630-640. doi:10.1111/jmwh.13009

The purpose of this US-based study was to share the developments of StartSmart, a mobile health (mHealth) intervention to support evidence-based prenatal screening, brief intervention, and referral to treatment in pregnancy. The prototype was developed based upon the current guidelines, focus group findings, and consultation with patient and provider experts. The prototype was then alpha tested by clinicians and patients. Clinicians were asked to give feedback on the tool and its feasibility. Patients were interviewed on the usefulness and usability of the tool. Expert clinicians provided guidance on the screening instruments, resources, and practice guidelines. Clinicians suggested identifying specific prenatal visits for the screening (first prenatal visit, 28-week visit, and 36-week visit). Patients reported that the tablet-based

screening was useful to promote adherence to guidelines and provided suggestions for improvement including more information on the diabetic diet and more resources for diabetes. During alpha testing, participants commented on navigability and usability. Patients reported favorable responses about question wording and ease of use. Clinicians reported that the use of mHealth to screen and counsel pregnant patients on risk and protective factors facilitated their ability to provide comprehensive care.

- 11. Hanna, J., Hanna, J., Lendoiro, E., Lendoiro, E., de Castro, A., de Castro, A., . . . Concheiro-Guisan, M. (2019). Detection of in utero ethanol exposure via ethyl glucuronide and ethyl sulfate analysis in umbilical cord and placenta. *Forensic Toxicology*, 37(1), 90-103. doi:10.1007/s11419-018-0439-4**

The purpose of this study was to develop and validate a method for determining the ethanol markers ethyl glucuronide (EtG) and ethyl sulfate (EtS) in umbilical cord and placenta tissues, versus in meconium. The ethanol marker EtG is a long-term marker of alcohol use during pregnancy in meconium. Using 59 samples from newborns whose meconium samples were positive for EtG, a validated method was created for the umbilical cord and placenta tissues. This method was found to be sensitive and specific for both direct metabolites of ethanol in these two types of tissue samples.

- 12. Hanson, J. D., Weber, T. L., Shrestha, U., Bares, V. J., Seiber, M., & Ingersoll, K. (2019). Acceptability of an eHealth intervention to prevent alcohol-exposed pregnancy among American Indian/Alaska Native teens. *Alcoholism, Clinical and Experimental Research*. doi:10.1111/acer.14229**

The aim of this study was to create and establish the acceptability of the Changing High-Risk Alcohol Use and Increasing Contraception Effectiveness Study (CHOICES) Program among adult American Indian/Alaska Native teens. The authors conducted 15 key informant interviews to review the existing CHOICES intervention and to finalize the CHOICES for American Indian Teens (CHAT) intervention. Results of the key informant interviews indicated that a Web-based intervention may increase teen engagement. Focus groups with American Indian/Alaska Native teens revealed that this type of intervention would be both acceptable and feasible to implement with a community of reservation-based teens. The results of this study provide evidence for this expansion of the CHOICES intervention, and for web based interventions for rural adolescents living in Indigenous communities.

- 13. Howlett, H., Mackenzie, S., Strehle, E.-M., Rankin, J., & Gray, W. K. (2019). A survey of health care professionals' knowledge and experience of Foetal Alcohol Spectrum Disorder and alcohol use in pregnancy. *Clinical Medicine Insights: Reproductive Health*, 13. doi:10.1177/1179558119838872**

This study sought to identify the level of awareness of FASD among National Health Service (NHS) health professionals in the UK, given that only a small percentage of children with FASD are identified. An online survey was developed to determine health care professionals' (midwives, health visitors, obstetricians, paediatricians, and general practitioners) perceived knowledge, attitudes, and clinical practices relating to alcohol in pregnancy and FASD. Survey responses ($n = 250$) were received from $n = 78$ midwives, $n = 60$ health visitors, $n = 55$ obstetricians, $n = 31$ paediatricians, and $n = 26$ general practitioners. About 58% of paediatricians had diagnosed a patient with FASD and 37% worried about stigmatisation with diagnosis. Paediatricians reported the highest levels of FASD training (55%), with much lower levels in midwives (21%). The authors identify a need for training in alcohol screening in pregnancy and FASD to improve awareness and recognition by UK professionals.

- 14. Hughes, E., Baca, E., Mahmoud, K. F., Edwards, A., Griffith, K. J., Matthews, E., . . . Mitchell, A. M. (2019). Nurses and Fetal Alcohol Spectrum Disorders prevention. *Issues in Mental Health Nursing*. doi:10.1080/01612840.2019.1565871**

Three universities, including the University of Alaska, Anchorage, the University of California, San Diego, and the University of Pittsburgh Schools of Nursing, collaborated to develop a toolkit to help nurses identify and address at-risk alcohol use and FASD prevention: *Fetal Alcohol Spectrum Disorders: A Toolkit for Nurse Champions*. The purpose of this toolkit is to provide information on alcohol screening, brief intervention, and FASD to nurses and to facilitate the recognition and prevention of FASD. The toolkit includes several resources that provide education and practice tips for health care providers.

15. Janssen, T., Magill, M., Mastroleo, N. R., Laws, M. B., Howe, C. J., Walthers, J. W., . . . Kahler, C. W. (2019). The role of therapist MI skill and client change talk class membership predicting dual alcohol and sex risk outcomes. *Journal of Clinical Psychology, 75*(9), 1527-1543. doi:10.1002/jclp.22798

The authors of this study examined the technical model of motivational interviewing (MI) in a dual-outcome intervention (addressing alcohol and sexual risk) with $n = 164$ individuals presenting to an emergency department who were part of a larger study testing the efficacy of MI compared to brief advice. Specifically, they explored the proportion of change talk across the session and identified three classes of alcohol-change talk and two classes of sexual risk-change talk. Greater therapist motivational interviewing consistent skill was associated with fewer heavy drinking days in the alcohol-change talk class and reduced odds of condom less sex for the low sexual risk-change talk class. The authors note that dual target MI process appears to be a complex interaction between the state of the MI client, the MI therapist and a shifting priority from one target to the other. They conclude that the study shows that the influence of MI consistency is not universally positive in a dual target MI, but rather is associated differentially with outcomes based on how client change language manifests during the session.

16. Lee, Y., & Cho, S. (2019). Technology-supported interventions for pregnant women: A Systematic review. *CIN: Computers, Informatics, Nursing, 37*(10), 501-512. doi:10.1097/CIN.0000000000000535

This systematic review sought to determine what technology-supported interventions were developed and delivered, how these interventions were developed and delivered, and the intervention effects on the targeted outcomes among pregnant women. A total of 11 studies were included for analysis, most of which were pilot studies of feasibility, acceptability, or preliminary effects of technology-supported interventions. Characteristics of the participants in these studies included: women with healthy pregnancies and pregnancies with various complications (e.g., preterm labor, smoking, and alcohol use); individuals mostly in the United States; and individuals who were white or African American. Various forms of technology were reported including computers, mobile phones, and audiovisual aids. The overall interventions were reported to be feasible, acceptable, and beneficial in all the selected studies.

17. Manriquez, M., Starer, J., Parisi, V., Tracy, E., McFadden, T., & Penney, L. (2019). Fetal Alcohol Spectrum Disorder prevention program: SBIRT's role in averting Fetal Alcohol Spectrum Disorders. *Birth Defects Research, 111*(12), 829-834. doi:10.1002/bdr2.1516

This review paper describes the activities to empower and educate health care providers to address alcohol use disorder in pregnancy and the effects of FASD, particularly regarding screening, brief intervention, and referral to treatment practices. Specifically, the authors describe the CDC funded initiative of the American College of Obstetricians and Gynecologists (ACOG), the FASD Prevention Program. One interesting aspect of this Program was to recruit 15 champions representing different parts of the country who supported integration of SBI training into residency training and in making grant round presentations at residency programs. The program also created resources to assist clinicians in integrating SBIR into their daily practice including the provision of a directory of state by state treatment resources to assist with making referrals. They have a further goal to get the AUDIT screening tool integrated in the ACOG prenatal record to support the generation of data regarding screening and brief intervention rates, rates of alcohol use during pregnancy and rates of change following an intervention.

18. McLellan, J. M., O'Carroll, R. E., Cheyne, H., & Dombrowski, S. U. (2019). Investigating midwives' barriers and facilitators to multiple health promotion practice behaviours: A qualitative study using the theoretical domains framework. *Implementation Science, 14*(1). doi:10.1186/s13012-019-0913-3

The authors of this two-part study investigated the perceived barriers and facilitators experienced by midwives regarding health promotion practice behaviours, including asking women about alcohol use during pregnancy. The authors combine two studies involving interviews with midwives practicing in a community-based setting ($n = 11$) and an online survey with midwives ($n = 505$). Midwives reported several barriers including: an increasing number of health promotion practice behaviours that warrant attention on top of existing clinical workloads; personal cognitive resources; a lack of continuity of care; and difficulty accessing appropriate training. A key facilitator included motivation to support pregnant women to address their health. Interventions that support midwives in addressing these barriers and facilitators in order to help pregnant women with health changes, such as alcohol use during pregnancy, are warranted.

19. Nathoo, T., Wolfson, L., Gelb, K. & Poole, N. (2019) New approaches to brief intervention on substance use. *Canadian Journal of Midwifery Research and Practice*, 18(1), 10-21.

