

## **FASD PREVENTION:**

An Annotated Bibliography of Articles Published in 2020

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# FASD Prevention Literature Search 2020

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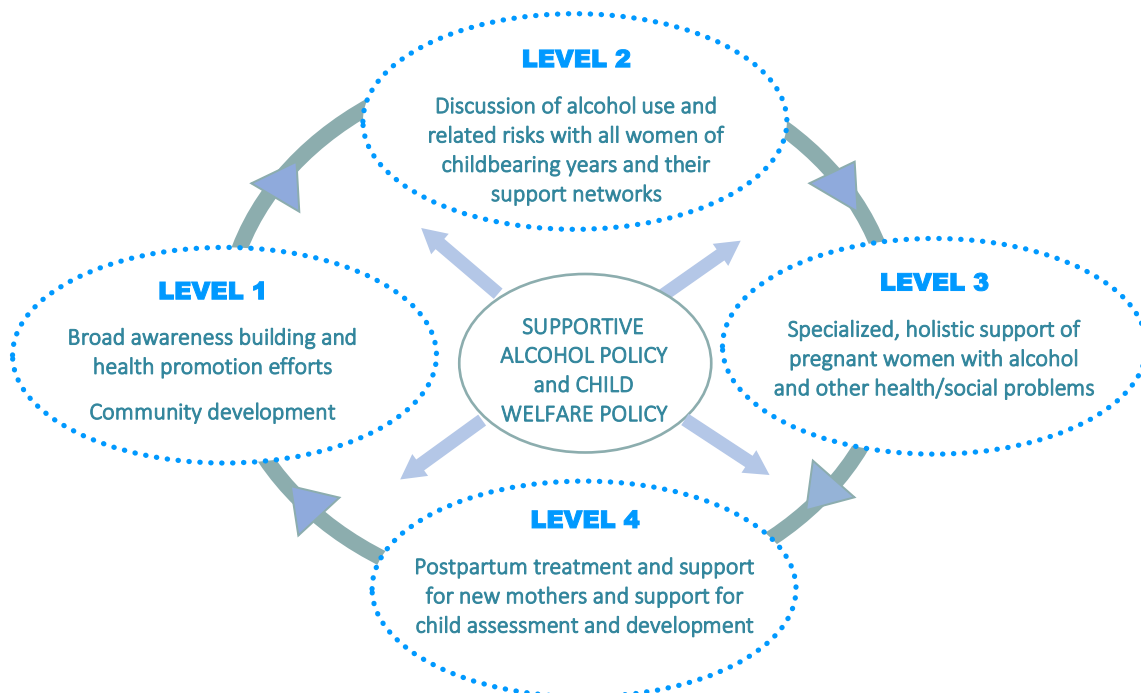
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## Introduction

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 2020:

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 foetal alcohol spectrum disorder OR alcohol related fetal damage; 2) [FASD OR fetal alcohol OR foetal alcohol OR alcohol exposed pregnancy OR alcohol] + [pregnancy] + [prevention OR preventing OR preventative]; 3) [Fetal OR fetus OR foetus 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 and three ( $n = 103$ ) articles were included from our searches. Three ( $n = 3$ ) articles were assigned to more than one category, three ( $n = 3$ ) were attributed to more than one country, and one ( $n = 1$ ) was regional. Table 1 provides an overview of the number of articles found in each topic area by country. Table 1 demonstrates that in the past year, research on FASD prevention, published in English, was most often being generated in the United States of America (US), Canada, and Australia.

**Table 1: Studies identified by topic and country**

Country	Number of Studies						Total
	Prevalence and Influences	Level 1	Level 2	Level 3	Level 4	Other	
Australia	2	2	6	1	0	3	<b>14</b>
Brazil	1	0	0	0	0	1	<b>2</b>
Canada	3	1	5	4	2	2	<b>17</b>
Denmark	0	0	1	0	0	0	<b>1</b>
Ethiopia	3	0	0	0	0	0	<b>1</b>
Germany	0	1	0	0	0	0	<b>1</b>
Ireland	0	0	1	0	1	0	<b>2</b>
Italy	0	0	0	0	0	1	<b>1</b>
Japan	1	0	0	0	0	0	<b>1</b>
New Zealand	1	0	2	0	0	0	<b>3</b>
Republic of the Congo	1	0	0	0	0	0	<b>1</b>
South Africa	3	0	1	0	0	0	<b>4</b>
Spain	2	0	1	0	0	0	<b>3</b>
Sub-Saharan Africa	1	0	0	0	0	0	<b>1</b>
Switzerland	0	0	1	0	0	0	<b>1</b>
The Netherlands	0	0	0	0	0	1	<b>1</b>
UK	1	0	3	3	1	1	<b>8</b>
US	17	0	14	4	3	6	<b>44</b>
Uruguay	1	0	0	0	0	0	<b>1</b>
	<b>37</b>	<b>3</b>	<b>33</b>	<b>12</b>	<b>7</b>	<b>14</b>	<b>106</b>

## A. Prevalence of, and influences and factors associated with, drinking in pregnancy

1. **Addila, E. A., Bisetegn, T. A., Gete, Y. K., Mengistu, M. Y., & Beyene, G. M. (2020). Alcohol consumption and its associated factors among pregnant women in Sub-Saharan Africa: A systematic review and meta-analysis' as given in the submission system. *Substance Abuse Treatment, Prevention, and Policy*, 15, 29. doi: <https://doi.org/10.1186/s13011-020-00269-3>**

This systematic review and meta-analysis investigated the pooled prevalence and factors associated with alcohol use during pregnancy in Sub-Saharan African countries. Sixty-seven ( $n=67$  articles) were included in the qualitative synthesis ( $n=37$ ) and systematic review and meta-analysis ( $n=30$ ). The estimated prevalence of alcohol use during pregnancy was 20.83% (95% CI: 18.21, 23.46). The pooled estimates from the meta-analysis found that depression (OR: 1.572; 95% CI: 1.34, 1.845), partners' alcohol use (OR: 1.32, 95% CI: 1.11, 1.57), knowledge of the harms of alcohol use (OR: 0.36, 95% CI: 0.29, 0.45), and unplanned pregnancy (OR: 2.33, 95% CI: 1.17, 4.63) were significantly associated with alcohol consumption during pregnancy. The authors concluded that public policies and resources are needed to support preventative initiatives to reduce alcohol use during pregnancy in Sub-Saharan Africa.

2. **Alamneh, A. A., Endris, B. S., & Gebreyesus, S. H. (2020). Caffeine, alcohol, khat, and tobacco use during pregnancy in Butajira, South Central Ethiopia. *PLOS ONE*, 15(5), e0232712. doi: 10.1371/journal.pone.0232712**

The aim of this Ethiopian study was to estimate the prevalence of caffeine consumption, alcohol consumption, khat chewing, and tobacco use during pregnancy among a cross-sectional sample of 352 pregnant women in South Central Ethiopia. Most pregnant women in the study consumed caffeine (98.2%), with 17.6% of women exceeding the World Health Organization's recommendation for daily caffeine intake. The prevalence of other reported substance use was 10% for alcohol and 35.8% for khat chewing, with none of the women reporting being active tobacco users but 23.2% being passive tobacco users. The findings of this study demonstrate high rates of polysubstance use across a diversity of substances, emphasizing the importance of programs and services that address women's substance use.

3. **Arfer, K.B., O'Connor, M.J., Tomlinson, M., & Rotheram-Borus, M.J. (2020). South African mothers' immediate and 5-year retrospective reports of drinking alcohol during pregnancy. *PLoS ONE* 15(4): e0231518. doi: <https://doi.org/10.1371/journal.pone.0231518>**

This South African study compared various ways of measuring alcohol use in pregnancy and their impacts on child health. Prenatal records were compared against 5-year retrospective reports in a sample of 576 Black mothers around Cape Town, South Africa. Dichotomous metrics (drinking or abstinent) were also compared against continuous metrics (fluid ounces of alcohol consumed per day). The results showed that where dichotomous measures were used, mothers reported slightly lower rates of drinking at five-year follow-up and were more likely to say they drank when interviewed during pregnancy. Where continuous metrics were used, mothers were likely to report higher amounts of alcohol when interviewed after pregnancy, thus reported alcohol use per day increased at five-year follow-up. All four measures of alcohol use were non-significantly associated with birth weight, height, child head circumference soon after birth, and child intelligence at age five. The findings demonstrate challenges associated with self-report. The authors recommend using post-birth continuous measures due to its flexibility and consistency found in previous research.

4. **Bhengu, B. S., Tomita, A., Mashaphu, S., & Paruk, S. (2020). The role of adverse childhood experiences on perinatal substance use behaviour in KwaZulu-Natal province, South Africa. *AIDS and Behavior*, 24(6), 1643-1652. doi: 10.1007/s10461-019-02661-y**

This South African study explored the role of adverse childhood experiences (ACEs) on perinatal substance use in KwaZulu-Natal Province, South Africa. Two hundred twenty-three ( $n=223$ ) women who were one-week postpartum were interviewed. The study found that alcohol (12.11%) and tobacco (8.07%) were the most common substances used prenatally. Increased ACE scores were significantly associated with both alcohol and tobacco use, as well as preterm delivery. The results of this study highlight the need for FASD prevention approaches that consider the role of ACEs on women's substance use.

5. **Bianchini, B. V., Maroneze, M. C., Timm, M. S., Dos Santos, B. Z., & Dotto, P. P. (2020). Prevalence of alcohol and tobacco use and perceptions regarding prenatal care among pregnant Brazilian women, 2017 to 2018: A mixed-methods study. *Maternal and Child Health Journal, 24*(12), 1438-1445. doi: 10.1007/s10995-020-03012-3**

This Brazilian study identified the prevalence of alcohol and tobacco drug use among pregnant women assisted in primary care units and through the Family Health Strategy in a city in southern Brazil between January 2017 and December 2018 ( $n=255$ ). Trained interviewers collected data on the use of alcohol and tobacco and socioeconomic characteristics via a questionnaire and qualitative interviews were performed with pregnant women who identified use. The prevalence of smoking and alcohol use was 12.55% and 14.12%, respectively. The study findings identified smoking and alcohol use as habits among some women during pregnancy and, consequently, the need for improving care because of their superficial knowledge regarding tobacco and alcohol use. The findings underscore the importance of strengthening measures and establishing new strategies that ensure women's understanding, empowerment, and choices-from the beginning of childbearing age regarding alcohol and tobacco use during pregnancy.

6. **Bitew, M. S., Zewde, M. F., Wubetu, M., & Alemu, A. A. (2020). Consumption of alcohol and binge drinking among pregnant women in Addis Ababa, Ethiopia: Prevalence and determinant factors. *PLoS ONE, 15*(12), e0243784. doi: 10.1371/journal.pone.0243784**

This Ethiopian study aimed to assess the magnitude of alcohol consumption and binge drinking and the related determinants among pregnant women in one of the capital's sub-cities. Data was collected through a structured questionnaire from a random sample of 367 women and analyzed using binary logistic regression. The prevalence of alcohol consumption, binge drinking, and weekly alcohol consumption of four or more units among pregnant women was found to be 39.78%, 3.54% and 4.9%, respectively. Among the key determinants of alcohol use in pregnancy were low education level, having an unplanned pregnancy, not having awareness about the harmful effects of alcohol consumption, and not having family social support. Based on the high level of alcohol use among pregnant women and the factors associated with the use of alcohol in pregnancy, the authors recommend interventions to create awareness on the harmful effects of alcohol, strengthening social support during pregnancy, and family planning services to reduce unplanned pregnancies.

7. **Burd, L. (2020). Drinking at the end of pregnancy: why don't we see it? *Pediatric Research, 88*(142).**

This US editorial examined prenatal alcohol exposure (PAE) in late pregnancy, and how PAE late in pregnancy is commonly under researched and under reported, despite its prevalence. The author cites studies in the US that suggest about 1 in 12 women are drinking at the end of pregnancy. Increased attention is warranted in screening and treatment with obstetrics, neonatologists, and labour and delivery nurses.

8. **Currie, C. L., Sanders, J. L., Swanepoel, L-M., & Davies, C. M. (2020). Maternal adverse childhood experiences are associated with binge drinking during pregnancy in a dose-dependent pattern: Findings from the All Our Families cohort. *Child Abuse and Neglect, 101*, 104348. doi: 10.1016/j.chiabu.2019.104348.**

This Canadian study examined associations between maternal adverse childhood experiences (ACEs) and binge drinking before and during pregnancy. Participants ( $N = 1663$ ) were middle to upper-middle income and well-educated women from a larger cohort (All Our Families study). Maternal ACEs were common in this sample, with 63% reporting at least one adverse experience before the age of 18. Approximately 5 in 10 (48.3%) women reported more than one binge drinking episode pre-pregnancy which was weakly associated with ACEs. During pregnancy 10% of women reported more than one binge drinking episode which was more strongly related to ACEs. Overall, experiences of childhood adversity resulted in a two to three times higher likelihood of binge drinking during pregnancy. The authors conclude that maternal ACEs have a significant influence on alcohol use during pregnancy and highlight the need for targeted interventions for expectant mothers across income levels.

9. Denny, C. H., Acero, C. S., Terplan, M., & Kim, S. Y. (2020). Trends in alcohol use among pregnant women in the U.S., 2011–2018. *American Journal of Preventive Medicine*, 59(5), 768 – 769. doi: <https://doi.org.10.1016/j.amepre.2020.05.017>

Using data from the national Behavioral Risk Factor Surveillance System (BRFSS) study, this US article investigated trends in alcohol use among pregnant women between 2011 and 2018 ( $n=20,736$ ). Women were between 18 and 44 years old and racially and ethnically diverse. The prevalence of drinking at least one drink in the past 30 days and the prevalence of binge drinking in the past 30 days significantly increased from 2011 to 2013, decreased in 2014, and slightly increased again in 2018. The overall trends were not significant for either increases or decreases. The observed increases in quantity and frequency of drinks were also not significant. The authors emphasize that alcohol use during pregnancy is increasing and therefore increased efforts by healthcare providers and public health advocates are needed to reduce alcohol consumption in pregnancy.

10. Gibson, S., Nagle, C., Paul, J., McCarthy, L., & Muggli, E. (2020). Influences on drinking choices among Indigenous and non-Indigenous pregnant women in Australia: A qualitative study. *PLoS ONE*, 15(4): e0224719.

This Australian study explored the influences impacting pregnant Indigenous and non-Indigenous women's choices around alcohol use in pregnancy. Interview and focus group discussions were conducted with 14 Indigenous and 14 non-Indigenous pregnant women attending antenatal care. Five main themes were identified: 1) the source of health information; 2) women's understanding of the harms of alcohol use in pregnancy; 3) the impacts of health information on decision-making; 4) women's conceptualization of their pregnancy; and 5) if women's sociocultural environments supported abstinence during pregnancy. Strategies are needed to: create consistent and evidence-based alcohol use information; create an accurate understanding of Fetal Alcohol Spectrum Disorder (FASD); and expand FASD prevention and reframe approaches to be more holistic and integrate women's sociocultural contexts.

11. Greenmyer, J. R., Klug, M. G., Nkodia, G., Popova, S., Hart, B., & Burd, L. (2020). High prevalence of prenatal alcohol exposure detected by breathalyzer in the Republic of the Congo, Africa. *Neurotoxicology & Teratology*, 80. doi: 10.1016/j.ntt.2020.106892.