In this paper the authors explore the ways in which brief intervention on substance use in the perinatal period can be a key component of midwifery care. The midwifery model of care is very well suited for open, collaborative conversations about substance use, as there are opportunities for ongoing and supportive relationship building throughout pregnancy, labour, birth, and into the postpartum period.

20. Olmstead, T. A., Yonkers, K. A., Ondersma, S. J., Forray, A., Gilstad-Hayden, K., & Martino, S. (2019). Cost-effectiveness of electronic- and clinician-delivered screening, brief intervention and referral to treatment for women in reproductive health centers. *Addiction*, 114(9), 1659-1669. doi:10.1111/add.14668

This study examined the cost effectiveness of brief intervention, and referral to treatment (SBIRT) comparing electronic and clinician-delivered approaches in Connecticut, United States. Women in reproductive health centers who used cigarettes, alcohol, illicit drugs, and prescription medications ($n = 439$) were randomly assigned to three groups: enhanced usual care, electronic-delivered SBIRT, or clinician-delivered SBIRT. The primary outcome measure of the trial was days of primary substance abstinence during the 6-month follow-up period. The electronic SBIRT was the most cost-effective method when considered from a health care perspective. However, enhanced usual care and electronic SBIRT were both considered to be cost-effective interventions when considered from a client perspective, depending on the level of willingness to pay. Therefore, electronic SBIRT could be an overall cost-effective approach to SBIRT for both health care providers and clients to help women reduce their substance use.

21. Ondersma, S. J., Chang, G., Blake-Lamb, T., Gilstad-Hayden, K., Orav, J., Beatty, J. R., . . . Yonkers, K. A. (2019). Accuracy of five self-report screening instruments for substance use in pregnancy. *Addiction*. doi:10.1111/add.14651

This US study explores the accuracy of current screening instruments for identification of substance use in pregnancy, given the methodological shortcomings in existing research. The study compared five existing instruments for ability to identify illicit drug, opioid and alcohol use, under privacy expectations consistent with applied practice and using a gold standard incorporating toxicological analysis. Participants included a convenience sample of $n = 1220$ racially, ethnically and socio-economically diverse pregnant women aged 18 years and over in three US sites encompassing four prenatal care clinics. Participants completed five screening instruments: the Substance Use Risk Profile—Pregnancy (SURP-P), CRAFFT (acronym for five-item screener with items related to car, relax, alone, forget, friends and trouble), 5Ps (parents, peers, partner, pregnancy, past), Wayne Indirect Drug Use Screener (WIDUS) and the National Institute on Drug Abuse (NIDA) Quick Screen. In a second phase participants provided a urine sample and completed a calendar recall-based interview regarding substance use. These screeners were tested, using receiver operating characteristic (ROC) analysis and accuracy statistics, against a reference standard consisting of substance use in three classes (illicit drugs, opioids and alcohol), considered positive if use was evident via 30-day calendar recall or urine analysis. The study found that 315 of 1220 participants (26%) met reference standard criteria for positivity. The single-item screening questions from the NIDA Quick Screen showed high specificity (0.99) for all substances, but very poor sensitivity (0.10–0.27). The 5Ps showed high sensitivity (0.80–0.88) but low specificity (0.35–0.37). The CRAFFT, SURP-P and 5Ps had the highest area under the curve (AUC) for alcohol (0.67, 0.66 and 0.62, respectively), and the WIDUS had the highest AUC for illicit drugs and opioids (0.70 and 0.69, respectively). Performance of all instruments varied significantly with race, site and economic status. The authors note the none of the five screeners showed both high sensitivity and high specificity, and area under the curve was low for nearly all measures.

22. Oni, H. T., Buultjens, M., Abdel-Latif, M. E., & Islam, M. M. (2019). Barriers to screening pregnant women for alcohol or other drugs: A narrative synthesis. *Women and Birth*, 32(6), 479-486. doi:10.1016/j.wombi.2018.11.009

The authors conducted a narrative review of the literature related to barriers health care providers face when screening pregnant women for alcohol and other drugs. They included nine papers in their review. The identified barriers to screening were: competing priorities and time constraint; lack of adequate screening skills and clear protocol; relationship between healthcare providers and pregnant women; healthcare providers' perceptions; under-reporting or none/false disclosure; inconclusive evidence regarding the risk of alcohol or other drug use in pregnancy; and concerns about guilt and anxiety. The authors conclude that these barriers need to be overcome to establish evidence-based screening practices.

- 23. Ordean, A., Forte, M., Selby, P., & Grennell, E. (2019). Screening, brief intervention, and referral to treatment for prenatal alcohol use and cigarette smoking: a survey of academic and community health care providers. *Journal of Addiction Medicine, 1*. doi:10.1097/ADM.0000000000000588**

The aim of this study was to determine current practices, barriers to implementation, and education needs of health care providers implementing screening, brief intervention, and referral to treatment (SBIRT) when addressing prenatal alcohol and cigarette use. The authors conducted a survey of health care providers in Toronto, Canada ($n = 118$). Almost all providers, including family physicians, midwives, and obstetricians, reported screening every pregnant woman for alcohol and cigarette use, but brief intervention was offered by fewer providers. Barriers to SBIRT included a perceived lack of appropriate resources, training, and clinical pathways. Overall, the results of this study indicate that health care providers often screen women for alcohol and cigarette use, but do not engage in brief intervention or referral to treatment services as frequently. Health care providers require increased education regarding effective SBIRT practices and resources.

- 24. Parrish, D. E., von Sternberg, K., Benjamins, L. J., Duron, J., & Velasquez, M. (2019). CHOICES-TEEN: Reducing substance-exposed pregnancy and HIV among juvenile justice adolescent females. *Research on Social Work Practice, 29*(6), 618-627. doi:10.1177/1049731518779717**

The purpose of this study was to assess the feasibility and acceptability of CHOICES-TEEN, a three-session intervention designed to reduce the overlapping risks of alcohol-exposed, tobacco-exposed, and HIV pregnancies. In this study, the CHOICES-TEEN intervention was assessed among women aged 14-17 in the juvenile justice system in Houston, Texas ($n = 21$). The results indicated a strong acceptability and feasibility for the intervention with high client satisfaction and high client/therapist ratings. The participating youth reduced their risk of having an alcohol or tobacco exposed pregnancy at 1 month follow up, as well as their risk of HIV. Overall, the results of this study indicate that CHOICES-TEEN is acceptable and feasible, and provides promising evidence for reducing overlapping, bundled health risks among this population.

- 25. Polak, K., Kelpin, S., & Terplan, M. (2019). Screening for substance use in pregnancy and the newborn. *Seminars in Fetal and Neonatal Medicine, 24*(2), 90-94. doi:10.1016/j.siny.2019.01.007**

In this review the authors critically assess the practice of screening and testing for substance use during pregnancy. They identify benefits and barriers for integrating screening into prenatal care. The authors also consider both the limitations and negative consequences of screening, and provide recommendations for the ethical implementation of screening for prenatal substance use. The discussion of ethical issues related to the use of biomarkers, the need to report positive screens, and the need to offer brief support following a positive screen is thoughtful. Practice points related to these ethical issues are provided.

- 26. Premji, S., McDonald, S. W., Zaychkowsky, C., & Zwicker, J. D. (2019). Supporting healthy pregnancies: Examining variations in nutrition, weight management and substance abuse advice provision by prenatal care providers in Alberta, Canada. A study using the All Our Families cohort. *PLoS ONE, 14*(1), e0210290. doi:10.1371/journal.pone.0210290**

In this study, the authors compared the nutritional, weight management and substance use advice provided to women by different prenatal care providers. Data from women participating in the All Our Families prospective pregnancy cohort was used to analyze advice provided by family doctors, doctors in low-risk maternity clinics (DLRMC), obstetricians, midwives, and walk-in clinic doctors. Between 53% and 73% of women reported receiving substance use advice, by provider type. Women attending DLRMC were more likely to provide, compared with not provide substance use advice (OR= 2.69, 95% CI: 2.20-3.28), whereas obstetricians and walk clinics were as equally likely to or not to provide such advice. The authors conclude the need for aligning best practice guidelines and evaluation to ensure a consistent message reaches all pregnant women in Alberta.

- 27. Pullon, S., Ballantyne, A., Macdonald, L., Barthow, C., Wickens, K., & Crane, J. (2019). Daily decision-making about food during pregnancy: A New Zealand study. *Health Promotion International, 34*(3), 469-478. doi:10.1093/heapro/dax098**

This study investigated how women in New Zealand made everyday decisions during pregnancy about food and drink, including dietary supplements and medications, alcohol and recreational drugs. Qualitative interviews were done with 20 women as a side-arm to a randomized control trial conducted with pregnant women in Wellington between 2013–2016.

The inductive thematic analysis of the interviews identified five themes as to decision-making about lifestyle behaviours: Information about food; Wanted and unwanted advice; Worry, anxiety and indecision; Making daily decisions about food; and Changes in decision making over time. Analysis showed that women had concern about information accuracy and overload from multiple, diverse sources. They described learning how to assess resource credibility, how to develop decision-making skills, and whom to trust. The study shows how the health information environment can be confusing or potentially harmful; and underlines the continued importance of the role of health professionals in not only interpreting information to discuss individualized advice, but also in empowering pregnant women to develop lifestyle-related decision-making skills.