This study assessed the prevalence of alcohol use in pregnancy and at delivery in the Republic of the Congo using a breathalyzer to measure breath alcohol concentration (BrAC) levels. Of the 662 pregnant women screened,  $n=192$  (29.0%) had a positive BrAC in their first trimester and 69% of the 192 women had a second positive BrAC. Of the women who tested positive during first and second assessment, 30% had BrAC concentrations comparable to binge drinking. Overall, 19% women screened positive for alcohol in all three assessments, with decreased BrAC readings in later assessments. Compared to previous studies using maternal self-reports, BrAC measures found a 20% higher prevalence of alcohol consumption during pregnancy. The authors conclude that the breathalyzer is a useful objective tool for detecting alcohol exposed pregnancies and highlight the urgent need to reduce alcohol use among pregnant women in the Republic of the Congo.

12. Haas, D. M., Mahnke, B., Yang, Z., Guise, D., Daggy, J., Simhan, H. N., Silver, R. M., Groban, W. A., Wapner, R. J., Makhoul, J., Parry, S., Mercer, B. M., & Saade, G. R. (2020). Profile of reported alcohol, tobacco, and recreational drug use in nulliparous women. *Obstetrics & Gynecology*, 135(6), 1281 – 1288. doi: 10.1097/AOG.0000000000003826.

This US study estimated rates of alcohol, tobacco, and recreational drug use throughout pregnancy among nulliparous women. Women ( $n=10,038$ ) from the nuMoM2b (Nulliparous Outcomes in Pregnancy: Monitoring Mothers to be) cohort study self-reported alcohol, tobacco, and recreational drug use during each trimester and at the time of delivery. Compared to alcohol use three months prior to pregnancy (64.6%), alcohol use significantly reduced during pregnancy (3.9% during trimester 1, 5.6% at trimester 2, 7.0% at trimester 3, and 6.1% at delivery,  $P<.001$  for all), but significantly increased as pregnancy progressed ( $p<.01$ ). Rates of smoking three months prior to pregnancy (17.8%) were significantly reduced during pregnancy and they continued to decline throughout pregnancy (5.9% at visit 1, 5.3% at visit 2, 4.7% at visit 3, and 3.9% at visit 4;  $p<.01$ ). Similarly, recreational drug use was reported by 33.8% of women three months before pregnancy and reports significantly declined throughout pregnancy (1.1% at visit 2, 0.7% at visit 3, 0.4% at visit 4). Despite the reductions in smoking and drug use during

pregnancy, the authors highlight the need for continued counselling throughout the duration of pregnancy, especially for women who consume alcohol.

- 13. Hernandez, M., von Sternberg, K., & Valesquez, M. M. (2020). Alcohol use and problems among Latinas at risk of alcohol-exposed pregnancy: The role of acculturation and interpersonal factors. *Journal of Ethnicity in Substance Abuse, 15*, 1 – 14. doi: 10.1080/15332640.2020.1777609.**

This US study examined the role of acculturation, relationships, age, and education on heavy drinking among 119 Latina adults at risk of an alcohol-exposed pregnancy (AEP). Increased acculturation was positively associated with having helping relationships and social support as well as with heavy drinking. There was no significant relationship between being partnered or education on heavy drinking or alcohol problems. However, there was a positive association between helping relationships and alcohol problems. Understanding the role of acculturation and demographic factors on behaviour can help inform strategies for Latinas at risk of AEP.

- 14. Howlett, H., Mackenzie, S., Gray, W. K., Rankin, J., Nixon, L. & Brown, N. W. (2020). Assessing the prevalence of alcohol consumption in early pregnancy using blood biomarker analysis: a consistent pattern across north-east England? *Journal of Public Health, 42*(1), e74 – e80. doi: 10.1093/pubmed/fdz039.**

This UK study investigated the prevalence of alcohol consumption in early pregnancy in a region in England using anonymously analyzed blood samples taken at antenatal appointments. Carbohydrate deficient transferrin (CDT), a validated marker of chronic alcohol exposure, and gamma-glutamyltransferase (GGT), a liver enzyme elevated for up to 8 weeks after alcohol exposure, were used as measures. CDT had a prevalence rate of 1.7%, and GGT had a prevalence rate of 4.2%, suggesting chronic alcohol use. However, no significant correlations were found between CDT or GGT. These findings support the authors' earlier work from a different area of England, suggesting similar patterns of sustained alcohol use in pregnancy across the North-East region of England. A comprehensive cost benefit analysis would be useful in deciding the utility of routine blood biomarkers for alcohol screening in pregnancy.

- 15. Hyer, J., Ulrickson, C., Yerelien, E., Metz, T. D., Allshouse, A., & Hoffman, M. C. (2020). Self-reported alcohol, tobacco, and marijuana use in pregnant women with depressive symptomatology. *American Journal of Perinatology, 37*(12), 1223 – 1227. doi: 10.1055/s-0039-1692685.**

This US study investigated whether pregnant women who report depressive symptoms were more likely to report use of alcohol, tobacco, and cannabis use during pregnancy. Data from the US Maternal-Fetal Medicine Units Network Preterm Prediction Study showed women with depressive symptoms were more likely to report: any alcohol use (OR: 1.4, 95% CI: 1.1-1.8), >1 drink per week (OR: 1.3, 95% CI: 1.0-1.8), and >1 drink per day (OR: 2.2, 95% CI: 1.5-3.5). Women with depressive symptoms were also more likely to report cannabis and cigarette use. These data reveal the importance of targeted screening of pregnant women with depressive symptoms for substance use.

- 16. Imaz, M. L., Navinés, R., Gelabert, E., Fonsesca, F., Gutierrez-Zotes, A., Guillamat, R., ... & Laffon, R. M-S. (2020). Substance use during pregnancy and personality dimensions. *Adicciones, 0*(0), 1433, doi: 10.202882.adicciones.1433.**

This Spanish study assessed personality traits associated with substance use during pregnancy in a sample of 1804 pregnant women. Fifty percent of women reported using substances during pregnancy, including caffeine (40%), tobacco (21%), alcohol (3.5%), or cannabis (0.3%). Personalities characterized by higher extraversion ( $p = .029$ ) and psychoticism ( $p = .009$ ) emerged as risk factors for substance use during pregnancy. Every 10 unit increase in those personality scores increased the odds of using substances by 12% and 16% respectively. Additionally, low education, being on leave during pregnancy, and previous psychiatric history were associated with using substances during pregnancy ( $p < .05$ ). Women who were pregnant for the first time were less likely to use substances during pregnancy ( $p = .001$ ). The authors recommend that personality dimensions be considered as potential risk factors when screening for substance use during pregnancy to optimize foetal, neonatal, and maternal health.



- 17. Ishitsuka, K., Hanada-Yamamoto, K., Mezawa, H., Saito-Abe, M., Konishi, M, Ohya, Y., & Japan Environment and Children's Study Group. Determinants of alcohol consumption in women before and after awareness of conception. *Maternal and Child Health Journal*, 24(2), 165 – 176. doi: 10.1007/s10995-019-02840-0.**

This nation-wide study from Japan examined the sociodemographic and behavioural factors associated with alcohol use before and after pregnancy awareness in pregnant women. Among 91,828 pregnant women, prevalence of alcohol use before pregnancy awareness was 50% and reduced to 2.8% after pregnancy awareness. Most women consumed low to moderate levels of alcohol. Before pregnancy awareness, high educational level, high household income, and smoking were significantly associated with increased odds of alcohol consumption. After pregnancy awareness, older age and smoking were significantly associated with increased odds of alcohol consumption, and high education level and high household income were significantly associated with decreased odds of alcohol consumption. Findings suggest that sociodemographic characteristics differ between women who consume alcohol before pregnancy awareness and women who continue to consume alcohol after pregnancy. This information may be useful in developing targeted strategies to reduce prenatal alcohol exposure.

- 18. Janssen, A., & Parslow, E. (2020). Pregnancy persistently reduces alcohol purchases: Causal evidence from scanner data. *Health Economics*, 30(2), 231 – 247. doi: 10.1002/hec.4188**

This US study analyzed household-level changes in alcohol purchases after a household member became pregnant. Household (N = 1,967) purchasing data from 2004 to 2017 came from the Nielsen Consumer Panel dataset. Households experiencing a first pregnancy reduced alcohol purchases by 36%. In the postpartum period, purchases of alcohol were 34% lower than before conception. No change was found for households in their second pregnancy. The authors suggest that reducing alcohol consumption during pregnancy creates consumption habits that are maintained long term.

- 19. Leszko, M., Keenan-Devlin, L., Adam, E. K., Buss, C., Grobman, W., Simhan, H., . . . Borders, A. (2020). Are personality traits associated with smoking and alcohol use prior to and during pregnancy? *PLoS ONE*, 15, e0232668.**

This US study compared women who consumed alcohol or smoked cigarettes before pregnancy with women who quit or continued smoking or consuming alcohol during pregnancy. It involved a sample of geographically diverse pregnant women over the age of 18 from a larger study cohort (MOMS study). The authors found that compared to non-drinkers, women who reported drinking before pregnancy and continued to drink were more likely to have high educational attainment and income. In terms of personality traits, they found that women who scored high on openness to experience were significantly more likely to continue alcohol consumption during pregnancy (OR: 1.07, 95% CI: 1.01 - 1.14,  $p = .02$ ). The authors discuss possible reasons for the link with this trait and conclude that better understanding of personality traits associated with health behaviors in pregnancy may allow for more targeted and effective health-promotion communication that will improve women's capacity for making change in their alcohol and tobacco use.

- 20. May, P. A., Hasken, J. M., Baete, A., Russo, J., Elliott, A. J., Kalberg, W. O., . . . Hoyme, H. E. (2020). Fetal Alcohol Spectrum Disorders in a Midwestern city: Child characteristics, maternal risk traits, and prevalence. *Alcoholism: Clinical and Experimental Research*, 44(4), 919-938. doi: 10.1111/acer.14314**

This US study described the traits of children with FASD and maternal risk factors in a Midwestern US city. Case-control samples were drawn from two separate first-grade cohorts (combined  $n = 4,047$ ) in every city school. Child growth, dysmorphology, and neurobehavior were assessed, and mothers were interviewed. For the samples combined, 891 children received dysmorphology examinations, and 44 children met criteria for FASD. Total dysmorphology scores differentiated diagnostic groups and neurobehavioral tests distinguished children with FASD from controls, more for behavioral problems than cognitive delay. An adjusted regression model of usual pre-pregnancy drinking indicated that maternal reports of 3 drinks per drinking day (DDD) were significantly associated with a FASD diagnosis ( $p = 0.020$ ), as were 5 or more DDD ( $p < 0.001$ ). Other significant maternal risk factors included: self-reported drinking in any trimester; smoking and cocaine use during pregnancy; later pregnancy recognition and later and less prenatal care; lower maternal weight, body mass index (BMI), and head circumference; and unmarried status. There was no significant difference in FASD prevalence by race, Hispanic

ethnicity, or socioeconomic status at this site. The prevalence of FASD was 1.4 to 4.1%. The authors note that this city displayed the lowest prevalence of FASD of the 4 sites studied. Nevertheless, FASD was common, and children with FASD demonstrated a common, recognizable, and measurable array of traits.

- 21. May, P. A., Hasken, J. M., Bozeman, R., Jones, J. V., Burns, M. K., Goodover, J., . . . Hoyme, H. E. (2020). Fetal Alcohol Spectrum Disorders in a Rocky Mountain Region city: Child characteristics, maternal risk traits, and prevalence. *Alcoholism: Clinical and Experimental Research, 44(4)*, 900-918. doi: 10.1111/acer.14315**

This US study described the traits of children with FASD and maternal risk factors in a Rocky Mountain city. The research drew samples from 2 cohorts of first-grade students and involved examining the children for physical growth, dysmorphology, and neurobehavior, as well as interviews with their mothers. Various results for the children with FASD were described including having significantly lower birth weight and more problems at birth and being less likely to be living with biological mother and father. The prevalence of FAS was 2.9 to 5.8 per 1,000 children, and total FASD was 34.9 to 82.5 per 1,000 children. More mothers of children with FASD reported drinking prior to pregnancy, in the first and second trimesters, and had partners with drinking problems than mothers of controls. However, reports of alcohol use and the use of cannabis, club drugs, cocaine, methamphetamines, and tobacco were similar for mothers of children with FASD and mothers of controls. Mothers of children with FASD were significantly younger at pregnancy, had lower average weight before pregnancy, less education, initiated prenatal clinic visits later, and reported more health problems (e.g., stomach ulcers and accidents). Controlling for other drug and tobacco use, a FASD diagnosis is 6.7 times (OR: 6.720, 95% CI: 1.6-28.0) more likely among children of women reporting pre-pregnancy drinking of 3 drinks per drinking day and 7.6 times more likely among women reporting 5 drinks per drinking day.

- 22. May, P. A., Hasken, J. M., Stegall, J. M., Mastro, H. A., Kalberg, W. O., Buckley, D., . . . Hoyme, H. E. (2020). Fetal Alcohol Spectrum Disorders in a Southeastern county of the United States: Child characteristics and maternal risk traits. *Alcoholism: Clinical and Experimental Research, 44(4)*, 939-959. doi: 10.1111/acer.14313.**

This US study described the traits of children with FASDs and maternal risk factors in a southeastern county. The research drew samples from 2 different cohorts of first-grade students and involved examining the children for physical growth, dysmorphology, and neurobehavior, as well as interviews with their mothers. Various results for the children were described and the weighted estimated prevalence of FASD was 4.9%. Significant maternal risk variables included reports of pre-pregnancy drinking, drinking in any trimester, and comorbid use of other drugs in lifetime and during pregnancy, especially alcohol and marijuana (14.9% among mothers of children with FASD vs. 0.4% for controls). Distal maternal risks included reports of other health problems (e.g., depression), living unmarried with a partner during pregnancy, and a lower level of spirituality. Controlling for other drug use during pregnancy, having a child diagnosed with a FASD was 17.5 times greater among women who reported usual consumption of 3 drinks per drinking day prior to pregnancy compared to non-drinking mothers. There was no significant difference in the prevalence of FASD by race or socioeconomic status.

- 23. May, P. A., Marais, A. S., De Vries, M. M., Buckley, D., Kalberg, W. O., Hasken, J. M., . . . Hoyme, H. E. (2021). The prevalence, child characteristics, and maternal risk factors for the continuum of Fetal Alcohol Spectrum Disorders: A sixth population-based study in the same South African community. *Drug and Alcohol Dependence, 218*, 108408. doi: 10.1016/j.drugalcdep.2020.108408**

This study aimed to determine prevalence of FASD, child characteristics, and maternal risk factors South African community 17 years after an initial study with a similar goal. First grade students ( $n = 735$ ) and their mothers were identified using active case ascertainment. Children with FAS, partial FAS, and alcohol related-neurodevelopmental disorder (ARND) had significantly different dysmorphology traits and neurobehavioral performance compared to controls. Mothers of children with FASD reported significantly more drinking before and during pregnancy. Mothers of children with FAS reported 7.8 ( $\pm 6.1$ ) drinks per drinking day (DDD) prior to pregnancy and 5.1 ( $\pm 5.9$ ) after pregnancy recognition. Distal maternal risk factors related to having a child with FASD included lower maternal height, weight, and body mass index; higher gravidity; lower education and household income; and later pregnancy recognition. Alcohol and tobacco remain the only commonly used drugs. Women reporting 2 DDD in the first trimester were 13 times more likely to have a child with FASD than non-drinkers; and those who reported

drinking throughout pregnancy were 19.4 times more likely to have a child with FASD. The authors conclude that seventeen years after the first study in this community, FASD prevalence remains high at 16% - 31%.