28. Sánchez-Sauco, M. F., Villalona, S., & Ortega-García, J. A. (2019). Sociocultural aspects of drug dependency during early pregnancy and considerations for screening: Case studies of social networks and structural violence. *Midwifery, 78*, 123-130. doi:10.1016/j.midw.2019.07.017

In this article, the authors use social network theory to examine the contextual components of substance use during pregnancy. They include considerations of structural violence to shift away from defining the issue as a pathologized disorder or a product of social inequalities. They conducted interviews with $n = 10$ pregnant women recruited from a hospital in Spain. The majority of the women reported poly-substance use, and 50% used alcohol during pregnancy. Key themes from the interviews included: a lack of social support to change their behaviour, reliance on extended social ties for emotional and socioeconomic support and every day experiences of structural violence. A common pattern in women's lives emerged. Women lacked support during childhood, leading to psychological traumas which they attempted to resolve through close connections with peers and intimate partners. Depending on these new relationships, the authors suggest, predisposed women to adopting new behaviour, such as substance use, with the hope of social inclusion and as a means to cope with past traumatic events in their family. The authors conclude that comprehensive assessment of social and environmental risks could improve the identification and treatment of substance use during pregnancy.

29. Schölin, L., & Fitzgerald, N. (2019). The conversation matters: a qualitative study exploring the implementation of alcohol screening and brief interventions in antenatal care in Scotland. *BMC Pregnancy and Childbirth, 19*(1), 316-311. doi:10.1186/s12884-019-2431-3

This study aimed to explore the implementation of a national antenatal screening and brief intervention (SBI) programme in Scotland. Qualitative interviews were conducted with antenatal SBI implementation leaders ($n = 8$) in eight Scottish health boards. Interviews were analysed thematically and using the 'practical, robust implementation and sustainability model' (PRISM) to understand differences in implementation across health boards and perceived setting-specific barriers and challenges. In several health boards, where reported maternal alcohol use was lower than expected, implementation leaders sought to optimize inquiries about women's alcohol use to facilitate honest disclosure. Strategies focused on having positive conversations, exploring pre-pregnancy drinking habits, and building a trusting relationship between pregnant women and midwives. Women's responses were encouraging and disclosure rates appeared improved, though with some unexpected variation over time. Adapting the intervention to the local context was also considered important. This is the first study to explore implementation leaders' experiences of antenatal SBI delivery and identify possible changes in disclosure rates arising from the approach taken. In contrast with current antenatal alcohol screening recommendations, a conversational approach was advocated to enhance the accuracy and honesty of reporting. This may enable provision of support to more women to prevent Fetal Alcohol Spectrum Disorders (FASD).

30. Schölin, L., Hughes, K., Bellis, M. A., Eriksson, C., & Porcellato, L. (2019). "I think we should all be singing from the same hymn sheet" – English and Swedish midwives' views of advising pregnant women about alcohol. *Drugs: Education, Prevention & Policy, 26*(5), 394-400. doi:10.1080/09687637.2018.1478949

This study explored frontline midwives' attitudes towards alcohol use during pregnancy and compared practices in England and Sweden. Sixteen semi-structured interviews were conducted with midwives working in Liverpool, England ($n = 7$) and Örebro County, Sweden ($n = 9$). Data were analysed inductively, using thematic analysis with thematic networks. The findings show that all midwives believed pregnant women should be advised not to consume any alcohol during pregnancy and there is a need to tailor their approach to the individual. A key concern among midwives in both countries was how to advise about alcohol exposure that occurs before the pregnancy is known to the woman. English midwives discussed the uncertainty around the risk of consuming small amounts of alcohol, whereas Swedish midwives believed any amount of alcohol was associated with risk. Discussing alcohol was viewed as part of the health professional's role, but routine

questions for all women were perceived to aid discussions about alcohol. Future research should further explore the impact of wider social and political environment on midwives' attitudes around risks with prenatal alcohol use.

- 31. Thibaut, F., Chagraoui, A., Buckley, L., Gressier, F., Labad, J., Lamy, S., . . . Yonkers, K. (2019). WFSBP and IAWMH Guidelines for the treatment of alcohol use disorders in pregnant women. *The World Journal of Biological Psychiatry, 20*(1), 17-50. doi:10.1080/15622975.2018.1510185**

This article describes the recommendations included in practice guidelines for the treatment of alcohol use disorders during pregnancy, developed by members of the International Task Force of the World Federation of Societies of Biological Psychiatry and the International Association for Women's Mental Health. The authors involved in the Task Force performed a systematic review of all available publications and extracted data from national and international guidelines. They cite that there is no safe level of alcohol use during pregnancy and that abstinence is recommended. Ideally, they recommend that women should stop alcohol use when pregnancy is planned and, in any case, as soon as pregnancy is known. They recommend that patterns of alcohol maternal drinking should be systematically conducted at first antenatal visit and throughout pregnancy. They recommend the use of brief interventions in the case of low or moderate risk of alcohol use. To prevent alcohol withdrawal symptoms when high and chronic alcohol intake is stopped, they recommend low doses of benzodiazepines, for the shortest duration as well as hospitalisation. They do not recommend pharmacological treatment for maintenance of abstinence during pregnancy, due to the low level of evidence and/or to low benefit/risk ratio.

- 32. Trocin, K. E., Weinstein, N. I., Oga, E. A., Mark, K. S., & Coleman-Cowger, V. H. (2019). Prenatal practice staff perceptions of three substance use screening tools for pregnant women. *Journal of Addiction Medicine, 1*. doi:10.1097/ADM.0000000000000543**

There is a need to identify an acceptable and comprehensive substance use screening tool for pregnant women in the United States. This qualitative study sought to better understand prenatal practice staff perceptions of three existing substance use screening tools for use among pregnant women in an outpatient practice setting. Eight focus groups with $n = 40$ total participants were conducted with clinical and administrative staff of two diverse Maryland prenatal practices to determine the acceptability and usability of three substance use screening tools (4P's Plus, NIDA-Modified Alcohol, Smoking and Substance Involvement Screening Test, and the Substance Use Risk Profile-Pregnancy scale). The focus groups were digitally recorded, transcribed, coded, and analyzed using thematic analysis. Participant perceptions of screening tools were dependent upon screening tool length, tone, comprehensiveness, subjectivity, time frame of questions, and scoring and clinician instructions. Most participants preferred the 4P's Plus screening tool because it is brief, comprehensive, easy for the patient to understand, and excludes judgmental language and subjective questions. These results provide valuable insight into the needs and preferences of prenatal practice staff as it relates to prenatal substance use screening.

Level 2 - Preconception interventions

- 1. Committee on Gynecologic Practice American Society for Reproductive Medicine. (2019). Prepregnancy counseling: Committee Opinion No. 762. *Fertility and Sterility, 111*(1), 32. doi:10.1016/j.fertnstert.2018.12.003**

This committee opinion from ASRM and the ACOG discusses the benefits of pre-pregnancy care in reducing the risk of adverse health effects for the woman, fetus, and neonate by working with the woman to optimize health, address modifiable risk factors, and provide education about healthy pregnancy. They note that all those planning to initiate a pregnancy should be counseled, including heterosexual, lesbian, gay, bisexual, transgender, queer, intersex, asexual, and gender nonconforming individuals. They offer the following opening question: "Would you like to become pregnant in the next year?" They recommend pre-pregnancy counseling whether the reproductive-aged patient is currently using contraception or planning pregnancy. Because health status and risk-factors can change over time, they recommend that pre-pregnancy counseling should occur several times during a woman's reproductive lifespan, increasing her opportunity for education and potentially maximizing her reproductive and pregnancy outcomes. They list many health issues to be addressed with recommended treatments, including that all patients should be routinely asked about their use of alcohol, nicotine products, and drugs, including prescription opioids and other medications used for nonmedical reasons.

- Hai, A. H., Hammock, K., & Velasquez, M. M. (2019). The efficacy of technology-based interventions for alcohol and illicit drug use among women of childbearing age: A systematic review and meta-analysis. *Alcoholism: Clinical and Experimental Research*, 43(12), 2464-2479. doi:10.1111/acer.14203**

This review examined research evidence from randomized controlled trials (RCTs) on the efficacy of technology-based interventions (TBIs) in preventing and reducing alcohol and illicit substance use among childbearing-aged women. Seven databases were searched to identify eligible studies. Two reviewers independently screened studies, extracted data, and assessed risks of bias. Robust variance estimation in meta-regression was used to estimate effect sizes and conduct moderator analyses. Fifteen RCTs including 3,488 participants were included in the systematic review. Meta-analysis results based on 13 RCTs suggest that TBIs were efficacious relative to control conditions in preventing and reducing substance use among women of childbearing age ($d = 0.19$, 95% CI: 0.02- 0.35). Preliminary moderator analysis results suggest that the efficacy of TBIs might not vary by participant age, race/ethnicity, the type of technology used, or whether a virtual health assistant was used. TBIs' efficacy in terms of specific substance use types (alcohol and illicit substance use) or control types (inactive control and active controls) was inconclusive, due to the limited number of studies in each category. The authors conclude that this systematic review and meta-analysis found evidence of TBIs' efficacy in reducing alcohol and illicit drug use among women of childbearing age.

- Hammarberg, K., & Taylor, L. (2019). Survey of Maternal, Child and Family Health Nurses' attitudes and practice relating to preconception health promotion. *Australian Journal of Primary Health*, 25(1), 43-48. doi:10.1071/PY18078**

The aim of this Australian-based study was to assess Maternal, Child and Family Health Nurses (MCAFHNs) attitudes towards preconception health promotion, whether and under what circumstances they talk to their families about this, and what might help them start a conversation about preconception health. Of the $n = 192$ respondents, most (65%) agreed it is part of the MCAFHNs role to promote preconception health but only one in eight (13%) felt very confident that they knew as much as they needed and less than half (46%) 'routinely' or 'sometimes' promoted preconception health in their clinical practice. Almost all agreed that more information and education on the topic would increase their confidence to discuss preconception health. The authors conclude that, with adequate educational and structural support, most MCAFHNs are willing to deliver preconception health promotion in their clinical practice. And that as most new mothers' access MCAFHNs, the potential health benefits of this are considerable.

- Khan, N. N., Boyle, J. A., Lang, A. Y., & Harrison, C. L. (2019). Preconception health attitudes and behaviours of women: A qualitative investigation. *Nutrients*, 11(7), 1490. doi:10.3390/nu11071490**

This study explored women's attitudes to preconception health (areas of importance, support sources, enablers and barriers), behaviours (information seeking and health actions taken) and information preferences in Australia. Fifteen women participated ($n = 7$ preconception, $n = 7$ pregnant and $n = 1$ postpartum) in semi structured interviews. Interviews were transcribed, coded and thematically analysed. Women perceived optimising lifestyle behaviours including a healthy diet, regular physical activity, reducing alcohol intake and pre-pregnancy vitamin supplementation as important preconception health actions to adopt. Few women acknowledged the importance of formal preconception health checks and screening with health professionals. Barriers to achieving health behaviour change included anxiety, stress and challenges obtaining reputable information. Information preferences included the internet or their general practitioner. While women predominantly prioritised optimising diet and physical activity prior to pregnancy, there appeared to be limited awareness of preconception health checks and screening. The authors highlight the need for broader awareness of overall preconception health and wellbeing and targeted health communication since maternal health can profoundly affect both individual and intergenerational health.

- Kizirian, N. V., Black, K. I., Musgrave, L., Hespe, C., & Gordon, A. (2019). Understanding and provision of preconception care by general practitioners. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 59(6), 799-804. doi:10.1111/ajo.12962**

The authors of this study explored the understanding and provision of preconception care by 110 general practitioners in the Sydney Local Health District, Australia. While the majority (84%) of general practitioners indicated that they should be the primary provider of preconception care, only slightly more than half of practitioners (53%) described being aware of preconception care guidelines. Topics commonly discussed with women included smoking, vaccination, alcohol use, and supplements/medication use. The least reported topics included weight and mental health. The results of this study suggest that improved resources and education are required to support adequate preconception care for women.

6. **Shawe, J., Patel, D., Joy, M., Howden, B., Barrett, G., & Stephenson, J. (2019). Preparation for fatherhood: A survey of men's preconception health knowledge and behaviour in England. *PLoS ONE*, 14(3), e0213897. doi:10.1371/journal.pone.0213897**

This study assessed level of pregnancy planning, preconception health behaviours, and information seeking from health professionals before conception, on the part of men attending antenatal care with their partners at three London Maternity Units. The data was collected using the partner version of the London Measure of Unplanned Pregnancy (LMUP), A total of $n = 573$ men were recruited (91% response rate) with a mean age of 34 years, 86% employed or full-time students and 66% with a degree. Half were overweight or obese, 16% were still smoking and 79% had consumed alcohol in the three months before conception. Of $n = 250$ men answering questions about medication, a third were taking medication with potentially adverse effects on male reproductive health, while 23% reported taking specific preconception vitamins designed for men. Before their partner became pregnant 47% had looked at information about pregnancy from a variety of sources, including online. Assessed by the LMUP, 74% of pregnancies were planned. Male 'planners' were more likely than other men to reduce smoking, reduce alcohol consumption and to eat more healthily in preparation for pregnancy. However, 57% took no action to improve their health. The authors noted that in this sample of relatively educated men accompanying their partners on an antenatal visit, nearly half had made at least one positive health behaviour change before pregnancy. Given their overweight status, use of medications and high prevalence of alcohol consumption and smoking, the authors cite the need for greater paternal preconception health awareness and care. Innovative ways to promote positive messages about fatherhood, including medication review as part of preconception care, should be evaluated for impact on improving paternal reproductive health and pregnancy and neonatal outcomes

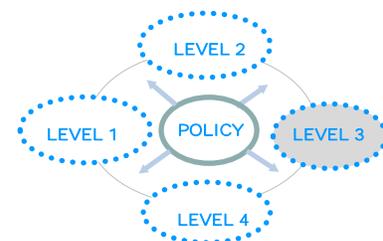
E. Level 3 Prevention

1. **Frazer, Z., McConnell, K., & Jansson, L. M. (2019). Treatment for substance use disorders in pregnant women: Motivators and barriers. *Drug and Alcohol Dependence*, 205, 107652. doi:10.1016/j.drugalcdep.2019.107652**

This US-based study explored women's self-reported reasons for pursuing substance use disorder (SUD) treatment or hesitating to do so. Interviews were used to explore common factors that motivate pregnant women with SUD to seek comprehensive care during pregnancy and common hesitations/barriers to treatment. Twenty women in treatment at a comprehensive care facility for pregnant and parenting women at Johns Hopkins participated. Interviews revealed several major themes in motivators to seek treatment including: readiness to stop using, concern for the baby's health, concern about custody of the baby or other children, wanting to escape violent environments or homelessness, and seeking structure. Barriers to treatment included fear of loss of custody, not wanting to be away from children/partner, concern about stigma or privacy, and lack of childcare and transportation. These themes may help direct future studies and guide efforts to increase access to crucial care in this vulnerable population.

2. **Geraghty, S., Doleman, G., & De Leo, A. (2019). Midwives' attitudes towards pregnant women using substances: Informing a care pathway. *Women and Birth*, 32(4), e477-e482. doi:10.1016/j.wombi.2018.09.007**

The purpose of this Australian-based study was to identify midwives' attitudes towards women using substances during pregnancy, in order to inform the development of an integrated care pathway for the provision of optimal care. A mixed methods research design was used, that included an online survey which collected quantitative data, and interviews and focus groups were used to collect qualitative data. Fifteen midwives participated in the online survey, and eleven midwives participated in the interviews and focus groups. Participants held a positive or neutral view towards women who used substances during pregnancy, and the participants had an empathetic perception of the issue of substance use within pregnancy, believing that women were using substances due to the environment and circumstances that they lived in, and that they had been raised and socialised in. Caring for women during pregnancy with substance misuse issues is complex and requires coordination and multidisciplinary care. Midwives have the capacity to provide sensitive midwifery care but require the framework to ensure women needing additional resources during pregnancy receive the services available and specific to their needs. The midwives in this study were supportive of developing an integrated care pathway to allow for collaborative care, and to enable a specialised midwifery approach.



3. Hubberstey, C., Rutman, D., Schmidt, R. A., Van Bibber, M., & Poole, N. (2019). Multi-service programs for pregnant and parenting women with substance use concerns: Women's perspectives on why they seek help and their significant changes. *International Journal of Environmental Research and Public, 16*(18).

The authors of this study present findings from the Co-Creating Evidence project, which is a multi-year evaluation of holistic programs across Canada that provide services to women at high risk of having an infant with prenatal alcohol or substance exposure. As part of a larger evaluation that utilizes a mixed methods design, the findings of this article focus on the results from interviews with women regarding their reasons for seeking help, how they use the different services, and what they see as being the most significant change in their lives as a result of the holistic programs. The findings of this study demonstrate that vulnerable, marginalized pregnant and parenting women who use substances will seek help when health and social care services are created and delivered in a way that addresses their unique roles, responsibilities, and realities, such as experiences of trauma, mental health concerns, poverty, and other factors related to the social determinants of health.

4. Kozhimannil, K. B., Dowd, W. N., Ali, M. M., Novak, P., & Chen, J. (2019). Substance use disorder treatment admissions and state-level prenatal substance use policies: Evidence from a national treatment database. *Addictive Behaviors, 90*, 272-277. doi:10.1016/j.addbeh.2018.11.019

The authors of this study examined state level prenatal substance use policies and substance use disorder treatment admissions among pregnant women in the United States between 2002 and 2014. The authors identified that states that included only criminal justice initiatives saw a decline in substance use treatment admissions among pregnant women. However, states that adopted multiple policies, including treatment and supportive services, clinician reporting requirements, and criminal justice initiatives, experienced an increase in substance use treatment admissions among pregnant women. The results provide evidence for an increase in admissions to substance use disorder treatment during pregnancy in states that engage in cross-sector policies that adopt a comprehensive approach to substance use.