- 24. McDonald, B. W., & Ellyett Watson, P. (2020). Maternal alcohol intakes before and during pregnancy: Impact on the mother and fetal outcome to 18 months. *Nordic Studies on Alcohol and Drugs*, 32(2), 153 – 171.**

This study from New Zealand investigated maternal alcohol consumption before and during pregnancy and the impact on mothers and infants at 18 months. Pregnant women's ( $n = 504$ ) measurements and lifestyle details and infants' ( $n = 370$ ) measurements and infant development were recorded. Fifty-three percent of women stopped drinking upon learning they were pregnant, 19% never drank, and 29% continued to drink. Twenty-two percent of mothers binge drank (>50 g) before pregnancy and 10% binge drank during pregnancy. Daily alcohol consumption was associated with obesity in mothers. Alcohol use before or during pregnancy had a slight negative effect on infants' growth and was not associated with infant motor development. Binge drinking before or during pregnancy was significantly associated with infants decreased vocal ability at 18 months.

- 25. Moraes Castro, M., Pinto, F., Pereiras, C., Fischer, A., Vogel, C., Duarte, V., ... González, G. (2020). Marijuana, tobacco, alcohol and cocaine use during pregnancy in 2013 and 2016. A self-report study in Montevideo, Uruguay. *Adicciones*, 32(3), 173 – 180. doi: 10.20882/adicciones.1107.**

This study compared maternal reports of cannabis, alcohol, tobacco, and cocaine use from 2013 to 2016, following the legalization of cannabis in Uruguay in 2013. The sample included 577 pregnant women, 319 of which were interviewed in 2013, and 258 in 2016. Women reported using cannabis before discovering their pregnancy at significantly higher rates in 2016 ( $n=79$ ; 30%) compared to 2013 ( $n=41$ ; 12.85%;  $p<.001$ ). Alcohol use increased from 23.82% in 2013 to 35.3% in 2016 ( $p = .003$ ). Women reported that they quit smoking when they found out they were pregnant at higher rates in 2016 (60%) compared to 2013 (43%;  $p = .008$ ). There were no significant changes in cocaine or cocaine derivatives between 2013 and 2016. Cannabis legalization may influence the use of substances, especially alcohol, during pregnancy. However, more research is needed to determine any causal relation between liberalized cannabis laws and increased substance use.

- 26. Ortega-Garcia, J. A., López-Hernández, F. A., Azurmendi Funes, M. L., Sánchez Sauco, M. F., Ramis, R. (2020). My partner and my neighbourhood. The built environment and social networks' impact on alcohol consumption during early pregnancy. *Health & Place*, 61:102239. doi: 10.1016/j.healthplace.2019.102239**

This Spanish study explored the role of partners' alcohol consumption, neighbourhood accessibility to alcohol, and social influence on maternal alcohol use. The majority of women (68%) reported drinking at least some alcohol during pregnancy. The findings demonstrate that partners' alcohol use has the strongest effect on women's alcohol consumption during pregnancy, but that the density of alcohol-serving establishments in women's neighbourhoods also had a positive effect on alcohol consumption probability. Future prenatal health interventions and recommendations should further integrate men and ecological considerations in order to reduce the probability of alcohol use in pregnancy.

- 27. Popova, S., Lange, S., Temple, V., Poznyak, V., Chudley, A. E., Burd, L., . . . Rehm, J. (2020). Profile of mothers of children with Fetal Alcohol Spectrum Disorder: A population-based study in Canada. *International Journal of Environmental Research and Public Health*, 17(21), 7986. doi: <https://doi.org/10.3390/ijerph17217986>**

This Canadian study compared the characteristics of mothers of children with FASD with mothers of typically developing control children as a part of larger WHO study to determine FASD prevalence among students aged 7 to 9 in Toronto schools. A total of 173 mothers were interviewed using a standardized questionnaire to collect data retrospectively on demographics, living environment, pregnancy history, nutrition, alcohol and other drug use prior to and following pregnancy recognition. Of these 173 mothers, 19 had a child who was diagnosed with FASD and 5 had a child who had received a deferred FASD diagnosis. The mothers of children with FASD did not differ significantly from mothers of the control group children with respect to age, ethnicity, marital status, and employment status at the time of pregnancy. However, mothers of children with FASD had lower levels of education ( $p < 0.01$ ) and were more likely to have received financial support ( $p < 0.05$ ) at the time of pregnancy, to

have smoked tobacco ( $p < 0.001$ ), and to have used cannabis or hashish ( $p < 0.01$ ) prior to pregnancy recognition, compared with mothers of control children. All mothers of children with FASD reported alcohol consumption prior to pregnancy recognition; however, only 10.5% reported alcohol consumption following pregnancy recognition. None of the mothers reported any drug use following pregnancy recognition. The authors conclude that risk of FASD occurs throughout our society regardless of age, ethnicity, marital status, and employment status at the time of pregnancy; and that population-based preventive interventions, including repeated screening, monitoring, and education regarding the effects of alcohol use, as well as other substances, before and during pregnancy, are needed.

**28. Racine, N., McDonald, S., Chaput, K., Tough, S., & Madigan, S. (2020). Maternal substance use in pregnancy: Differential prediction by childhood adversity subtypes. *Preventive Medicine, 141*: 106303.**

This Canadian study examined the association between maternal adverse childhood experiences (ACEs) on substance use in pregnancy, including alcohol, tobacco, and drug use. The study further examined how different adversity subtypes (i.e., sexual abuse, family violence, and household dysfunction) impact maternal substance use. Women from a community-based pregnancy cohort ( $n=1,994$ ) provided information on ACE exposure and maternal substance use. Medium effects were found for the role of household dysfunction on binge drinking, drug use, and smoking in pregnancy, while small effects were found for family violence on binge drinking, drug use, and smoking. Sexual abuse did not have a significant effect on substance use after controlling covariates. The findings also demonstrated a dose-response association between number of ACEs and substance use in pregnancy. Increased support for women with a history of childhood adversity is needed to further support the reduction of substance use in pregnancy.

**29. Ramos, A. M., Marceau, K., Neiderhiser, J. M., de Araujo-Greecher, M., Natsuaki, M. N., & Leve, L. D. (2020). Maternal consistency in recalling prenatal experiences at 6 months and 8 years postnatal. *Journal of Developmental & Behavioral Pediatrics, 41*, 698 – 705.**

This US study examined women's recall of prenatal experiences, behaviours, and birth outcomes at 6 months and 8 years postpartum. Using the modified life history calendar and a pregnancy screening tool, women from the Early Growth and Development Study (EGDS;  $n=117$ ) reported on their prenatal health behaviours, substance use, and experiences with labour and delivery. Mothers recall was consistent for type of delivery, smoking and marijuana use during pregnancy, specific medical concerns during pregnancy, and medicine used for induction. Recall consistency was fair for alcohol use, illicit substance use, and the use of drugs other than an epidural during labour. These findings suggest that women's recall over time is moderately consistent.

**30. Symons, M., Carter, M., Oscar, J., Pearson, G., Bruce, K., Newett, K., & Fitzpatrick, J. P. (2020). A reduction in reported alcohol use in pregnancy in Australian Aboriginal communities: A prevention campaign showing promise. *Australian and New Zealand Journal of Public Health, 44*(4), 284-290. doi: <https://doi.org/10.1111/1753-6405.13012>**

This Australian study reported the percentage of women who reported alcohol use during pregnancy to their midwives in 2008, 2010, and 2015 as part of the Marulu FASD Prevention Strategy, a community-led initiative in Western Australia. Alcohol use during pregnancy significantly reduced over time, decreasing from 61% in 2010 to 31.9% in 2015. First trimester alcohol use was also reduced over time from 45.1% in 2008 to 21.6% in 2015. Most women saw a midwife during their first trimester. The authors also identified significant relationship between increased maternal age and alcohol use during pregnancy in the third trimester, specifically. The results of this study demonstrate evidence for community-led strategies to reduce the rates of alcohol use during pregnancy among communities with high rates of prenatal alcohol use.

**31. Tebeka, S., De Premorel Higgons, A., Dubertret, C., & Le Strat, Y. (2020). Changes in alcohol use and heavy episodic drinking in U.S. women of childbearing-age and peripartum between 2001-2002 and 2012-2013. *Addictive Behaviors, 107*, 106389. doi: 10.1016/j.addbeh.2020.106389**

This US study explored 12-month alcohol use and heavy episodic drinking prevalence rates among women of childbearing age, pregnant women, and postpartum women in a representative sample of women in the United States ( $n=24,536$ ). The prevalence rate of 12-month alcohol use increased from 2001/2002 to 2012/2013 among women of childbearing age (66.14% to 75.48%) and pregnant and postpartum women (57.81% to 66.19%). The

prevalence rate of heavy episodic drinking also increased among women of childbearing age (22.57% to 36.36%) and pregnant and postpartum women (17.85% to 28.21%). The results of this study highlight the increase in women's alcohol use over this 10-year period, demonstrating a need for ongoing research to consider the personal, community, and policy-level impacts on women's alcohol use.

- 32. Tesfaye, G., Demlew, D., G/tsadik, M., Habte, F., Molla, G., Kifle, Y., & Gebreegziabhier, G. (2020). The prevalence and associated factors of alcohol use among pregnant women attending antenatal care at public hospitals Addis Ababa, Ethiopia, 2019. *BMC Psychiatry, 20*(1), 337. doi: 10.1186/s12888-020-02747-1**

This Ethiopian study examined the prevalence rate and associated risk factors for alcohol use during pregnancy among a random sample of pregnant women ( $n=585$ ) accessing prenatal health care at public hospitals in Addis Ababa. The prevalence of alcohol use during pregnancy was 37.1%. Risk factors for alcohol use in pregnancy included a lack of formal education, pre-pregnancy alcohol use, partner's alcohol use, and a lack of social support. The results of this study demonstrate high rates of alcohol use during pregnancy in the region and identify areas of intervention and support for pregnant women with substance use challenges.

- 33. Thompson, E. L., Litt, D. M., Griner, S. B., & Lewis, M. A. (2021). Cognitions and behaviors related to risk for alcohol-exposed pregnancies among young adult women. *Journal of Behavioral Medicine, 44*(1), 123-130. doi: 10.1007/s10865-020-00183-w**

This US study assessed the alcohol and sex-related cognitions and behaviours that are associated with women's risk for alcohol-exposed pregnancies. The risk of an alcohol-exposed pregnancy among young women (aged 18-20) was determined by contraceptive status and heavy episodic drinking. Alcohol-related sexual expectancies (i.e., sexual enhancement, risk-taking, and disinhibition) were significantly associated with increased odds of an alcohol-exposed pregnancy risk. However, women who indicated having more safe sex and protective behavioural strategies (e.g., talking to a partner about birth control) had decreased odds of an alcohol-exposed pregnancy risk. The results of this study demonstrate that interventions targeting young women's prenatal alcohol use should consider sexual expectancies and protective behavioural strategies as important components of prevention.

- 34. Tung, I., Chung, T., Krafty, R. T., Keenan, K., & Hipwell, A. E. (2020). Alcohol use trajectories before and after pregnancy among adolescent and young adult mothers. *Alcoholism: Clinical and Experimental Research, 44*(8), 1675-1685. doi: <https://doi.org/10.1111/acer.14394>**

This US study examined changes in risky drinking (i.e.,  $\geq 3$  drinks per occasion) from pre-pregnancy to post-pregnancy and identified pre-pregnancy predictors of risky drinking among a sample of 432 adolescents and young adult mothers in the United States. Participants reported their frequency of risky drinking in the year of pregnancy, 2 years before and after pregnancy, as well as their social and cognitive risk factors for drinking. 11% of mothers engaged in risky drinking at least once a month during the year of pregnancy. The results of a latent class analysis revealed four trajectories of risky drinking: 3 stable trajectories (low, moderate, and high frequencies) and 1 distinct trajectory (i.e., "postpartum initiators"). The results of this study revealed diverse trajectories of risk drinking from pre-pregnancy and post-pregnancy and suggest that pregnant women who have elevated risk factors for moderate to heavy drinking may benefit from targeted interventions and support.

- 35. Umer, A., Lilly, C., Hamilton, C., Baldwin, A., Breyel, J., Tolliver, A., . . . Maxwell, S. (2020). Prevalence of alcohol use in late pregnancy. *Pediatric Research, 88*(2), 312-319. doi: 10.1038/s41390-019-0731-y**

This US study estimated the prevalence of prenatal alcohol exposure (PAE) in West Virginia. In analyzing 1,830 newborn residual dried blood spots for phosphatidyl ethanol (PETH), the authors determined that the prevalence of late pregnancy prenatal alcohol exposure was 8.1% and ranged from 2.27% to 17.11% by region. Factors associated with PAE included smoking, preterm births, birth weight of  $\leq 2000$  g vs.  $>3000$  g, no exclusive breastfeeding intention, and not exclusively breastfeeding before discharge. The results of this study suggest high rates of PAE for the state and provide evidence for the need for targeted interventions and services to help reduce the risk of prenatal alcohol exposure in West Virginia.

36. Ye, P., Angal, J., Tobacco, D. A., Willman, A. R., Friedrich, C. A., Nelson, M. E., . . . Elliott, A. J. (2020). Prenatal drinking in the Northern Plains: Differences between American Indian and Caucasian mothers. *American Journal of Preventive Medicine*, 58(4), e113-e121. doi: <https://doi.org/10.1016/j.amepre.2019.12.004>

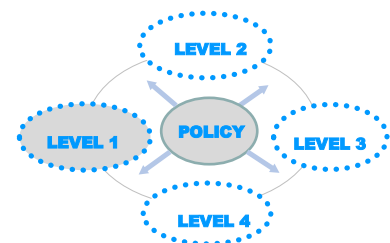
This US study explored the patterns and risk factors of alcohol use during pregnancy among American Indian ( $n=2,124$ ) and Caucasian ( $n=2,753$ ) mothers in the Northern Plains. More Caucasian mothers (63%) reported drinking during pregnancy compared to American Indian mothers (52%), though more American Indian mothers (41%) reported binge drinking compared to Caucasian mothers (28%). American Indian mothers had a lower risk of drinking later in pregnancy but had a higher risk of binge drinking during the first trimester compared to Caucasian mothers. The risk factors for drinking during pregnancy differed by group; frequent relocation was a risk factor for alcohol use during pregnancy among American Indian mothers, but marriage, income, parity, and fertility treatment were identified risk factors for Caucasian mothers. The results of this study provide further evidence of differences in patterns of alcohol use during pregnancy and risk factors for alcohol use during pregnancy among these groups.