5. Martin, C. E., Scialli, A., & Terplan, M. (2019). Unmet substance use disorder treatment need among reproductive age women. *Drug and Alcohol Dependence, 206*. doi:10.1016/j.drugalcdep.2019.107679

Using data from the 2007–2014 National Survey of Drug Use and Health, the authors determined the unmet substance use disorder (SUD) treatment need among women 18–44 years old in the USA. They conducted multivariable logistic regressions to determine if pregnancy/ parenting status was associated with treatment need and receipt. They found that among reproductive age women, only 9% of those who expressed a SUD treatment need received treatment (95% CI: 8.4-10.2%). Despite being a priority population, pregnant and parenting women were not more likely to receive treatment compared with not pregnant or parenting women (pregnant AOR = 0.9, 95% CI: 0.5-1.8, and parenting AOR = 0.7; 95% CI: 0.5-0.9). There were racial disparities with Black and Hispanic women less likely to receive treatment. They conclude that few women of reproductive age in the USA who need treatment actually receive it, which emphasizes the need for increased gender informed services.

6. McGrory, J., Breckenridge, J., & Mowll, J. (2019). Women who use alcohol and other drugs during pregnancy: Exploring the complexity of client engagement and their compliance with human service expectations. *Journal of Social Work Practice. doi:10.1080/02650533.2019.1572079*

The purpose of this paper was to discuss issues related to how Australian women using alcohol and other drugs may engage with various services and professional groups during pregnancy. Additionally, the extent to which women who are using substances comply (or not) with individual treatment plans was addressed, including different approaches to engagement and compliance in various health and child welfare interventions. The authors identify several personal challenges women face, such as scrutiny and diminished choice, which intersect with complex and inconsistent expectations in other systems, particularly regarding the threat of child removal. Using a case study, the authors highlight the systemic and relational practice challenges of engaging and addressing the needs of women who use alcohol and other drugs during pregnancy and explore the complexity of ensuring compliance with a multitude of intervention plans.

7. **Meinhofer, A., Witman, A., Murphy, S. M., & Bao, Y. (2019). Medical marijuana laws are associated with increases in substance use treatment admissions by pregnant women. *Addiction*. doi:10.1111/add.14661**

Using data from the 2002-2014 Treatment Episodes Data Set Admissions in the United States, the authors explore outcomes for pregnant and non-pregnant women admitted for substance use treatment in 21 medical marijuana law states and 27 non-medical marijuana states. Specifically, changes in outcomes (e.g., number of treatment admissions per 100,000 women aged 12-49) were explored before and after the implementation of medical marijuana laws. Among pregnant women, the rate of marijuana treatment admissions increased in medical marijuana states compared to non-medical marijuana states, which also included increases in treatment admissions for other substances, such as alcohol and cocaine. However, there was no significant association between medical marijuana law states and treatment admissions among non-pregnant women. Overall, medical marijuana law implementation in the United States was associated with greater substance use treatment use by pregnant women, particularly in states with legal dispensaries.

8. **Motz, M., Andrews, N.C.Z., Bondi, B.C., Leslie, M. & Pepler, D.J. (2019). Addressing the impact of interpersonal violence in women who struggle with substance use through developmental-relational strategies in a community program. *International Journal of Environmental Research and Public Health*, 16(21), <https://doi.org/10.3390/ijerph16214197>**

In this paper, the authors outlined specific strategies used at Breaking the Cycle (BTC), a community-based prevention and early intervention program for substance using pregnant and parenting women. These strategies promote self-regulation, executive functions, safety, and relationship capacity. To support self-regulation and executive functioning BTC programs focus on: 1)) supporting time management; 2) monitoring the physical program space; 3) encouraging regulated interactions; and 4) paying attention to readiness and internal processes. To support safety and relationship capacity, programming at BTC focuses on: 1) engagement and building trust in relationships; and 2) maintaining therapeutic relationships. The program uses a developmental–relational approach which places attention on the link between experiences of violence in relationships across development and later substance use issues.

9. **Nguyen, M. N., Siahpush, M., Grimm, B. L., Singh, G. K., & Tibbits, M. K. (2019). Women from racial or ethnic minority and low socioeconomic backgrounds receive more prenatal education: Results from the 2012 to 2014 Pregnancy Risk Assessment Monitoring System. *Birth: Issues in Perinatal Care*, 46(1), 157-165. doi:10.1111/birt.12394**

This study examined racial, ethnic, and socioeconomic differences in the receipt of prenatal health education in the United States. Using data from the 2012 to 2014 Pregnancy Risk Assessment Monitoring System, analyses were conducted on a sample of $n = 68,025$ participants from 27 states regarding racial, ethnic, and socioeconomic variables in relation to receiving comprehensive prenatal health education, HIV testing, and breastfeeding, alcohol, and smoking cessation information. Participants who belonged to a racial or ethnic minority, had a high school degree or less, received federal assistance, and those who were on Medicaid during pregnancy all had higher odds of receiving comprehensive prenatal health education. Despite reporting higher levels of prenatal health education, underprivileged women in the United States continue to experience inequalities in adverse birth outcomes, suggesting an increased need for promoting positive health behaviours and birth outcomes.

10. **Singal, D., Brownell, M., Wall-Wieler, E., Chateau, D., Hanlon-Dearman, A., Longstaffe, S., & Roos, L. L. (2019). Prenatal care of women who give birth to children with Fetal Alcohol Spectrum Disorder in a universal health care system: a case-control study using linked administrative data. *CMAJ Open*, 7(1), E63-E72. doi:10.9778/cmajo.20180027**

This study investigated rates of prenatal care usage of women who have given birth to children with Fetal Alcohol Spectrum Disorder (FASD) in Manitoba Canada. A case-control study was conducted using data for women with children born between Apr. 1, 1984, and Mar. 31, 2012, with follow-up until 2013, using linkable administrative data. The study group included data on $n = 702$ women whose child(ren) was (were) diagnosed with FASD between Apr. 1, 1999, and Mar. 31, 2012, at a centralized diagnostic clinic. The comparison group included $n = 2,097$ women whose child(ren) did not have an FASD diagnosis, matched on the index child's birthdate, postal code and socioeconomic status. Adequacy of prenatal care was determined using the Revised Graduated Prenatal Care Utilization Index. Women in the study group had lower socioeconomic status than women in the comparison group and were more likely to have mental health disorders and involvement with the child welfare system. Rates of inadequate prenatal care were higher among women in the study

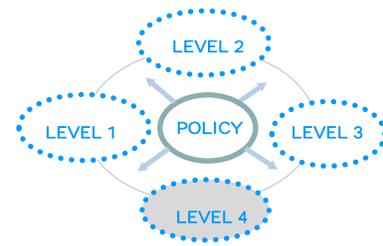
group (adjusted relative risk (ARR)= 2.47, 95% CI: 2.08-2.94), as were rates of no prenatal care (ARR = 3.55, 95% CI: 2.42-5.22). In the study group, 41% of women accessed inadequate or no prenatal care, and 59% received intermediate, adequate or intensive prenatal care. The authors conclude that women who give birth to children with FASD have higher rates of inadequate prenatal care and significant social complexities. The authors cite the need for addressing socioeconomic disparities in the use of prenatal care; and the need for multisector interventions that facilitate the uptake of prenatal care by high-risk women who use alcohol.

11. Thibaut, F., Chagraoui, A., Buckley, L., Gressier, F., Labad, J., Lamy, S., . . . Yonkers, K. (2019). WFSBP and IAWMH Guidelines for the treatment of alcohol use disorders in pregnant women. *The World Journal of Biological Psychiatry, 20*(1), 17-50. doi:10.1080/15622975.2018.1510185

See abstract above (Level 2 Prevention).

F. Level 4 Prevention

1. Boreham, M., Marlow, S., & Gilchrist, G. (2019). “..that warm feeling that [alcohol] gave me was what I interpreted love would feel like.” Lived experience of excessive alcohol use and care proceedings by mothers in the family justice system in the UK. *Addictive Behaviors, 92*, 186-193. doi:10.1016/j.addbeh.2018.12.032



The authors conducted $n = 16$ in depth interviews with alcohol using mothers engaged with various child and family services in across the UK to examine how they made sense of their alcohol use and their position as mothers as they navigated care proceedings. Key themes of repeated traumatic events, poor childhood relationships and current fear of violence in their intimate relationships were related to the use of alcohol to manage these issues. Isolation and shame were associated with increased alcohol use in their lives, and was seen as a barrier to help-seeking. Women wanted to change their behaviour for themselves and their children, but felt excluded from their children’s lives and experienced a continuous need to prove their parenting skills and abstinence from alcohol. The authors conclude that supporting women with their experiences of complex trauma should be considered to improve best practice for care proceedings.

2. Milligan, K., Meixner, T., Tremblay, M., Tarasoff, L.A., Usher, A., Smith, A., Niccols, A., & Urbanoski K.A. (2019) Parenting interventions for mothers with problematic substance use: A systematic review of research and community practice. *Child Maltreatment*. <https://doi.org/10.1177/1077559519873047>

This paper presents a mixed methods study that combines a systematic review and a multisite community study of parenting interventions offered within integrated programs serving mothers with children aged 0-6. The paper describes parenting interventions and examines the replication of interventions within and across the research and community samples. They identified 17 integrated programs in the literature, that described a total of 20 different manualized parenting interventions. Of the 12 community program that they identified, nine offered at least one manualized parenting intervention, and were included in the review. Group programs were the most common format in both the literature and community programs. Little to no information was available on the proportion of women in programs who were mandated by child welfare to attend parenting intervention. It was more common for programs to develop parenting interventions locally, than implement an evidence-based intervention drawn from the research literature (13/20 parenting interventions in the research sample and 10/16 programs in the community sample). However, consistent with research evidence, maternal emotion regulation within parenting interventions was commonly addressed.

3. Pei, J., Carlson, E., Tremblay, M., & Poth, C. (2019). Exploring the contributions and suitability of relational and community-centered Fetal Alcohol Spectrum Disorder (FASD) prevention work in First Nation communities. *Birth Defects Research, 111*(12), 835-847. doi:10.1002/bdr2.1480

The authors present the evaluation results of Parent Child Assistance Program (PCAP) services in rural and isolated First Nations communities in Alberta. Using participatory approaches, they evaluated the implementation of existing PCAP services in six communities over an eight-month period. Qualitative interviews and focus groups were conducted with $n = 35$ participants to examine the impact and suitability of these programs. The results indicated the importance of suitable

mechanisms for guiding the implementation of PCAP in First Nation communities, and highlight the importance of relational and trauma-informed programs, and culturally responsive and respectful services within Indigenous communities.

- 4. Rotheram-Borus, M. J., Arfer, K. B., Christodoulou, J., Comulada, W. S., Stewart, J., Tubert, J. E., & Tomlinson, M. (2019). The association of maternal alcohol use and paraprofessional home visiting with children's health: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 87*(6), 551-562. doi:10.1037/ccp0000408**

This study from South Africa highlights the need for home visiting programs that address maternal drinking during pregnancy and early childhood. The authors analysed observational data related to visits with $n = 1,236$ mothers and their children from pregnancy to five years post birth within a longitudinal randomized controlled trial. Paraprofessional home visitors coached mothers on coping with multiple risk factors, including a brief, 1-visit intervention on alcohol prevention in pregnancy. The authors assessed changes in maternal drinking over time in relation to the intervention, and then examined the impact of these drinking patterns on child outcomes over five years. They found that even brief alcohol interventions, nested within a generalist home visiting intervention, result in less problematic drinking over the next five years. Such interventions are important as problematic alcohol use is associated with outcomes in children such as increased challenges to maintain healthy growth, inhibitory control, and nonaggressive behavior overtime.

- 5. Thomas, R., & Mukherjee, R. (2019). Exploring the experiences of birth mothers whose children have been diagnosed with Fetal Alcohol Spectrum Disorders: a qualitative study. *Advances in Dual Diagnosis, 12*(1), 27-35. doi:10.1108/ADD-10-2018-0014**

This UK study explored the experiences of birth mothers following a diagnosis of FASD in their children. Individual semi-structured interviews with five women were conducted, and an interpretive phenomenological analytical approach used to generate themes from these interviews. Potential feelings of blame when considering the cause of their child's condition was one tension described by mothers. Many life struggles were also described. A process of transformation and a renewed sense of purpose were noted, as well as a range of internal and external factors that helped the mothers cope. The study authors note how life is difficult for the women, yet a sense of hope is present. The mothers have a renewed sense of purpose to do the best they can for their child and to raise awareness of FASD. An understanding of these experiences can help service providers better meet the needs of parents and children affected by FASD.

G. Systemic, destigmatizing and ethical considerations

- 1. Badry, D., Coons-Harding, K. D., Cook, J., & Bocking, A. (2019). Finding answers, improving outcomes: a case study of the Canada Fetal Alcohol Spectrum Disorder research network. *Advances in Dual Diagnosis, 12*(1/2), 53-61. doi:10.1108/ADD-05-2018-0006**

This descriptive paper presents a profile of the Canada Fetal Alcohol Spectrum Disorder research network (CanFASD). CanFASD is a Canadian non-governmental organization whose aim is to engage national cross-disciplinary research and knowledge translation for stakeholders and partners including communities, policy makers and governments. The authors describe CanFASD's contributions in key topic areas including diagnosis, prevention, intervention, justice and child welfare, with a focus on evidence-based decision making, research and knowledge exchange. The authors highlight the need to work collaboratively on a national and international basis in response to the distinct challenges posed by FASD for individuals, families and society.

- 2. Corrigan, P. W., Shah, B. B., Lara, J. L., Mitchell, K. T., Combs-Way, P., Simmes, D., & Jones, K. L. (2019). Stakeholder perspectives on the stigma of fetal alcohol spectrum disorder. *Addiction Research & Theory, 27*(2), 170-177. doi:10.1080/16066359.2018.1478413**

This US-based study seeks to identify stereotypes, prejudice, and discrimination related to FASD stigma. A 9-member community based participatory research (CBPR) team conducted focus groups ($n = 20$) and one-on-one interviews ($n = 3$) on attitudes and beliefs regarding children with FASD and their biological mothers. Study participants included adults with FASD, biological mothers, other relatives, and health care providers. Themes included stigmatizing perceptions of children with FASD (e.g., immature, lazy, violent, socially inept) and biological mothers (e.g. child abusers, in denial, secretive, ignorant). Discriminatory behaviors specific to children with FASD and their biological mothers were identified as neglect,

avoidance, and abuse. Discrimination by health care providers showed an undermining of services for biological mothers and their children with FASD (e.g., lack of understanding, lack of identification, poor communication skills). The authors conclude that the results can be used to develop tailored anti-stigma assessments and interventions.

- 3. Dejong, K., Olyaei, A. M. Y., & Lo, J. O. (2019). Alcohol use in pregnancy. *Clinical Obstetrics and Gynecology*, 62(1), 142-155. doi:10.1097/GRF.0000000000000414**

This US-based review focuses on the trends in prenatal alcohol exposure. The authors discuss drinking guidelines, at-risk populations, adverse maternal and foetal health outcomes, drinking guidelines for pregnant and breastfeeding women, and health effects specific to FASD and child development. This includes neurodevelopment effects, discussion of structured questionnaires and screening tools to assess prenatal alcohol exposure, and evidence from preclinical studies. The authors conclude that FASD will continue to be a substantial public health concern, and that evidence suggests that the preconception and prenatal period are an opportunity to intervene, mitigate, and prevent FASD.

- 4. Lowik, A. J., & Knight, R. (2019). Toward gender-inclusive, nonjudgmental alcohol interventions for pregnant people: Challenging assumptions in research and treatment. *Journal of Addiction Medicine*, 13(5), 335-337. doi:10.1097/ADM.0000000000000495**

In this commentary, the authors present four common assumptions made in the alcohol use during pregnancy literature that they argue impede efforts to address this issue in nonjudgmental and gender-inclusive ways. The first assumption identified is “all pregnancies are wanted” which includes using “baby” and “child” when referring to a fetus, as well as the assertion that pregnancy is a “window of opportunity” for change. The second assumption is “all pregnant people are mothers, and the ‘baby’ is always hers” which implies a set of parenting responsibilities that may not be the reality for all pregnant people. Third, the literature often assumes that “all pregnant people are women” and disregards the possibility of pregnant trans, two-spirit and people of other genders. The final assumption presented is that “alcohol interventions are of primary benefit for the fetus,” frequently framing the health of the pregnant person as secondary. The authors conclude that these four assumptions need to be addressed in research and interventions involving pregnant people to effectively advance gender-inclusive and nonjudgmental approaches to preventing AEP.

- 5. Mc Elhinney, H., Taylor, B. J., & Sinclair, M. (2019). Decision making by health and social care professionals to protect an unborn baby: Systematic narrative review. *Child Care in Practice*. doi:10.1080/13575279.2019.1612733**

This systematic narrative review describes studies regarding the professional decision making by health and social care professionals regarding child protection of an unborn baby (e.g., protection from abuse and neglect). A total of 10 papers were included for analysis, which consisted of qualitative studies, surveys, and randomized trials of the effectiveness of decision support tools. A large number of risk factors were identified including: alcohol use, antenatal care, previous children in care, domestic violence, drug use, lack of education, employment challenges, unrealistic expectations of the baby, housing challenges, learning disability, feelings about pregnancy, low socioeconomic status, mental illness, mother’s childhood experiences, lack of parenting capacity, and physical disability. Overall, this narrative review identified that there are a number of materials published on the range of risk factors, but there are more limited materials on the development of assessment tools and on the decision-making process.

- 6. Poole, N., Schmidt, R. A., Bocking, A., Bergeron, J., & Fortier, I. (2019). The potential for Fetal Alcohol Spectrum Disorder prevention of a harmonized approach to data collection about alcohol use in pregnancy cohort studies. *International Journal of Environmental Research and Public Health*, 16(11), 2019. doi:10.3390/ijerph16112019**

Research studies where women can report alcohol use in a confidential context are important for learning about alcohol use before, during, and after pregnancy in order to inform FASD prevention initiatives. The Research Advancement through Cohort Cataloguing and Harmonization (ReACH) initiative, which links a number of cohort studies on maternal/child health issues, provides a novel opportunity for integrating Canadian pregnancy and birth cohort information pertaining to women’s alcohol use during pregnancy. The authors of this paper describe the data that can be collected using formal validated alcohol screening tools (e.g., structured screening tools to identify risky drinking), the data currently collected by various Canadian perinatal surveillance efforts (e.g., individual questions), and the data collected from 12 pregnancy cohorts in the ReACH Catalogue (e.g., frequency of alcohol use, quantity of alcohol use, heavy alcohol use). Recommendations for data collection are provided, including the need for a standard to measure alcohol consumption to

facilitate harmonization and data analysis across cohorts to generate more accurate data on women's alcohol use in Canada.