37. Young-Wolff, K. C., Sarovar, V., Alexeeff, S. E., Adams, S. R., Tucker, L.-Y., Conway, A., . . . Weisner, C. (2020). Trends and correlates of self-reported alcohol and nicotine use among women before and during pregnancy, 2009–2017. *Drug and Alcohol Dependence*, 214, 108168. doi: <https://doi.org/10.1016/j.drugalcdep.2020.108168>

This US study investigated trends and correlates of the frequency of self-reported alcohol and nicotine use among a cross-sectional sample of pregnant women in Northern California from 2009 to 2017. Alcohol use before pregnancy increased from 2009 to 2017 (62.4% to 65.9%), whereas prenatal alcohol use decreased over the same time period (11.6% to 8.8%). Nicotine use decreased both before pregnancy (12.7% to 7.7%) and during pregnancy (4.3% to 2.0%). Higher odds of substance use were observed among those who used the substance daily or weekly in the year before pregnancy and differed by sociodemographic factors. The results of this study provide positive findings for the decrease of prenatal substance use from 2009 to 2017. The results of this study also provide evidence for interventions and education about the risks of substance use, particularly for frequent users, prior to conception.

## B. Level 1 Prevention

1. Cook, M. Leggat, G., & Pennay, A. (2020). Change over time in Australian newspaper reporting of drinking during pregnancy: A content analysis (2000–2017). *Alcohol and Alcoholism*, 55(6), 690-697. doi: <https://doi.org/10.1093/alcalc/aga072>



This Australian study explored whether and how messages about alcohol use during pregnancy changed from 2000 to 2017. The largest number of articles published on this topic was in 2007. There was a significant increase over time in messaging that discouraged drinking during pregnancy (from 20.69% in 2001 to 53.78% in 2013) and a significant decrease in articles presenting mixed advice (from 15.93% in 2009 to 0% in 2017). Messages about harms to the child (from 0.97% in 2008 to 29.69% in 2015) and prevention initiatives (from 0% in 2005 to 12.5% in 2017) significantly increased over time. Most articles did not adopt a position about women’s alcohol use pregnancy. Over time, Australian newspapers have communicated stronger messaging regarding abstinence from alcohol during pregnancy; however, opportunities remain for collaboration between researchers and public health advocates to disseminate evidence-based messaging about drinking during pregnancy.

2. Smith, J. A., Reid, N., Hewlett, N., D'Antoine, H., Gray, L., & Elliott, E. (2020). Mandatory pregnancy health warning labels on alcohol: Listen to the experts not the industry. *Health Promotion Journal of Australia*, 31(3), 327-329.

This Australian editorial made the case for implementation of structural and population-wide interventions as part of a comprehensive national FASD prevention strategy, and specifically for mandatory pregnancy health warning labels on alcohol products. The authors note how the alcohol industry in Australia interfered in the recent efforts

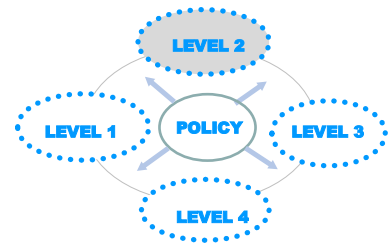
to bring in evidence-based, full colour health warnings on alcohol products, and how this ran counter to opinions of the surveyed Australian public, as well as over 150 public health and medical bodies and peak organizations in Australia. It urged the Ministers of the Forum of Food Regulation to listen to the health experts and prioritize the health and wellbeing of mothers and babies over commercial interests.

- 3. Zhao, J., Stockwell, T., Vallance, K., & Hobin, E. (2020). The effects of alcohol warning labels on population alcohol consumption: An interrupted time series analysis of alcohol sales in Yukon, Canada. *Journal of Studies on Alcohol and Drugs*, 81(2), 225-237. doi: 10.15288/jsad.2020.81.225**

This Canadian study examined the efficacy of new alcohol warning labels in the Yukon and associations with reduced alcohol consumption. The new alcohol warning label included a cancer warning, low risk drinking guidelines, and standard drink messages, replacing previous pregnancy related alcohol warning labels. Total per capita retail alcohol sales in Whitehorse, Yukon decreased by 6.31% during the intervention period. Per capita sales of alcohol products labeled with the alcohol warning label decreased by 6.59%. Among unlabeled alcohol products, sales increased by 6.91%. However, there was a larger reduction in alcohol sales when the pregnancy warning labels were reintroduced (-9.97%,  $p < .001$ ). The results of this intervention demonstrate that applying new alcohol warning labels in this context was associated with reduced population level alcohol consumption and provide evidence that warning labels may be a helpful strategy in disseminating visible and impactful messages about the risks of alcohol use and alcohol use during pregnancy.

### C. Level 2 Prevention

- 1. Carey, M. P., Rich, C., Norris, A. L., Krieger, N., Gavarkovs, A. G., Kaplan, C., ... Carey, K. B. (2020). A brief clinic-based intervention to reduce alcohol misuse and sexual risk behavior in young women: Results from an exploratory clinical trial. *Archives of Sexual Behavior*, 49(4), 1231 – 1250. doi: 10.1007/s10508-020-01635-9.**



This US study examined the efficacy of a brief intervention supplemented with text messaging and a curated website, on alcohol use and sexual risk behavior among young women. Young women seeking care from a reproductive health clinic who screened positive for alcohol misuse and sexual risk behaviour were invited to participate and randomized to a) a brief in-person intervention using personalized feedback regarding alcohol use and sexual health or b) a control condition. 64% of eligible women agreed to participate, 74% of eligible women were enrolled, and 86% of enrolled women were retained through follow-up. Women who received the brief intervention reported strong satisfaction with their intervention (4.65 vs. 3.98 on a five-point scale) and reported that text messaging was helpful (4.73 on a seven-point scale) and acceptable (5.27 on a seven-point scale). Women in both conditions reduced alcohol use and sexual risk behaviour over time. Women who received the brief intervention reduced their maximum daily alcohol intake (from 7.68 to 4.82 standard drinks) compared to controls (from 6.48 to 5.65). Women in the brief intervention group also reported fewer occasions of condomless sex (median = 2.5) compared to controls (median 5.0) although this finding was not significant. The brief intervention, supplemented with text messaging and a website, that targets alcohol use and sexual behaviour was feasible and acceptable to young women and led to lower levels of alcohol misuse and sexual risk behaviour.

- 2. Chang, G. (2020). Maternal substance use: Consequences, identification, and interventions. *Alcohol Research Current Reviews*, 40(2), 06. doi: 10.35946/arcrc.v40.2.06.**

This review explored the prevalence and consequences of prenatal exposure to alcohol, tobacco, cannabis, and opioids. The review also compares screening questionnaires for prenatal alcohol and substance use and discusses barriers to inquiry and disclosure. Psychosocial interventions post-screening are discussed, with suggestions for future research to examine barriers to screening.

- 3. Charron, E., Mayo, R. M., Heavner-Sullivan, S. F., Eichelberger, K. Y., Dickes, L., Truong, K. D., & Rennert, L. (2020). "It's a very nuanced discussion with every woman": Health care providers' communication**

**practices during contraceptive counseling for patients with substance use disorders. *Contraception*, 5, 349 – 355.**

This qualitative US study explored health care providers' communication practices during contraceptive counseling for women with substance use disorders (SUDs). Medical doctors and advanced practice nurses ( $n = 24$ ) used a variety of communication strategies, including patient-centered approaches. Providers emphasized building trust and tailoring discussions to patients' responses to open-ended questions. They balanced clinical judgement with patient preferences for contraceptive methods. Long-acting reversible contraceptive methods were most often recommended, and providers emphasized the benefits of these methods for women with SUDs. Women with SUDs may be distrustful of health care providers because of experiences of stigma and discrimination, however, the authors conclude that patient-centered contraceptive counselling may be effective in increasing trust and improving relationships and communication between women and their health care providers.

- 4. Doherty, E., Kingsland, M., Wiggers, J., Anderson, E. A., Elliott, E. J., Symonds, I., ... Wolfenden, L. (2020). Barriers to the implementation of clinical guidelines for maternal alcohol consumption in antenatal services: A survey using the theoretical domains framework. *Health Promotion Journal of Australia*, 31(1), 133 – 139. doi: 10.1002/hpja.258**

This Australian study assessed potential barriers to the implementation of clinical guideline recommendations by antenatal clinicians and managers regarding maternal alcohol consumption. For clinicians, environmental context and resources (i.e., complexity of appointments and availability of supporting systems); social influences (i.e., expectations of others that alcohol will be addressed); beliefs about capabilities (i.e., confidence in providing guideline recommendations); and behavioural regulation (i.e., planning and responding to feedback) were the most commonly cited barriers. For managers, emotion regulation (i.e., stress in managing change) and environmental context and resources (i.e., complexities of managing change) were the most commonly cited barriers. The antenatal service environment and availability of resources appear to be primary barriers to both clinicians and managers implementing guidelines for maternal alcohol consumption. In the development of interventions to support the delivery of clinical guideline recommendations addressing alcohol consumption during pregnancy, a broad range of potential barriers at both the clinician and manager levels need to be considered and targeted by effective implementation strategies.

- 5. Erng, M. N., Smirnov, A., & Reid, N. (2020). Prevention of alcohol-exposed pregnancies and fetal alcohol spectrum disorder among pregnant and postpartum women: A systematic review. *Alcoholism: Clinical and Experimental Research*, 44(12), 2451 – 2448. doi: <https://doi.org/10.1111/acer.14489>**

This systematic review from Australian researchers explored the literature from 1970 onwards for studies that examined interventions to prevent alcohol-exposed pregnancies (AEP) and FASD. Included articles ( $N = 34$ ) were conducted in the US, South Africa, Sweden, Ukraine, and the UK, and were included if pregnant, postpartum women, and/or their support networks were included. Studies covered a range of prevention strategies including brief interventions ( $n = 15$ ), long-term/intensive approaches ( $n = 6$ ), educational interventions ( $n = 5$ ), counselling ( $n = 3$ ), multicomponent interventions ( $n = 2$ ), and nutritional supplementation interventions ( $n = 3$ ). Interventions were examined for their effects on alcohol consumption, knowledge, contraceptive use, neonatal outcomes, family well-being or functioning, economics, and healthcare utilization outcomes. While most brief interventions did not significantly influence maternal or neonatal outcomes, there was some evidence of effectiveness when partners were involved and among subgroups of women who consumed larger amounts of alcohol or had polysubstance use. Long-term interventions that used a holistic approach and focussed on family and social well-being in addition to reducing substance use, showed promise for pregnant women who used multiple substances. More research is needed to improve the effectiveness of interventions for all women during pregnancy and postpartum to prevent AEPs and reduce the risk of FASD.

- 6. Graves, L., Carson, G., Poole, N., Patel, T., Bigalky, J., Green, C. R., & Cook, J. L. (2020). Guideline No. 405: Screening and counselling for alcohol consumption during pregnancy. *Journal of Obstetrics and Gynaecology Canada*, 42(9), 1158 – 1173.e1. doi: <https://doi.org/10.1016/j.jogc.2020.03.002>**

This clinical practice guideline from Canada outlines national standards of care for screening and counselling pregnant women and women of childbearing age about alcohol consumption and alcohol use disorder in Canada



based on current best evidence. A search of publications on alcohol use in pregnancy (2010 – 2018) was conducted in Medline, EMBASE, and CENTRAL databases to inform the content and recommendations. The quality of evidence was evaluated using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology framework. The implementation of these guidelines using validated screening tools and brief intervention approaches may improve the ability of obstetrical care providers to identify alcohol consumption and alcohol use problems, increase provider confidence and competence in supporting women, and optimize the health of pregnant women and women of childbearing age.

- 7. Greenmyer, J. R., Stacy, J. M., Klug, M. G., Foster, K., Christopher, T., & Burd, L. (2020). Pregnancy status is associated with screening for alcohol and other substance use in the emergency department. *Journal of Addiction Medicine, 14*(4), e64-369. doi: 10.1097/ADM.0000000000000616**

This US study aimed to determine the rates of screening for substance use in pregnant women ( $n=2,742$ ) versus non-pregnant women ( $n=9,888$ ) in the emergency department (ED) at a community hospital from 2012 - 2017. Non-pregnant women were screened for substance use at higher rates than pregnant women (3.66 vs. 1.90%, respectively, OR: 1.96). Non-pregnant women 14 to 19 and 30 to 34 had the highest likelihood for screening (OR >3.0). Pregnant women were screened only half as often as non-pregnant women. Increased screening is needed among pregnant women, as earlier recognition of substance use with pregnant women offers increased opportunities for intervention and prevention of adverse outcomes related to substance use in the current and future pregnancies.

- 8. Hanson, J. D., Weber, T. L., Shrestha, U., Bares, V. J., Seiber, M., & Ingersoll, I. (2020). Acceptability of an eHealth intervention to prevent alcohol-exposed pregnancy among American Indian/Alaska Native teens. *Alcoholism: Clinical and Experimental Research, 44*(1), 196 – 202. doi: 10.1111/acer.14229.**

This US feasibility study examined the acceptability and development of a tribally led Changing High-Risk Alcohol Use and Increasing Contraception Effectiveness Study (CHOICES) Program for American Indian/Alaska Native (AI/AN) teens. Guided by interviews with key informants ( $N=15$ ), CHOICES was modified, and focus groups were conducted with AI/AN teens to validate and finalize OST CHAT (CHOICES for American Indian Teens) intervention. Key informants identified that a web-based intervention may increase teen engagement. The authors discuss the potential of this evidence- and web-based prevention intervention to reach AI/AN teens, teens on reserve, and rural Indigenous communities.

- 9. Hocking, M., O’Callaghan, F., & Reid, N. (2020). Women's experiences of messages relating to alcohol consumption, received during their first antenatal care visit: An interpretative phenomenological analysis. *Women & Birth, 33*(2), e122 – e128. doi: 10.1016/j.wombi.2019.02.002**

This Australian study explored and interpreted the messages related to alcohol consumption that women receive during their first antenatal care visit. Women who had attended antenatal care in the past two years ( $n=12$ ) participated in semi-structured interviews. Messages received by participants about alcohol consumption were generally consistent with national guidelines, stating that there is no safe level of alcohol during pregnancy. Women interpreted these messages, however, within a broader, personal and socio-cultural context, leading women's choices about alcohol consumption to be informed by their individual understanding of risk. Participants expressed a preference for antenatal support that is tailored to their individual needs in order to facilitate open discussions about sensitive topics. Further strategies to prevent FASD should encourage women to abstain during pregnancy, while also providing individualized antenatal care that best enables this to be accomplished.

- 10. Howlett, H. (2020) An antenatal alcohol service evaluation of the north-east of England and north Cumbria. *Journal of Public Health, 42*(2), 374 – 287. doi: <https://doi.org/10.1093/pubmed/fdaa020>**

This UK study evaluated current alcohol prevention, screening, and treatment service provision in maternity care across North-East England. There was a large variation in clinical practices, service provision, and staff training across the region. A number of alcohol screening tools were identified, each with diverse thresholds for referral; data collection and documentation practices were incomparable; audits were rare; and guidelines were primarily influenced by local commissioning agreements. Standardized patient pathways involving alcohol screening and management practices are required. Further, there is a need for sharing best practices to facilitate referrals and support. This will require appropriate leadership, hiring and training strategies.

- 11. Ko, J. Y., Tong, V. T., Haight, S. C., Terplan, M., Stark, L., Snead, C., Schulkin, J. (2020). Obstetrician-gynecologists' practices and attitudes on substance use screening during pregnancy. *Journal of Perinatology*, 40(3), 422 – 432. doi: 10.1038/s41372-019-0542-3.**

This US study described obstetrician-gynecologists' practices and attitudes related to substance use screening in pregnant patients. Obstetrician-gynecologists with screening practices ( $n=353$ ) reported frequently screened for substance use (79%) and using a validated screening tool (11%) used a validated instrument. Confidence was the highest for treating pregnant patients using tobacco (81%) followed by alcohol (60%). Many respondents considered tobacco and alcohol screening to be a high priority compared to other substances. Respondents whose practices make it a high priority to screen for all substances were 1.2 times as likely to frequently screen compared to their counterparts. Four out of five obstetricians-gynecologists reported a high frequency of substance use screening in pregnant patients. Findings highlight the importance of increasing priority of substance use screening by obstetrician-gynecologists.

- 12. Lemola, S., Gkiouleka, A., Urfer-Maurer, N., Grob, A., Tritten Schwarz, K., & Meyer-Leu, Y. (2020). Midwives' engagement in smoking- and alcohol-prevention in prenatal care before and after the introduction of practice guidelines in Switzerland: Comparison of survey findings from 2008 and 2018. *BMC Pregnancy Childbirth*, 20(1), 31. doi: 10.1186/s12884-019-2706-8**

This Swiss study assessed changes in midwives' investment in smoking and alcohol use prevention during pregnancy prior to, and after, the introduction of practice guidelines in Switzerland. The authors collected survey data at two time points (2008 and 2018) to examine differences in smoking and alcohol use prevention across midwives' practice regions, year of graduation, and work setting. Midwives were more aware of the risks of smoking and consuming alcohol over time and indicated an increase in explaining the risks of substance use to pregnant women. However, midwives also reported that their engagement with more extensive prevention strategies across the duration of pregnancy was still limited. The results of this study highlight that although the practice guidelines may have contributed to midwives' increased awareness of the risks of alcohol and tobacco use during pregnancy, the practice guidelines did not increase midwives' engagement in the prevention of alcohol and tobacco use during pregnancy.

- 13. Mendoza, R., Morales-Marente, E., Soledad Palacios, M., Rodríguez-Reinado, C., Corrales-Gutiérrez, I., García-Algar, Ó. (2020). Health advice on alcohol consumption in pregnant women in Seville (Spain). *Gaceta Sanitaria*, 34(5), 449 – 458.**

This Spanish study analyzed the extent of health advice surrounding alcohol use in pregnancy that women remember receiving, their perceptions of the advice, and whether there were social inequities surrounding their health advice. A sample of 426 women in their 20<sup>th</sup> week of pregnancy participated in structured interviews with health professionals. Less than half (43%) of the women remembered receiving advice around alcohol consumption, with 43.5% recalling receiving advice not to consume any alcohol during pregnancy from their midwife, 25% from their obstetrician, and 20.3% from their general practitioner. Women with lower education levels were least likely to receive health advice. The findings demonstrate that a large proportion of the population does not receive (or recall receiving) recommended health advice to avoid alcohol use in pregnancy.

- 14. Murphy, M., McHugh, S., O'Keeffe, L. M., Greene, R. A., Corcoran, P., & Kearney, P. (2020). Preventive health counselling during antenatal care using the pregnancy risk assessment monitoring system (PRAMS) in Ireland. *BMC Pregnancy and Childbirth*, 20:98.**

This Irish study describes the use, content, and quality of preventive health counselling during pregnancy using data from the Pregnancy Risk Assessment Monitoring System (PRAMS) Ireland study. Hospital discharge records were reviewed for self-reported maternal health behaviours. Among 718 women, 84.8% of women reported receiving counselling about breastfeeding, 48.4% about alcohol, 47.6% about smoking, and 31.5% about weight gain. Women who smoked before pregnancy ( $n=170$ ) were more likely to receive counselling on the effects of smoking during pregnancy compared to non-smokers (AOR 2.72, CI 95% 1.84 – 4.02). However, women who reported drinking alcohol before pregnancy or did not breastfeed were not more likely to receive counselling on alcohol use in pregnancy or breastfeeding. The results demonstrate that rates of preventive health counselling are dependent on the health behaviour, and that preventive health counselling is not consistently provided.

15. Odendaal, H. J., Brink, L. T., Nel, D. G., Carstens, E., De Jager, M., Potter, M., Du Plessis, C., & Groenewald, C. A. (2020). Smoking and drinking habits of women in subsequent pregnancies after specific advice about the dangers of these exposures during pregnancy. *South African Medical Journal*, *110*(11), 1100 – 1104. doi: 10.7196/SAMJ.2020.v110i11.14667.

This South African study examined whether providing women with information about the dangers of smoking and drinking during pregnancy would reduce rates of substance use in subsequent pregnancies. Women in their first pregnancy ( $n=889$ ) were compared to women in their second ( $n=888$ ) or third pregnancies ( $n=77$ ). The proportion of women who drank alcohol did not significantly change from first to second or third pregnancy. Similar trends were found for smokers. Advising women to refrain from smoking and drinking during pregnancy did not effectively change maternal behaviour in this population. Confounding factors, such as short interpregnancy intervals, drug exposure during pregnancy, and socioeconomic conditions, should be explored.

16. Olusanya, O. A., & Barry, A. E. (2020). Dissemination of prenatal drinking guidelines: A preliminary study examining personal alcohol use among midwives in a Southwestern US State. *Journal of Midwifery & Women's Health*, *65*(5), 634-642. doi:10.1111/jmwh.13146

This US study sought to examine and compare the personal alcohol use and communication practices regarding prenatal alcohol consumption among certified midwives in a southwestern state. Personal drinking behaviors were assessed with Alcohol Use Disorder Identification Test-Consumption (AUDIT-C). All midwives ( $n = 61$ ) reported they typically screened a patient for alcohol use during an initial prenatal visit. However, 8.2% of respondents opted for recommendations that advised patients to drink once in a while. Similarly, 6.6% of midwives counseled women to have no more than one drink per day. In the cohort of participants ( $n = 40$ ) with AUDIT-C scores, 25 (62.5%) engaged in non-risky drinking (AUDIT-C scores  $<3$ ). Most respondents ( $n = 39$ ; 97.5%) typically consumed 1 to 2 standard drinks on the day they drank. Results of this study highlight the importance of advocating healthy lifestyles among health care professionals while also promoting communication practices that align with national alcohol guidelines.

17. Olusanya, O. A., Olokunlade, T., Rossheim, M. E., Greene, K., & Barry, E. (2020). Alcohol messages disseminated to pregnant women by midwives. *American Journal of Drug and Alcohol Abuse*, *11*, 1 – 10. doi: 10.1080/00952990.2020.1836187.

This US study examined alcohol-related messaging disseminated by midwives to pregnant women. Certified professional and nurse midwives ( $n = 61$ ) responded to an online survey containing an open-ended prompt asking midwives how they would respond to patients consuming alcohol in pregnancy out of the belief that 'safe' levels of alcohol will not cause harm. Less than half of the midwives (45.9%) encouraged pregnant women to discontinue alcohol use in pregnancy. However, there was a large divergence in responses, categorized into five non-exclusive themes: unknown safe limits and harmful effects, alcohol abstinence is best, light drinking is acceptable, describe your drinking, and I will refer you. The most common messages were "safe levels of prenatal alcohol use are unknown" (68.9%) and "discontinue alcohol during pregnancy" (45.9%). Certified professional midwives were more likely to suggest referrals ( $p = .024$ ) and less likely to share abstinence-based messaging ( $p = .003$ ) compared to certified nurse midwives. Further efforts are required to align alcohol use messaging with practice guidelines that encourage abstinence.

18. Oni, H. T., Buultjens, M., Blandthorn, J., Davis, D., Abdel-latif, M. & Islam, M. M. (2020). Barriers and facilitators in antenatal settings to screening and referral of pregnant women who use alcohol or other drugs: A qualitative study of midwives' experience. *Midwifery*, *81*. doi: <https://doi.org/10.1016/j.midw.2019.102595>.

This Australian study explored midwives' barriers and facilitators to screening and referring pregnant women who use alcohol or other substances in antenatal settings. Eighteen midwives from urban, rural, and regional antenatal services in Victoria participated in semi-structured interviews. Seven themes were generated using thematic analysis. The majority of the barriers and all of the facilitators were interrelated and a result of institutional or practitioner-related factors. Institutional and practitioner related barriers included a lack of screening tools, inadequate support and training to screen, discomfort in screening, lack of supports following screening, and high workload with limited consultation time. Client-related barriers included partial or non-disclosure of substance use

in pregnancy, and a reluctance to follow-up with referrals. Facilitators included adoption of women-centered practice, knowledge of the harms of substance use during pregnancy, training and experience, continuity of care, and multidisciplinary care team and funding. Midwives were willing to screen for substance use during pregnancy but wanted increased accessibility to validated screening tools and ongoing training. Additional multidisciplinary supports are necessary to further support women with a high risk of a substance-exposed pregnancy.

- 19. Ordean, A., Forte, M., Selby, P., & Grennell, E. (2020). 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, 14(4)*, e76 – e82.**

This Canadian study examined current screening, brief intervention, intervention, and referral to treatment (SBIRT) for prenatal alcohol and cigarette use among healthcare providers and investigated barriers to implementation and educational needs. The sample consisted of family physicians, midwives, and obstetricians ( $n = 118$ ) from two Toronto hospitals; a community-based facility and an academic health sciences center. Almost all providers reported screening all pregnant woman for alcohol and smoking status; however, brief interventions were offered less often. Education and supportive counseling were more likely to be provided for prenatal cigarette smoking than for alcohol use. Community-based providers were significantly more likely to refer pregnant women to addiction treatment programs. Lack of resources, training, and clinical pathways were identified by providers as barriers to implementing SBIRT. There is a need to educate providers in effective brief counselling strategies and appropriate treatment resources, as well as to develop clinical care pathways to increase the use of SBIRT for prenatal alcohol and cigarette use.

- 20. Reid, N., White, C., Hawkins, E., Crawford, A., Liu, W., & Shanley, D (2020). Outcomes and needs of health and education professionals following fetal alcohol spectrum disorder-specific training. *Journal of Paediatrics and Child Health, 56(2)*, 317 – 323. <https://doi.org/10.1111/jpc.14608>**

This study from Australia and New Zealand examined the impacts of FASD-specific training on health and education professionals' current practices. Professionals from Australia and New Zealand ( $n=52$ ) completed an online survey about their training experience and changes in practice post-training. Following the training, participants noted increases in asking about alcohol use in pregnancy; providing referral for FASD assessments; and providing assessments and diagnosis with other professionals. Further, professionals noted increased knowledge, awareness, and confidence about FASD. The training had positive outcomes on understanding FASD and enabling neurodevelopmental assessments for FASD.

- 21. Shah, P. V., Tong, S., Hwang, S. S., & Bourque, S. L. (2021). Racial/ethnic differences in prenatal and postnatal counseling about maternal and infant health-promoting practices among teen mothers. *Journal of Pediatric and Adolescent Gynecology, 34(1)*, 40-46. doi: 10.1016/j.jpag.2020.10.002**

This US study examined racial and ethnic differences in prenatal and postnatal counseling of teenage mothers. A diverse range of counseling factors were explored including tobacco, alcohol, and drug use, weight gain, HIV testing, influenza vaccination recommendations, breastfeeding, infant safe sleep, postpartum depression, and contraception. Using a sample of 544,930 teenage mothers, the authors identified that racial and ethnic differences existed in receiving perinatal counseling, with Black teenagers being more likely to receive counseling on factors such as substance use and HIV testing, and Hispanic teenagers being more likely to receive counseling on influenza vaccine recommendations, compared to White teenagers. The results of this study highlight the need for further research to address the reasons for these race-based differences in prenatal and postnatal counseling.

- 22. Stevens, S., Anstice, N., Cooper, A., Goodman, L., Rogers, J., & Wouldes, T. A. (2020). Multiple tools are needed for the detection of prenatal alcohol exposure: findings from a community antenatal setting. *Alcohol: Clinical and Experimental Research, 44(4)*, 1001-1011. doi:10.1111/acer.14309**

This New Zealand study explored the use of multiple measurement tools (i.e., a lifestyle questionnaire, TWEAK questionnaire, a substance use inventory, and phosphatidyl ethanol [PEth] biomarker test of alcohol metabolism) in understanding alcohol use across pregnancy at different timepoints, as well as the rates and patterns of alcohol use, in a community prenatal setting. The authors identified that when a pregnancy was unplanned, women were significantly more likely to find out that they were pregnant later and to consume alcohol at moderate to heavy levels. The TWEAK was more likely to identify risky alcohol consumption than the lifestyle questionnaire. There

was no association between maternal self-reports of alcohol use and Peth results ( $p = 0.72$ ). Women in this study also self-reported moderate to heavy rates of alcohol use in early pregnancy, though PEth results also showed alcohol use in late pregnancy. The results of this study demonstrate that multiple measurement tools and methods may help in identifying prenatal alcohol exposure at different times throughout pregnancy.

- 23. Sword, W., Green, C., Akhtar-Danesh, N., McDonald, S. D., Kaminsky, K. Roberts, N., & Cook, J. (2020). Screening and Intervention Practices for Alcohol Use by Pregnant Women and Women of Childbearing Age: Results of a Canadian Survey. *Journal of Obstetrics and Gynaecology Canada*, 42(9), 1121-1128. doi: <https://doi.org/10.1016/j.jogc.2020.02.114>**

This study examined health care providers' familiarity with and use of the Society of Obstetricians and Gynaecologists of Canada's (SOGC) 2010 Alcohol Use and Pregnancy Consensus Clinical Guidelines and identified barriers and enablers that affected guideline uptake. A national survey was conducted among midwives, obstetricians, family physicians, and nurses ( $n = 588$ ). Just over half of the respondents were familiar with and used the guidelines. Most respondents asked women about alcohol consumption, but relatively few used a screening questionnaire. Approximately two-thirds of respondents provided brief intervention and referral to harm reduction or treatment services. Enablers of guideline adherence included knowledge about the risks of alcohol in pregnancy, perceived responsibility to identify and address at-risk drinking, and a belief that women are motivated to reduce their alcohol consumption if pregnant or planning to become pregnant. Lack of confidence in ability to use screening questionnaires and to provide brief intervention, as well as a lack of belief in the effectiveness of both practices, were barriers to use. Strategies are needed to improve familiarity with and uptake of the Alcohol Use and Pregnancy Consensus Clinical Guidelines. Particular attention should be given to education and training regarding the use of validated screening questionnaires and brief intervention practices.

- 24. Symons, M., Carter, M., Oscar, J., Pearson, G., Bruce, K., Newett, K., & Fitzpatrick, J. P. (2020). A reduction in reported alcohol use in pregnancy in Australian Aboriginal communities: A prevention campaign showing promise. *Australian and New Zealand Journal of Public Health*, 44(4), 284-290. doi: <https://doi.org/10.1111/1753-6405.13012>**

See above (Prevalence of, and influences and factors associated with, drinking in pregnancy).