7. **Wolfson, L., Poole, N., Morton Ninomiya, M., Rutman, D., Letendre, S., Winterhoff, T., . . . Rowan, T. (2019). Collaborative action on Fetal Alcohol Spectrum Disorder prevention: principles for enacting the Truth and Reconciliation Commission Call to Action #33. *International Journal of Environmental Research and Public Health*, 16(9), 1589. doi:10.3390/ijerph16091589**

This article describes the development of a consensus statement with eight tenets for enacting reconciliation approaches to community-based, culture-led FASD prevention with Indigenous communities was co-developed in May 2017. This paper uses the consensus statement and eight exemplary FASD prevention programs from Indigenous communities and organizations across Canada to highlight identity, culture, and relationships as central elements of FASD prevention in Indigenous communities. The consensus statement provides guidance for developing community- and culture-led FASD prevention programs and highlights the importance of Indigenous knowledge systems in developing and researching FASD prevention in, and with, Indigenous communities.

Summary of included studies by method and country of study

Table 2: Included studies by method, country and page number

#	Author	Title	Method	Country	Page
Prevalence of Drinking During Pregnancy					
n = 14	Agrawal et al.	Alcohol, cigarette, and cannabis use between 2002 and 2016 in pregnant women from a nationally representative sample	Cross sectional	USA	4
	Bakhireva et al.	Prenatal alcohol exposure prevalence as measured by direct ethanol metabolites in meconium in a Native American tribe of the southwest.	Cohort	USA	4
	Balachova et al.	Smoking and alcohol use among women in Russia: Dual risk for prenatal exposure	Cross sectional	Russia	4
	Delano et al.	Prevalence of fetal alcohol exposure by analysis of meconium fatty acid ethyl esters: A national Canadian study	Cohort	Canada	4
	Jawad et al.	Alcohol, smoking, folic acid and multivitamin use among women attending maternity care in London: A cross-sectional study.	Cross sectional	UK	5
	Kesmodel & Urbute	Changes in drinking patterns, and attitudes toward and knowledge about alcohol consumption during pregnancy in a population of pregnant Danish women	Cross sectional	Denmark	5
	Keyes et al.	Is there a recent epidemic of women's drinking? A critical review of national studies	Review	USA	5
	Kim	Overall health and drinking behavior among pregnant and breastfeeding women in Korea.	Cross sectional	Korea	5
	Palmer, Layte & Kearney	The maternal health behaviours of non-Irish nationals during pregnancy and the effect of time living in Ireland	Cross sectional	Ireland	5
	Qato et al.	Co-use of alcohol, tobacco, and licit and illicit controlled substances among pregnant and non-pregnant women in the United States: Findings from 2006 to 2014 National Survey on Drug Use and Health (NSDUH) data.	Cross sectional	USA	6
	Roberts & Thompson	Estimating the prevalence of United States women with alcohol-exposed pregnancies and births	Cross sectional	USA	6
	Romero-Rodriguez et al.	Changes in alcohol intake during pregnancy in Spain, 1980 to 2014	Cohort	Spain	6
	Tung et al.	Adolescent childbirth, miscarriage, and abortion: Associations with changes in alcohol, marijuana, and cigarette use	Cohort	USA	7
	Wubetu et al.	Prevalence of risky alcohol use behavior and associated factors in pregnant antenatal care attendees in Debre Berhan, Ethiopia, 2018	Cross sectional	Ethiopia	7
Influences and factors associated with drinking in pregnancy					
n = 20	Association of Women's Health, Obstetric and Neonatal Nurses	Optimizing outcomes for women with substance use disorders in pregnancy and the postpartum period	Policy statement	USA	7
	Bhengu et al.	The role of adverse childhood experiences on perinatal substance use behaviour in kwazulu-natal province, South Africa	Cross sectional	South Africa	8
	Deutsch	The importance of intimate partner violence in within-relationship and between-person risk for alcohol-exposed pregnancy	Cross sectional	USA	8

	Edwards et al.	Protective effects of pregnancy on risk of alcohol use disorder	Cross sectional	Sweden	8
	Esper, Horta & Erikson	Stressful life events and alcohol consumption in pregnant women: A cross-sectional survey.	Cross sectional	Brazil	8
	Gouilhers et al.	Pregnancy as a transition: First-time expectant couples experience with alcohol consumption	Qualitative	Switzerland	8
	Hammer	I can tell when you're staring at my glass': self- or co-surveillance? Couples' management of risks related to alcohol use during pregnancy.	Qualitative	Switzerland	8
	Jawad et al.	Alcohol, smoking, folic acid and multivitamin use among women attending maternity care in London: A cross-sectional study.	Cross sectional	UK	5
	Kim	Overall health and drinking behavior among pregnant and breastfeeding women in Korea.	Cross sectional	Korea	5
	Lamy et al.	Risk factors associated to tobacco and alcohol use in a large French cohort of pregnant women.	Cross sectional	France	10
	Lopez & Lichtenberger	Predictors of alcohol use disorders in Argentinean pregnant women	Cross sectional	Argentina	10
	Martinelli et al.	Motivation for alcohol consumption or abstinence during pregnancy: A clinical-qualitative study in Brazil.	Qualitative	Brazil	10
	Mathunjwa-Dlamini et al.	Swazi Pregnant Women's Knowledge on Consuming Alcoholic Beverages.	Cross sectional	South Africa	10
	McQuire et al.	The causal web of foetal alcohol spectrum disorders: A review and causal diagram	Systematic Review	UK	10
	Montag, Calac & Chambers	Community-specific risk and protective factors for risky alcohol consumption in American Indian Women of reproductive potential: Informing interventions	Mixed methods	USA	11
	Palmer, Layte & Kearney	The maternal health behaviours of non-Irish nationals during pregnancy and the effect of time living in Ireland	Cross sectional	Ireland	5
	Reid et al.	Understanding contraceptive behaviour to prevent unintended alcohol-exposed pregnancies	Cross sectional	Australia	11
	Salameh et al.	Trends in mental health and substance use disorders and treatment receipt among pregnant and nonpregnant women in the united states, 2008-2014	Cross sectional	USA	11
	Tung et al.	Adolescent childbirth, miscarriage, and abortion: Associations with changes in alcohol, marijuana, and cigarette use	Cohort	USA	7
	Wubetu, Habte & Dagne	Prevalence of risky alcohol use behavior and associated factors in pregnant antenatal care attendees in Debre Berhan, Ethiopia, 2018	Cross sectional	Ethiopia	7
Level 1 Prevention					
<i>n</i> = 11	Adebiyi, Mukumbang & Beytell	A guideline for the prevention and management of Fetal Alcohol Spectrum Disorder in South Africa.	Policy guideline	South Africa	12
	Adebiyi, Mukumbang & Erasmus	The distribution of available prevention and management interventions for Fetal Alcohol Spectrum Disorder (2007 to 2017): Implications for collaborative actions.	Review	South Africa	12
	Choate et al.	Fetal alcohol spectrum disorder: What does public awareness tell us about prevention programming?	Cross sectional	Canada	12
	Giglia & Reibel	Has a national policy guideline influenced the practice of raising the topic of alcohol and breastfeeding by maternal healthcare practitioners?	Qualitative	Australia	13
	Lim et al.	Pregnancy, fertility, breastfeeding, and alcohol consumption: An analysis of framing and	Content analysis	UK	13

		completeness of information disseminated by alcohol industry-funded organizations			
	Maani Hessari et al.	Alcohol industry CSR organizations: What can their twitter activity tell us about their independence and their priorities? A comparative analysis.	Content analysis	UK	13
	Parackal & Parackal	A renewed media-mix, based on the dynamic transactional model, for communicating the harms of alcohol to women in New Zealand.	Mixed methods	New Zealand	13
	Popova et al.	Alcohol Industry-Funded Websites Contribute to Ambiguity Regarding the Harmful Effects of Alcohol Consumption During Pregnancy: A Commentary on Lim et al.	Commentary	Canada	14
	Roberts et al. a	Racial differences in the relationship between alcohol/pregnancy policies and birth outcomes and prenatal care utilization: A legal epidemiology study	Cross sectional	USA	14
	Roberts et al. b	State policies targeting alcohol use during pregnancy and alcohol use among pregnant women 1985-2016: Evidence from the Behavioral Risk Factor Surveillance System	Cross sectional	USA	14
	Woodruff & Roberts	"Alcohol During Pregnancy? Nobody Does That Anymore": State Legislators' Use of Evidence in Making Policy on Alcohol Use in Pregnancy	Qualitative	USA	14
Level 2 Prevention					
<i>n</i> = 32	Ahankari et al.	The effectiveness of combined alcohol and sexual risk taking reduction interventions on the sexual behaviour of teenagers and young adults: a systematic review.	Systematic review	UK	15
	Albrecht et al.	Fetal Alcohol Spectrum Disorders: Implications for Primary Care Nurse Practitioners	Review	USA	15
	Bagley & Badry	How personal perspectives shape health professionals' perceptions of Fetal Alcohol Spectrum Disorder and risk	Qualitative	New Zealand	15
	Celio et al.	Mechanisms of behavior change in a brief dual-target motivational intervention: Reduction in alcohol use mediates intervention effects on risky sex.	RCT	USA	16
	Chiodo et al.	Prenatal alcohol screening during pregnancy by midwives and nurses.	Cross sectional	USA	16
	Coleman-Cowger et al.	Accuracy of Three Screening Tools for Prenatal Substance Use.	Instrument validation	USA	16
	Doherty et al.	Antenatal care for alcohol consumption during pregnancy: pregnant women's reported receipt of care and associated characteristics	Cross sectional	Australia	16
	Elertson & Schmitt	Ask them all: Self-report universal prenatal substance use screening in the united states	Cross sectional	USA	17
	Forray et al.	Assessment of an electronic and clinician-delivered brief intervention on cigarette, alcohol and illicit drug use among women in a reproductive healthcare clinic	RCT	USA	17
	Gance-Cleveland et al.	Using the Technology Acceptance Model to Develop StartSmart: mHealth for Screening, Brief Intervention, and Referral for Risk and Protective Factors in Pregnancy.	Feasibility study	USA	17
	Hanna et al.	Detection of in utero ethanol exposure via ethyl glucuronide and ethyl sulfate analysis in umbilical cord and placenta.	Cross sectional	USA	18