- 25. Toquinto, S. M., Berglas, N. F., McLemore, M. R., Delgado, A., & Roberts, S. C. M. (2020). Pregnant women's acceptability of alcohol, tobacco, and drug use screening and willingness to disclose use in prenatal care. *Women's Health Issues*, 30(5), 345-352. doi: [10.1016/j.whi.2020.05.004](https://doi.org/10.1016/j.whi.2020.05.004)**

This US study explored acceptability by women of substance use screening and their willingness to disclose their substance use to providers in four prenatal care facilities in Louisiana and Maryland. 589 pregnant women completed a survey and interview, indicating that most women perceived screening to be acceptable for alcohol, tobacco, and other drug use during prenatal care. Almost all women in the study noted that they were willing to disclose their substance use to their provider. The results of this study provide positive findings for women's willingness to engage in honest conversations about substance use during pregnancy and encourage safe, non-judgemental conversations between women and their care providers about substance use during pregnancy.

- 26. Trocin, K. E., Weinstein, N. I., Oga, E. A., Mark, K. S., & Coleman-Cowger, V. H. (2020). Prenatal Practice Staff Perceptions of Three Substance Use Screening Tools for Pregnant Women. *Journal of Addiction Medicine*, 14(2).**

Using a qualitative study design, this US study sought to better understand prenatal practice staff's perceptions 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) for use with pregnant women in two Maryland prenatal practices. The authors explored clinical and administrative staff's perspectives on the acceptability and usability of the three substance use screening tools in terms of participants' views on the tools' length, tone, comprehensiveness, subjectivity, time frame, scoring, and clinician instructions. Most participants liked the 4P's Plus screening tool best because of its brevity, comprehensiveness, ease of use, and lack of judgmental language. The results of this study provide evidence for the needs and preferences of prenatal staff as it pertains to substance use screening tools during pregnancy.

- 27. Ujhelyi Gomez, K., Goodwin, L., Jackson, L., Jones, A., Chisholm, A., & Rose, A. K. (2020). Are psychosocial interventions effective in reducing alcohol consumption during pregnancy and motherhood? A systematic review and meta-analysis. *Addiction*. doi: <https://doi.org/10.1111/add.15296>**

This systematic review and meta-analysis from UK authors explored the evidence for psychosocial interventions delivered in health care settings and homes to reduce alcohol use among pregnant and postpartum women. 24 studies were included in the review with only 10 studies being pooled for further analysis. There were significant treatment effects for pregnancy studies regarding abstinence ( $p < 0.001$ ) and motherhood studies regarding a reduction in drinking ( $p = 0.02$ ). A wide range of techniques to foster behaviour change were used, including information about consequences, social support, goal setting, and action planning. The results of the narrative synthesis component of the review identified inconsistent findings about the effectiveness of the interventions. Overall, the findings suggest that psychosocial interventions may help facilitate abstinence among pregnant women compared with usual care or no interventions, as well as a reduction in alcohol consumption among mothers. These results may provide helpful evidence for the use of techniques that support behaviour change as part of psychosocial interventions to help women reduce or stop their alcohol use.

- 28. Weile, L. K. K., Wu, C., Hegaard, H. K., Kesmodel, U. S., Henriksen, T. B., Ibsen, I. O., & Nohr, E. A. (2020). Identification of Alcohol Risk Drinking Behaviour in Pregnancy Using a Web-Based Questionnaire: Large-Scale Implementation in Antenatal Care. *Alcohol & Alcoholism*, *55*(2), 225-232. doi: [10.1093/alcalc/agz100](https://doi.org/10.1093/alcalc/agz100)**

This Danish study investigated the feasibility of a web-based questionnaire for collecting information about alcohol use during pregnancy and identify risky drinking behaviours among women referred for antenatal care. As well, the authors sought to identify the factors associated with risky drinking behaviour and the use of specialized care. 4% of women who responded to the questionnaire had risky drinking behaviour. This risk was associated with higher alcohol consumption prior to pregnancy, unplanned pregnancy, younger age, nulliparity, and higher levels of physical activity during pregnancy. The web-based questionnaire was feasible for collecting information about alcohol use during pregnancy and may be beneficial in helping identify women who may need referrals to more specialized care.

- 29. Wise, L. A., Wesselink, A. K., Hatch, E. E., Weuve, J., Murray, E. J. Wang, T. R., ... Rothman, K. J. (2020). Changes in behavior with increasing pregnancy attempt time: A prospective cohort study. *Epidemiology*, *31*(5), 659-667. doi: [10.1097/EDE.0000000000001220](https://doi.org/10.1097/EDE.0000000000001220)**

This article examined behaviour change during pregnancy among women in a North American preconception cohort study. Among 250 women attempting pregnancy for up to 12 months without conceiving, there was small-to-moderate reductions from baseline to 12 months including in caffeine intake (-19.5 mg/day), alcohol intake (-0.85 drinks/week), cannabis use (-3.89 percentage points), and vigorous exercise (-0.68 hours/week), and a large increase in activities to improve conception chances (e.g., ovulation testing) (21.7 percentage points). There was little change in cigarette smoking (-0.27 percentage points), perceived stress scale score (-0.04 units), or other factors (e.g., sugar-sweetened soda intake, moderate exercise, intercourse frequency, and multivitamin use). Although many women changed behaviour with increasing pregnancy attempt, the changes were modest for most variables. Understanding changes over time can be useful for tailoring programming.

- 30. Wright, T., Young, K., Darragh, M., Corter, A., Soosay, I., & Goodyear-Smith, F. (2020). Perinatal e-screening and clinical decision support: The Maternity Case-finding Help Assessment Tool (MatCHAT). *Journal of Primary Health Care*, 265-271. doi: [10.1071/HC20029](https://doi.org/10.1071/HC20029)**

This New Zealand study examined the potential of a perinatal electronic screening tool (Maternity Case-finding Help Assessment Tool (MatCHAT)) to support midwives' clinical decisions. Five midwives reported on the effectiveness of MatCHAT in e-screening 20 prenatal and postpartum women for mental health, substance use, and family violence concerns. Women reported substance use ( $n = 8$ ), depression ( $n = 1$ ), and anxiety ( $n = 5$ ) during e-screening. Midwives perceived MatCHAT to be useful and acceptable; however, midwives also highlighted multiple contextual barriers to implementation. The authors conclude that e-screener, such as MatCHAT, have

the potential to improve early identification of mental health, substance use, and family violence concerns if contextual barriers are overcome.

- 31. Yonkers, K. A., Dailey, J. I., Gilstad-Hayden, K., Ondersma, S. J., Forray, A., Olmstead, T. A., & Martino, S. (2020). Abstinence outcomes among women in reproductive health centers administered clinician or electronic brief interventions. *Journal of Substance Abuse Treatment, 113*, 107995. doi: <https://doi.org/10.1016/j.jsat.2020.02.012>**

This US study explored the abstinence outcomes from a randomized clinical trial of screening, brief intervention, and referral to treatment (SBIRT) among women seeking reproductive health services. Women who screened positive for substance use were randomly assigned to one of three groups: clinician administered SBIRT; electronically administered brief intervention; or enhanced usual care. 7.7% of women in the clinician-administered SBIRT group and 12.8% of women in the electronically administered brief intervention group reported abstinence from their primary substance of use at 6-month follow up. The results of this study suggest that both types of both brief interventions can be helpful in helping women reduce their substance use in reproductive health settings.

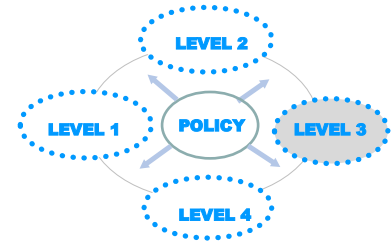
- 32. Young-Wolff, K. C., Tucker, L. Y., Armstrong, M. A., Conway, A., Weisner, C., & Goler, N. (2020). Correlates of pregnant women's participation in a substance use assessment and counseling intervention integrated into prenatal care. *Maternal Child Health Journal, 24*(4), 423-431. doi:10.1007/s10995-020-02897-4**

This US study examined the demographic and clinical correlates of women's participation in an initial assessment and counseling intervention in prenatal care in a large health care system in Northern California. The sample of women included women who screened positive for substance use via a self-report questionnaire and/or a urine toxicology test. 11,843 women screened positive for prenatal substance use. Most women were White (42%) and screened positive for a number of substances (38% for alcohol only, 20% for cannabis only, 5% for nicotine only, 17% for other drugs only, and 19% for  $\geq 2$  substances). Women who were younger, had a lower income, were single, and had a positive urine toxicology test had higher odds of participation in the initial assessment and counseling intervention. The results indicate that integrated substance use interventions may be helpful in reaching vulnerable populations of pregnant women.

- 33. Zinsser, L. A., Stoll, K., Wieber, F., Pehlke-Milde, J., & Gross, M. M. (2020). Changing behaviour in pregnant women: A scoping review. *Midwifery, 85*, 102680. doi: <https://doi.org/10.1016/j.midw.2020.102680>**

In this scoping review, midwifery researchers from Germany and Canada provided an overview of existing interventions related to behaviour change in pregnancy with a particular emphasis on programmes that include empowerment components to promote autonomy and woman-led decision-making. A systematic search strategy was applied to retrieve relevant papers in August 2017 and again in October 2018. Thirty studies met the criteria for inclusion. These studies addressed weight management, smoking cessation, general health education, nutrition, physical activity, alcohol consumption and dental health. The main approach was knowledge gain through education. More than half of the studies ( $n = 17$ ) included three or more aspects of empowerment as part of the intervention. The most frequent aspect used to foster women's empowerment was to support development of new skills and competencies, including through self directed learning. Education for knowledge gain was found to be the prevailing approach in behaviour change programmes and empowerment aspects were not a specific focus of these programmes. There is a need to design interventions that empower women, which may be beneficial during and beyond pregnancy. The findings indicate that midwives are well-suited to develop, manage, implement or assist in these efforts.

## D. Level 3 Prevention



1. Catherine, N. L. A., Boyle, M., Zheng, Y., McCandles, L., Xie, H. Lever, R., ... Waddell, C. (2020). Nurse home visiting and prenatal substance use in a socioeconomically disadvantaged population in British Columbia: analysis of prenatal secondary outcomes in an ongoing randomized controlled trial. *CMAJ Open*, 8(4), e667-e675. doi: 10.9778/cmajo.20200063

This Canadian study compared the efficacy of Nurse-Family Partnership (NFP), a home visitation program, against existing services in improving child and maternal health outcomes. Girls and women aged 14-24 years who were pregnant with their first child and experiencing socioeconomic disadvantage participated in the study ( $n = 739$ ,  $n = 368$  in the intervention group). Alcohol and cigarette use decreased in both groups; however, the changes were not statistically significant. Participants in NFP also had a moderate decrease in past 2-day cigarette use among smokers (DIC  $-1.6$ , 95% CI  $-6.4$  to  $-1.3$ ). NFP was not found to reduce rates of street drug, or “any” substance use; however, significant reductions in prenatal cannabis use were found (difference in changes [DIC] of count  $-6.4$ , 95% CI  $-17.0$  to  $-1.7$ ). NFP may be effective in reducing certain types of prenatal substance use in economically disadvantaged populations.

2. Erng, M. N., Smirnov, A., & Reid, N. (2020). Prevention of alcohol-exposed pregnancies and fetal alcohol spectrum disorder among pregnant and postpartum women: A systematic review. *Alcoholism: Clinical and Experimental Research*, 44(12), 2451 – 2448. doi: <https://doi.org/10.1111/acer.14489>

See above (Level 2).

3. Hennelly, S. E., Perman-Howe, P., Foxcroft, D. R., & Smith, L. A. (2020). The feasibility of 'Mind the Bump': A mindfulness based maternal behaviour change intervention. *Complementary Therapies in Clinical Practice*, 40. doi: <https://doi.org/10.1016/j.ctcp.2020.101178>

This UK study developed and evaluated the feasibility of ‘Mind the Bump’, a mindfulness-based maternal behaviour change intervention. Mind the Bump aimed to improve mindfulness, mental health, and adherence to UK maternal health behaviour guidance. The findings demonstrated that over the eight-week intervention, mindfulness, positive affect, and wellbeing improved. Stress, negative affect, depression, anxiety, and adherence to guidance did not improve. The intervention was not fully feasible, though there is potential to adapt the delivery and content of this type of intervention in consultation with pregnant women, to address the existing intervention’s limitations. There is a scarcity of research on maternal health mindfulness-based interventions, and the potential of mindfulness-based interventions for improving maternal mental and behavioural health together should be further explored.

4. Jones, S. W., Darra, S., Davies, M., Jones, C., Sunderland-Evans, W., & Ward, M. R. M. (2020). Collaborative working in health and social care: Lessons learned from preliminary findings of young families’ pregnancy to age 2 project in South Wales, United Kingdom. *Health & Social Care in the Community*. <https://doi.org/10.1111/hsc.13146>

This Welsh study evaluated JIGSO SWANSEA, a collaborative and multidisciplinary pregnancy project that supports young pregnant people (ages 16 – 24) from 17 weeks of pregnancy to two years post-partum. The study examined the impact of the project on alcohol and tobacco use during pregnancy, breastfeeding, nutrition, parenting knowledge and skills, and social service outcomes compared to local and national data. The results demonstrated higher levels of breastfeeding initiation and lower alcohol and tobacco use compared to the national average. Parents reported increased confidence and knowledge in parenting skills and improved family relationships. Parents who were heavily involved in JIGSO programming also had improved relationships with and positive outcomes from engagement with child services. This evaluation showed promising results of the impacts of multidisciplinary, collaborative strategies.



5. **Meier, J., & Edginton, E. (2020). The prenatal maternal representations of mothers at risk of recurrent care proceedings in the Family Drug and Alcohol Court: A thematic analysis. *Infant Mental Health Journal, 41*(5), 628 – 641. doi: <https://doi.org/10.1002/imhj.21876>**

In this UK study, five pregnant mothers at risk of recurrent removals of their infants and children due to child protection concerns were interviewed about their perceptions of themselves as mothers, of their babies, and of the mother-baby relationship. Seven key themes emerged: (1) uncertainty and fear of losing their baby/Uncertainty but hope of becoming a mother; (2) not wanting to be like their own mother; (3) experiencing recovery and pregnancy as two interdependent processes; (4) struggling to imagine the baby; (5) the omnipresence of previous children; (6) pleasure at starting to have a connection with the baby; and (7) noting the baby's dependency. The authors discuss the clinical relevance of these results and suggest grief, maternal self-identity, recovery from substance abuse, and managing uncertainty as areas of intervention for mothers at risk of child protection involvement.

6. **Nagpal, T. S., Bhattacharjee, J., da Silva, D. F., Souza, S. C. S., Mohammad, S., Puranda, J. L., ... Adamo, K. B. (2020). Physical activity may be an adjuvant treatment option for substance use disorders during pregnancy: A scoping review. *Birth Defects Research, 113*(3), 265 – 275. doi: <https://doi.org/10.1002/bdr2.1803>**

This scoping review from Canadian authors summarized literature assessing the relationship between prenatal exercise and substance use disorders. Eight studies were included in this review (five human studies, three animal model studies). Studies in humans suggest that pregnant women with substance use disorders are interested in engaging in physical activity interventions; however, known acute metabolic and physiological responses to prenatal exercise may be impaired in this population. Rodent models show preliminary evidence for improved mental health outcomes following prenatal exercise for substance use disorders. The findings from this review may inform the development of future exercise programs as a component of substance use treatment for pregnant women.

7. **Rutman, D., Hubberstey, C., Poole, N., Schmidt, R. A., & Van Bibber, M. (2020) Multi-service prevention programs for pregnant and parenting women with substance use and multiple vulnerabilities: Program structure and clients' perspectives on wraparound programming. *BMC Pregnancy and Childbirth, 20*, 441.**

This Canadian evaluation examined how community-based, multi-service programs aimed at reaching vulnerable pregnant or parenting women with substance use and complex issues are structured, their cross-sectoral partnerships, and clients' perceptions of their services. The Co-Creating Evidence (CCE) project evaluated eight multi-service programs located in six Canadian jurisdictions, using interviews with clients, program staff and service partners. Each of the programs in the CCE study employs a multi-service model that both reflects a wrap-around approach to care and is intentionally geared to removing barriers to accessing services. The programs are either operated by a health authority ( $n = 4$ ) or by a community-based agency ( $n = 4$ ). The programs' focus on the social determinants of health, and their provision of primary, prenatal, perinatal and mental health care services is essential; similarly, onsite substance use and trauma/violence related services is pivotal. Further, programs' support in relation to women's child welfare issues promotes collaboration, common understanding of expectations, and helps to prevent child/infant removals. The programs involved in the CCE study have blended social and primary care and prenatal care. Their success is in respectfully and flexibly responding to women's diverse needs, interests and readiness, within a community-based, wraparound service delivery model that paves the way for others offering pre- and postnatal programming.

8. **Rutman, D., & Hubberstey, C. (2020). Cross-sectoral collaboration working with perinatal women who use substances: outcomes and lessons from HerWay Home. *Journal of Social Work Practice in the Addictions, 20*(3), 179-193. doi:10.1080/1533256X.2020.1793068**

This Canadian study presented evaluative findings of the HerWay Home program, a multiservice drop-in and outreach program for pregnant women with substance use issues in British Columbia, Canada. The goals of the program are to help women and their families experience healthy birth outcomes, decrease substance use, and create positive connections between mothers and children, regardless of custody. The results of the program

evaluation demonstrated the cross-sectoral service collaborations and outcomes for service partners, as well as women and their families. Programs such as HerWay Home provide examples of relationship-based approaches to supporting this vulnerable population of pregnant and parenting women.

9. **Sadicario, J. S., Parlier-Ahmad, A. B., Brechbiel, J. K., Islam, L. Z., & Martin, C. E. (2021). Caring for women with substance use disorders through pregnancy and postpartum during the COVID-19 pandemic: Lessons learned from psychology trainees in an integrated OBGYN/substance use disorder outpatient treatment program. *Journal of Substance Abuse Treatment, 122*, 108200. doi: 10.1016/j.jsat.2020.108200**

This US study summarized the challenges and facilitators to substance use disorder treatment for pregnant and parenting women amidst the COVID-19 pandemic, with a specific focus on the deployment telepsychology services, which offer an integrated, trainee-based program utilizing multidisciplinary care. The shift from in-person services to telepsychology services provided opportunities for program improvement and implementation, while maintaining some of the elements that made the program unique. The results of this study highlight the importance of integrated and continued services for pregnant and parenting women with substance use challenges during COVID-19 and demonstrate opportunities for virtually meeting women's needs.

10. **Salameh, T. N., & Hall, L. A. (2020) Depression, anxiety, and substance use disorders and treatment receipt among pregnant women in the United States: A systematic review of trend and population-based studies.**

This systematic review identified potential long term population trends on depression, anxiety, and substance use disorders and treatment among pregnant women in the United States. Two studies showed that illicit drug use disorders increased in pregnant women over the past decade, particularly opioid and cannabis use disorders. Three studies reported an increase in treatment admissions for these disorders; however, the overall treatment admission rate for pregnant women remained relatively low at 4%. Three studies identified an increase in antidepressant use in pregnant women. Nine studies revealed that white ethnicity, older reproductive age, college education, and health insurance coverage were associated with mental health and substance use treatment receipt among pregnant women. There is a critical need for innovative preventative interventions, policies and treatment programs for mental health and substance use treatment services for pregnant women. This includes addressing racial/ethnic care disparities, barriers to, and factors associated with treatment receipt among pregnant women.

11. **Salameh, T. N., Hall, L. A., Crawford, T. N., Staten, R. R., & Hall, M. T. (2020). Likelihood of mental health and substance use treatment receipt among pregnant women in the USA. *International Journal of Mental Health and Addiction*. doi:10.1007/s11469-020-00247-7**

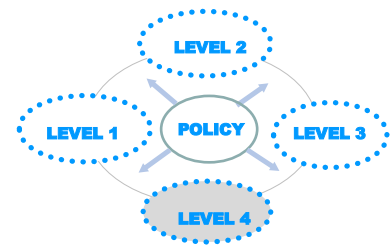
This US study explored predictors of mental health and substance use treatment receipt in pregnant women through secondary analysis of data from the 2008–2014 National Survey on Drug Use and Health. Two logistic regression models were run to identify predictors of mental health treatment receipt among pregnant women aged 18–44 years with mental health problems ( $n = 1106$ ) and predictors of substance use treatment among pregnant women with substance use disorders ( $n = 521$ ). Forty four percent of pregnant women with mental health problems received mental health treatment, and only 13% of pregnant women with substance use disorders received substance use treatment. Women with anxiety disorder (vs. no disorder) major depression (vs. no depression), higher level of serious psychological distress, college (vs. less than high school) education), and health insurance coverage (vs. no coverage) had higher odds of mental health treatment receipt. African American and Hispanic women had lower odds for mental health treatment relative to Whites. The best set of predictors of substance use treatment receipt included non-White (vs. White ethnicity), large (vs. small urban) residency, alcohol and illicit drug use disorders (vs. no disorder), and comorbid anxiety/depression disorder (vs. no disorder). The common barriers reported by pregnant women who had unmet need for mental health treatment included perceived cost, opposition to treatment, and stigma, regardless of their disorder. The researchers conclude that the majority of pregnant women with mental health/substance use disorders do not receive treatment, and that policy and treatment initiatives that address barriers to and predictors of treatment receipt are needed to help this vulnerable population of pregnant women to gain access to treatment.

12. Salameh, T. N., Hall, L. A., Crawford, T. N., Staten, R. R., & Hall, M. T. (2020). 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 & Gynaecology*, 41(4), 298-307. doi:10.1080/0167482x.2019.1689949

This US study compared trends in mental health and substance use disorders and treatment receipt by pregnant and nonpregnant women from 2008 to 2014. Using data from the 2008-2014 National Survey on Drug Use and Health, logistic regression was employed to compare trends in mental health and substance use disorders and treatment receipt for mental health and substance use disorders among matched groups of pregnant ( $n = 5,520$ ) and nonpregnant women ( $n = 11,040$ ). Past-year anxiety disorder, past-month psychological distress and illicit drug use disorders 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 researchers conclude that there is both a need for preventive strategies addressing anxiety disorder, psychological distress and illicit drug use among women of childbearing age, as well as need for initiatives to increase access to mental health treatment among pregnant women.

## E. Level 4 Prevention

1. Abatemarco, D. J., Gannon, M., Hand, D. J., Short, V. L., McLaughlin, K., Martin, D. (2020). The use of mindfulness dialogue for life in substance use disorder treatment in the time of COVID-19. *Journal of Substance Abuse Treatment*, 122, 108213. doi: 10.1016/j.jsat.2020.108213



This US commentary described the use of a mindfulness-based program (Mindfulness Dialogue for Life (MDfL)) to support staff in a substance use treatment program for pregnant and parenting women through the challenges of transitioning service delivery to online platforms during the COVID-19 pandemic. MDfL sessions were offered to the program team ( $n = 70$ ) to strengthen communication between staff and leadership, support one another, and brainstorm creative solutions to support clients and staff with pandemic challenges. Forty percent of all staff participated at least once, with an average of 13 participants in each session. Participant subjective reports of their experiences with MDfL and themes identified by researchers who observed MDfL sessions were connectedness to each other, fear for the safety of their patients and of contracting COVID-19, perceived loss of control caused by the pandemic, and self-discovery through mindfulness practices. Future directions include efforts to understand the efficacy of MDfL in encouraging uptake of mindfulness practices at home, improving substance use disorder treatment outcomes, reducing staff burnout, and assessing why some staff members declined to participate.

2. Baker, S., & Christian, M. (2020). An exploratory study to investigate alcohol consumption among breast-feeding mothers. *Public Health Nutrition*, 1-7. doi:10.1017/s1368980020001160

This UK study identified social factors associated with breastfeeding and continued alcohol consumption among mothers, employing secondary data analyses of information from a 2011 cross-sectional survey designed to capture infant dietary habits (Diet and Nutrition Survey of Infants and Young Children). Complete data from 2683 breastfeeding mothers were included, and further analyses were carried out on those who continued to drink alcohol ( $n = 227$ ). Several social factors were found to influence the likelihood of drinking alcohol while breastfeeding. Older mothers, mothers with partners who drank alcohol, those with higher educational attainment and household income, and those who consumed alcohol while pregnant were more likely to drink alcohol while breastfeeding. Mothers who breastfed infants older than 12 months were less likely to drink alcohol than those feeding infants aged 4-6 months. Given that social circumstances influence the likelihood of alcohol use among breastfeeding mothers, it is important to better understand mothers' contextual decision-making, and to consider offering information about options for reducing use and practicing harm reduction strategies, not only abstinence only messaging.

- 3. Damashek, A., Kothari, C., Berman, A., Chahin, S., Lutzker, J. R., Guastafarro, K., ... Self-Brown, S. (2020). Engagement in home visiting services during the transition from pregnancy to postpartum: A prospective mixed methods pilot study. *Journal of Child and Family Studies, 29*, 11 – 28.**

This US study used quantitative and qualitative methods to investigate factors related to maternal engagement with home visiting services during the transition from pregnancy to postpartum. Pregnant women ( $n = 39$ ) were followed up to 15 months postpartum. At three months postpartum, 33 of the original 39 women were interviewed. Engagement in services during this transition period was found to be influenced by the client-provider relationship. Mothers' perceptions of home visitors as reliable, culturally competent, trustworthy, supportive, personable, good communicators, knowledgeable, collaborative, and flexible were important for retention in services. These findings fill a gap in the literature by focusing on the transitional period from pregnancy to postpartum, and the authors point to important implications for home visitor training.

- 4. Ivers, J-H., Harris, A., McKeown, P., & Barry, J. (2020). Mothers experiences of the parenting under pressure program (PuP) in a residential therapeutic community: A qualitative study. *Journal of Psychoactive Drugs*. <https://doi.org/10.1080/02791072.2020.1856455>**

This Irish study provided the first evaluation of the Parenting Under Pressure (PuP) program in a residential setting. The PuP program aims to support parents who have/have had substance use dependencies within a case-management model by using psychological principles relating to parenting, child development, and parental emotion regulation. Among 23 women participating in qualitative interviews, guilt was a dominant theme. The primary expectation of participants was to improve their relationships and access to their children. The reported benefits of the PuP program to the women and their children were immediate and direct. As the women progressed through the program, they were visibly building confidence in their abilities to parent. Results show a positive response to, and need to develop, more integrated treatment responses to assist parents with substance use dependencies.

- 5. O'Malley, D., Chiang, D. F., Siedlik, E. A., Ragon, K., Dutcher, M., & Templeton, O. (2020). A promising approach in home visiting to support families affected by maternal substance use. *Maternal and Child Health Journal, 25*, 42 – 53.**

This US study described the implementation of the Team for Infants Exposed to Substance abuse (TIES) Program, a home-based, multidisciplinary model to support the complex needs of families with substance exposed pregnancies. Multi-year implementation of TIES indicated the efficacy of home-based programming. TIES focused on reducing maternal alcohol and other substance use, improving child and maternal health, family income and housing, and increasing positive parenting. The home visitation model was effective in building a relationship between families and home visitation specialists. The family-centered, trauma-informed, and culturally appropriate model resulted in high retention and completion rates for women with a history of substance use.

- 6. Ritland, L., Jongbloed, K., Mazzuca, A., Thomas, V., Richardson, C. G., Spittal, P. M., Guhn, M. (2020). Culturally safe, strengths-based parenting programs supporting Indigenous families impacted by substance use: A scoping review. *International Journal of Mental Health and Addiction, 18*, 1586 – 1610. doi: <https://doi.org/10.1007/s11469-020-00237-9>**

This scoping review examined available research from Australia, Canada, New Zealand, and the US on parenting programs for Indigenous families impacted by substance use. Despite limited literature on parenting interventions, the findings suggest that culturally safe and strengths-based programming has the potential to support wellness and parenting outcomes. Key considerations contributing to positive outcomes for Indigenous families were: 1) self-determination of families and communities, 2) connection to culture and values, 3) healing from historic and intergenerational trauma, 4) building trust through cultural safety, and 5) seeing pregnancy as a critical period to offer substance use services.

- 7. Rutman, D., Hubberstey, C., Poole, N., Schmidt, R. A., & Van Bibber, M. (2020) Multi-service prevention programs for pregnant and parenting women with substance use and multiple vulnerabilities: Program structure and clients' perspectives on wraparound programming. *BMC Pregnancy and Childbirth, 20*, 441.**

See above (Level 3).

## F. Other – stigma, ethnical issues, and systemic approaches

1. **Edwards, A., Kelsey, B., Pierce-Bulger, M., Rawlins, S., Ruhl, C., Ryan, S., & King, D. K. (2020). Applying ethical principles when discussing alcohol use during pregnancy. *Journal of Midwifery & Women's Health, 65*(6), 795 – 801. doi: <https://doi.org/10.1111/jmwh.13159>**

This article from US authors explored adverse health outcomes associated with alcohol use in pregnancy as well as the application of ethical principles into discussions of alcohol and client health with women of reproductive age. The incorporation of alcohol screening and brief intervention into primary care is recommended as a framework for ensuring all clients receive evidence-based and non-stigmatizing information about alcohol use in general and during pregnancy. Within this framework, the authors recommend screening and brief intervention as a framework for applying guiding principles of autonomy, beneficence, nonmaleficence, veracity, and justice. This approach should be used to support women in making informed decisions about their health in ways that are destigmatizing.

2. **Gonçalves Caires, T. L. & da Silva Santos, R. (2020). Malformation and death X alcoholism: Perspective of nursing the theory of transitions for alcoholic pregnant women. *Revista Brasileira de Enfermagem, 73*(1), doi: [10.1590/0034-7167-2018-0233](https://doi.org/10.1590/0034-7167-2018-0233).**

This qualitative study from Brazil explored women's knowledge of the harms of alcohol use in pregnancy. Women ( $n = 17$ ) receiving care at the Psychological Care Center for Alcohol and Drugs (CAPSad) were interviewed. While many women did not know about the fetal harms of alcohol use in pregnancy, some women who were aware of the harms of drinking during pregnancy also were aware of the linkages to physical malformations and raised concerns about diagnosis. Other women raised fears of fetal death among women who drank alcohol during pregnancy. Further information about the full range of harms that can result from alcohol use in pregnancy is required.