Hanson et al.	Acceptability of an eHealth Intervention to Prevent Alcohol-Exposed Pregnancy Among American Indian/Alaska Native Teens.	Feasibility study	USA	18
Howlett et al.	A Survey of Health Care Professionals' Knowledge and Experience of Foetal Alcohol Spectrum Disorder and Alcohol Use in Pregnancy.	Cross sectional	UK	18
Hughes et al.	Nurses and Fetal Alcohol Spectrum Disorders prevention	Toolkit development	USA	18
Janssen et al.	The role of therapist MI skill and client change talk class membership predicting dual alcohol and sex risk outcomes	RCT	USA	19
Lee & Cho	Technology-Supported Interventions for Pregnant Women: A Systematic Review.	Systematic review	USA	19
Manriquez et al.	Fetal Alcohol Spectrum Disorder prevention program: SBIRT's role in averting Fetal Alcohol Spectrum Disorders.	Review	USA	19
McLellan et al.	Investigating midwives' barriers and facilitators to multiple health promotion practice behaviours: a qualitative study using the theoretical domains framework.	Qualitative	UK	19
Nathoo et al.	New approaches to brief intervention on substance use	Review	Canada	20
Olmstead et al.	Cost-effectiveness of electronic- and clinician-delivered screening, brief intervention and referral to treatment for women in reproductive health centers	Cost-effectiveness	USA	20
Ondersma et al.	Accuracy of five self-report screening instruments for substance use in pregnancy	Instrument validation	USA	20
Oni et al.	Barriers to screening pregnant women for alcohol or other drugs: A narrative synthesis.	Narrative review	Australia	20
Ordean et al.	Screening, Brief Intervention, and Referral to Treatment for Prenatal Alcohol Use and Cigarette Smoking: A Survey of Academic and Community Health Care Providers.	Cross sectional	Canada	21
Parrish et al.	CHOICES-TEEN: Reducing substance-exposed pregnancy and HIV among juvenile justice adolescent females	Feasibility study	USA	21
Polak, Kelpin & Terplan	Screening for substance use in pregnancy and the newborn.	Review	USA	21
Premji et al.	Supporting healthy pregnancies: Examining variations in nutrition, weight management and substance abuse advice provision by prenatal care providers in Alberta, Canada. A study using the All Our Families cohort.	Cohort	Canada	21
Pullon et al.	Daily decision-making about food during pregnancy: a New Zealand study.	Qualitative	New Zealand	21
Sanchez-Sauco, Villalona & Ortega-Garcia	Sociocultural aspects of drug dependency during early pregnancy and considerations for screening: Case studies of social networks and structural violence.	Qualitative	Spain	22
Schölin & Fitzgerald	The conversation matters: a qualitative study exploring the implementation of alcohol screening and brief interventions in antenatal care in Scotland.	Qualitative	UK	22
Schölin et al.	"I think we should all be singing from the same hymn sheet" -" English and Swedish midwives' views of advising pregnant women about alcohol.	Qualitative	UK/ Sweden	22

	Thibaut et al.	WFSBP* and IAWMH(**) Guidelines for the treatment of alcohol use disorders in pregnant women.	Practice guidelines	International	23
	Trocin et al.	Prenatal Practice Staff Perceptions of Three Substance Use Screening Tools for Pregnant Women	Qualitative	USA	23
Preconception Interventions					
n = 6	Committee on Gynecologic Practice, American Society for Reproductive Medicine	Prepregnancy counseling: Committee Opinion No. 762.	Practice guidelines	USA	23
	Hai et al.	The Efficacy of Technology-Based Interventions for Alcohol and Illicit Drug Use Among Women of Childbearing Age: A Systematic Review and Meta-Analysis.	Systematic Review	USA	24
	Hammarberg & Taylor	Survey of Maternal, Child and Family Health Nurses' attitudes and practice relating to preconception health promotion.	Cross sectional	Australia	24
	Khan et al.	Preconception Health Attitudes and Behaviours of Women: A Qualitative Investigation.	Qualitative	Australia	24
	Kizirian et al.	Understanding and provision of preconception care by general practitioners.	Qualitative	Australia	24
	Shawe et al.	Preparation for fatherhood: A survey of men's preconception health knowledge and behaviour in England.	Cross sectional	UK	25
Level 3 Prevention					
n =11	Frazer, McConnell & Jansson	Treatment for substance use disorders in pregnant women: Motivators and barriers.	Qualitative	USA	25
	Geraghty, Doleman & De Leo	Midwives' attitudes towards pregnant women using substances: Informing a care pathway.	Mixed methods	Australia	25
	Hubberstey et al.	Multi-Service Programs for Pregnant and Parenting Women with Substance Use Concerns: Women's Perspectives on Why They Seek Help and Their Significant Changes.	Qualitative	Canada	26
	Kozhimannil et al.	Substance use disorder treatment admissions and state-level prenatal substance use policies: Evidence from a national treatment database	Policy analysis	USA	26
	Martin, Scialli & Terplan	Unmet substance use disorder treatment need among reproductive age women	Cross sectional	USA	26
	McGrory, Breckenridge & Mowll	Women who use alcohol and other drugs during pregnancy: Exploring the complexity of client engagement and their compliance with human service expectations	Case study	Australia	26
	Meinhofer et al.	Medical marijuana laws are associated with increases in substance use treatment admissions by pregnant women	Cross sectional	USA	27
	Motz et al.	Addressing the impact of interpersonal violence in women who struggle with substance use through developmental-relational strategies in a community program	Review	Canada	27
	Nguyen et al.	Women from racial or ethnic minority and low socioeconomic backgrounds receive more prenatal education: Results from the 2012 to 2014 Pregnancy Risk Assessment Monitoring System.	Cross sectional	USA	27
	Singal et al.	Prenatal care of women who give birth to children with Fetal Alcohol Spectrum Disorder in a universal health care system: a case-control study using linked administrative data.	Case control	Canada	27

	Thibaut et al.	WFSBP* and IAWMH(**) Guidelines for the treatment of alcohol use disorders in pregnant women.	Practice guidelines	International	23
Level 4 Prevention					
n = 5	Boreham, Marlow & Gilchrist	"..that warm feeling that [alcohol] gave me was what I interpreted love would feel like.." Lived experience of excessive alcohol use and care proceedings by mothers in the family justice system in the UK.	Qualitative	UK	28
	Milligan et al.	Parenting interventions for mothers with problematic substance use: A systematic review of research and community practice.	Systematic Review	Canada	28
	Pei et al.	Exploring the contributions and suitability of relational and community-centered Fetal Alcohol Spectrum Disorder (FASD) prevention work in First Nation communities.	Qualitative	Canada	28
	Rotheram-Borus et al.	The association of maternal alcohol use and paraprofessional home visiting with children's health: A randomized controlled trial	RCT	South Africa	29
	Thomas & Mukherjee	Exploring the experiences of birth mothers whose children have been diagnosed with Fetal Alcohol Spectrum Disorders: a qualitative study.	Qualitative	UK	29
Systemic, destigmatizing and ethical considerations					
n = 7	Badry et al.	Finding answers, improving outcomes: a case study of the Canada Fetal Alcohol Spectrum Disorder research network.	Descriptive	Canada	29
	Corrigan et al.	Stakeholder perspectives on the stigma of fetal alcohol spectrum disorder.	Qualitative	USA	29
	Dejong et al.	Alcohol Use in Pregnancy.	Review	USA	30
	Lowik & Knight	Toward gender-inclusive, nonjudgmental alcohol interventions for pregnant people: Challenging assumptions in research and treatment	Commentary	Canada	30
	Mc Elhinney, Taylor & Sinclair	Decision making by health and social care professionals to protect an unborn baby: Systematic narrative review	Systematic Review	UK	30
	Poole et al.	The Potential for Fetal Alcohol Spectrum Disorder Prevention of a Harmonized Approach to Data Collection about Alcohol Use in Pregnancy Cohort Studies.	Commentary	Canada	30
	Wolfson, L. et al.	Collaborative Action on Fetal Alcohol Spectrum Disorder Prevention: Principles for Enacting the Truth and Reconciliation Commission Call to Action #33.	Descriptive	Canada	31

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