3. **Greenmyer, J. R., Popova, S., Klug, M. G., & Burd, L. (2020). Fetal Alcohol Spectrum Disorder: a systematic review of the cost of and savings from prevention in the United States and Canada. *Addiction, 115*(3), 409 – 417. doi: [10.1111/add.14841](https://doi.org/10.1111/add.14841)**

This systematic review investigated the costs and savings of FASD prevention efforts in the US and Canada and aimed to estimate the economic benefits of expanding existing prevention initiatives. Included articles on FASD prevention ( $n = 3$ ) found that targeted and evidence-based prevention programs delivered to women at the highest risk of having a child with FASD significantly reduced the costs of prevention. The authors found that a case of FASD could be prevented for \$20,000 to \$47,615 USD or an average of \$99,400 CAD, a substantially lower cost than the cost of care for a case of FASD. It is concluded that expanding risk-based primary prevention efforts for FASD would be economically efficient in the US and Canada.

4. **Hanson, J., Mohawk, C., Shrestha, U., Gross, M., O'Leary, M., Sarche, M. (2020). The importance of understanding social context in the reduction of AEP risk among native women. *Alcoholism: Clinical and Experimental Research, 44*(11), 2152-2157. <https://doi.org/10.1111/acer.14470>**

This commentary from the US aimed to identify important paths for addressing alcohol-exposed pregnancies (AEP) with Indigenous women that integrate the perspectives of the women and communities who participate in these interventions. The authors emphasize the importance of holistic AEP prevention programs to better account for the social contexts and integrate social support networks. Existing AEP prevention efforts do not integrate a multigenerational or community-wide component or address the efficacy of connectedness in reducing binge and risky drinking. Public health interventions should work with community partners to provide solutions that fully account for the contexts and root causes for alcohol use and further configure programs to include social networks.

5. **Heslehurst, N., Hayes, L., Jones, D., Newham, J., Olajide, J., McLeman, L., . . . Azevedo, L. (2020). The effectiveness of smoking cessation, alcohol reduction, diet and physical activity interventions in**

**changing behaviours during pregnancy: A systematic review of systematic reviews. *PLoS ONE*, 15(5), e0232774-e0232774. doi:10.1371/journal.pone.0232774**

This systematic review of systematic reviews conducted by researchers from the UK reported the effectiveness of interventions delivered during pregnancy on changing women's behaviour across multiple behavioural domains. The researchers searched 14 databases for systematic reviews published from 2008, reporting interventions delivered during pregnancy targeting smoking, alcohol, diet or physical activity as outcomes. They found 109 systematic reviews of behaviour change interventions delivered in pregnancy, and 36 of those systematic reviews reported behavioural outcomes. All 16 smoking reviews and all 4 alcohol reviews reported maternal behaviours as outcomes whereas only 16 out of 89 diet and/or physical activity reviews reported these behaviours. Most interventions were predominantly set in high-income countries. Overall, there was consistent evidence for improving healthy diet behaviours related to increasing fruit and vegetable consumption and decreasing carbohydrate intake, and fairly consistent evidence for increase in some measures of physical activity and for reductions in fat intake and smoking during pregnancy. There was a lack of consistent evidence across reviews reporting smoking cessation, abstinence or relapse or any alcohol behaviours. The authors note that the most consistent review evidence is for interventions improving dietary behaviours during pregnancy compared with other behaviours. Limited data are available for alcohol interventions in pregnancy or interventions in low- or middle-income-countries, and thus are priority areas for future research.

- 6. Martin, R., Bruxner, G., Ng, G., Brewster, C., & Kothari, A. (2020). Drowning our sorrows: Clinical and ethical considerations of termination in alcohol-affected pregnancy. *BMC Pregnancy and Childbirth*, 20(1), 356. doi: 10.1186/s12884-020-03012-9**

This debate-style article used two case studies encountered by clinicians in Australia to consider the ethical issues facing clinicians caring for pregnant women who consume alcohol. The authors identified the limitations in evidence that clinicians face such as: how there is neither a recognized safe level of alcohol consumption in pregnancy, nor an objective method to corroborate self-reported rates of alcohol consumption. They also note the existing conflict between the need to affirmatively meet the mother's needs and wishes, and the risk of ongoing harm to the fetus. To illuminate the ethical and moral challenges that clinicians face, two ethical tenets are discussed, including one where the consequences of the action take precedence, and where individual autonomy may need to be curbed for the collective good. As a conclusion the authors offer that practitioners should offer best supportive and qualitative evidence, provide non-judgmental, non-directional advice, and promote alcohol reduction and social support.

- 7. McCormack, C., & Monk, C. (2020). Considering prenatal alcohol exposure in a developmental origins of health and disease framework. *American Journal of Psychiatry*, 177(11), 1025-1028. doi: 10.1176/appi.ajp.2020.20091376**

This editorial from Australian authors discusses the findings of a study by Lees et al. of almost 10,000 adolescents with the goal of isolating the effects of prenatal alcohol exposure (PAE) by controlling statistically for other potentially confounding variables that could explain child outcomes. The findings showed maternal alcohol use was not associated with any child psychopathology, behavioural, or cognitive outcomes and instead that: parent psychopathology showed the strongest associations with child psychopathology; socioeconomic status with cognitive outcomes; and the proximal social environment (e.g., school quality and neighborhood safety) and social interactions (e.g., parenting) with impulsive behaviors. The editors who commented on the Lees et al. article concluded that PAE may more accurately be conceptualized as a risk factor—a necessary, but not sufficient, condition for fetal alcohol spectrum disorders. Viewing alcohol in this way recognizes alcohol as a teratogen yet allows consideration for the probabilistic nature of sequelae for offspring based in part on the many variables in the prenatal and postnatal environments, limiting blame placed on mothers and instead recognizing compromised child outcomes as, in part, manifestations of larger societal issues.

- 8. McQuire, C., Daniel, R., Hurt, L., Kemp, A., & Paranjthy, S. (2020). The causal web of foetal alcohol spectrum disorders: A review and causal diagram. *European Child & Adolescent Psychiatry*, 29(5), 575-594. doi:10.1007/s00787-018-1264-3**

The UK authors of this study conducted a systematic search and narrative synthesis of the evidence on the factors that influence a child's susceptibility to FASD following prenatal alcohol exposure and used this to create a causal diagram (directed acyclic graph; DAG) to describe the causal pathways to FASD. The diagram shows multifaceted and complex aetiology of FASD including a range of lifestyle, sociodemographic, maternal, social, gestational, and genetic factors. The authors conclude that the causal diagram can be used as a tool to inform data collection and statistical modelling strategies to minimise bias in future studies of FASD and that such causal knowledge (versus discussion of associations) is important for identifying effective mechanisms for prevention and intervention programmes.

9. Mello, S., Stifano, S., Tan, A. S., Sanders-Jackson, A., & Bigman, C. A. (2020). Gendered conceptions of preconception health: A thematic analysis of men's and women's beliefs about responsibility for preconception health behavior. *Journal of Health Communication, 25*(5), 374-384. doi:10.1080/10810730.2020.1775728

This US study explored society's gendered expectations of responsibility for engaging in recommended preconception health (PCH) behaviours (i.e., avoiding smoking, drinking, and environmental toxins) among a convenience sample of heterosexual adults with reproductive intentions. An applied thematic analysis of online survey responses from American men and women ( $n = 573$ ) identified themes related to following or challenging PCH behaviours. Both men and women frequently referenced biological connections between prospective parents and offspring as justification for PCH behaviors. When challenging PCH recommendations, respondents mentioned excessive control of women and men's secondary role in reproduction. Overall, gender stereotypes were more commonly expressed in relation to men yet reflected both traditional and contemporary male roles (i.e., as supporters, co-parents). When judging personal responsibility, women commonly viewed PCH behaviors as the 'duty of a good mother'. PCH communication strategies may need to take into account how women may support empowerment and choice for women collectively yet engage in traditional self-stereotyping when considering their own responsibilities as mothers. They also note the potential for PCH educators to challenge restrictive definitions of masculinity, foster equity in relationships, and promote views of men's dual roles as fathers and maternal helpers with responsibility for PCH.

10. Messina, M.P., D'Angelo, A., Battagliese, G., Coriale, G., Tarani, L., Pichini, S., ... & FASD Study Group. Fetal alcohol spectrum disorders awareness in health professionals: Implications for psychiatry. *Rivista di Psichiatria, 55*(20), 79 – 89. doi: 10.1708/3333.33022

This Italian study explored the knowledge of FASD and the attitudes and practice surrounding alcohol use in pregnancy from a sample of healthcare providers. An anonymous online questionnaire, including alcohol use screening tools such as the AUDIT-C, T-ACE, and Drinking Motive Questionnaire and knowledge, attitudes, and practice towards alcohol use during pregnancy, was sent to 400 healthcare professionals and students. Of 320 respondents, 96.3% were women. The AUDIT-C revealed that 52.4% of healthcare professionals were low-risk drinkers and 27.6% were hazardous drinkers. The majority (90.6%) of professionals never completed a course that described the impacts of alcohol use in pregnancy. However, most (91.3%) were willing to participate in professional development in order to learn more about the effects of alcohol use in pregnancy. Half (51.1%) of the healthcare professionals encourage zero alcohol in pregnancy, but only a small percentage (19.1%) discussed the harms of alcohol use in pregnancy. Further training to healthcare professionals is an important strategy in preventing alcohol use in pregnancy.

11. Oei, J. L. (2020). Alcohol use in pregnancy and its impact on the mother and child. *Addiction, 115*(11), 2148 – 2163. doi: 10.1111/add.15036.

This narrative review from an Australian author looked at how prenatal alcohol exposure impacts mother and child outcomes. It notes that there is now substantial evidence that alcohol-related harm can extend beyond the individual person, leading to epigenetic changes and intergenerational vulnerability and disadvantage. Emerging therapeutic options may mitigate the impacts of alcohol exposure, but significant knowledge gaps remain. The authors conclude that future research into the impact of therapeutic and preventative strategies with nutritional supplementation and environmental interventions show promise and urgent research is needed to determine the impact of low-level drinking on pregnancy and childhood outcomes.

- 12. Pedruzzi, J. A., Hamilton, O., Hodgson, H. H. A., Connor, E., Johnson, E., & Fitzpatrick, J. (2020). 'We do what we can as soon as we can' Alcohol and Other Drug workforce perspectives on preventing and responding to prenatal alcohol exposure. *Drugs: Education, Prevention and Policy*. doi:10.1080/09687637.2020.1843600**

This qualitative study from Australia explored the role of alcohol and other drug (AOD) services in preventing prenatal alcohol exposure (PAE), identifying barriers and facilitators to care, and highlighting gaps and opportunities to preventing PAE. Staff ( $n = 26$ ) from 18 service organizations involved in care coordination and referral, case management, or treatment and support for women at risk of PAE participated in interviews. Findings demonstrated the complexity of issues faced by women accessing AOD services; the need for treatment and intervention approaches that respond to that complexity; and the need to address gaps in existing service delivery.

- 13. Roberts, S. C. M., Mericle, A. A., Subbaraman, M. S., Thomas, S., Kerr, W., & Berglas, N. F. (2020). Variations by education status in relationships between alcohol/pregnancy policies and birth outcomes and prenatal care utilization: A legal epidemiology study. *Journal of Public Health Management and Practice, 26 Suppl 2, Advancing Legal Epidemiology, S71-s83*. doi:10.1097/phh.0000000000001069**

This US study investigated whether the effects of eight alcohol and pregnancy policies in the United States differed depending on education status, with a focus on low birth weight, preterm birth, prenatal care use, and alcohol use as outcomes. The impact of these policies varied by education status for both preterm birth and low birth weight, and prenatal care use. However, these policies generally did not vary for alcohol use. Overall, the examined policies had both adverse effects and beneficial effects for some groups of women. The results of this study identified that the impacts of alcohol and pregnancy policies vary by education status, with a general pattern of women with more education typically experiencing health harms, and women with less education experiencing less harms and, in some cases, health benefits. Policies that focus on reducing harms related to alcohol use during pregnancy are needed to further support pregnant women with diverse experiences and demographics. The authors note that the hypothesis, that health benefits of policies would be concentrated in women with more education, was not supported.

- 14. Roozen, S., Stutterheim, S. E., Bos, A. E. R., Kok, G., & Curfs, L. M. G. (2020). Understanding the Social Stigma of Fetal Alcohol Spectrum Disorders: From Theory to Interventions. *Foundations of Science*. doi:10.1007/s10699-020-09676-y**

This narrative review conducted by Dutch authors examined the research on stigma and FASD. Four types of stigma, which were interrelated, were identified: public stigma, self-stigma, stigma by association, and structural stigma. Public stigma (i.e., people's mental, emotional, and behavioural reactions to a person perceived as having a stigmatized condition) was identified as the most common form of stigma. However, less was known about other areas of stigma, including FASD-related self-stigma (i.e., the social and psychological impact of having a stigma), stigma by association (i.e., extending to people associated with individuals with FASD or women who consume alcohol during pregnancy), and structural stigma (i.e., stigma that is reflected, legitimized, and propagated by institutions and ideologies). The results of this study demonstrate the pervasive stigma experienced by individuals with FASD, their parents and caregivers, and pregnant women, and highlight the need for approaches that work towards stigma reduction.



## 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
<b>Prevalence of, and influences and factors associated with, drinking in pregnancy</b>					
<i>n = 37</i>	Addila et al.	Alcohol consumption and its associated factors among pregnant women in Sub-Saharan Africa: A systematic review and meta-analysis <sup>1</sup> as given in the submission system.	Systematic review & meta-analysis	Ethiopia	4
	Alameh et al.	Caffeine, alcohol, khat, and tobacco use during pregnancy in Butajira, South Central Ethiopia.	Cross-sectional	Ethiopia	4
	Arfer et al.	South African mothers' immediate and 5-year retrospective reports of drinking alcohol during pregnancy.	Cross-sectional	South Africa	4
	Bhengu et al.	The role of adverse childhood experiences on perinatal substance use behaviour in KwaZulu-Natal Province, South Africa.	Cross-sectional	South Africa	4
	Bianchini et al.	Prevalence of alcohol and tobacco use and perceptions regarding prenatal care among pregnant Brazilian women, 2017 to 2018: A mixed-methods study.	Mixed-methods	Brazil	5
	Bitew et al.	Consumption of alcohol and binge drinking among pregnant women in Addis Ababa, Ethiopia: Prevalence and determinant factors.	Cross-sectional	Ethiopia	5
	Burd	Drinking at the end of pregnancy: Why don't we see it?	Editorial	US	5
	Currie et al.	Maternal adverse childhood experiences are associated with binge drinking during pregnancy in a dose-dependent pattern: Findings from the All Our Families cohort.	Cohort	Canada	5
	Denny et al.	Trends in alcohol use among pregnant women in the U.S., 2011–2018.	Cross-sectional	US	6
	Gibson et al.	Influences on drinking choices among Indigenous and non-Indigenous pregnant women in Australia: A qualitative study.	Qualitative	Australia	6
	Greenmyer et al.	High prevalence of prenatal alcohol exposure detected by breathalyzer in the Republic of the Congo, Africa.	Cohort	Republic of the Congo	6
	Haas et al.	Profile of reported alcohol, tobacco, and recreational drug use in nulliparous women.	Cohort	US	6
	Hernandez et al.	Alcohol use and problems among Latinas at risk of an alcohol-exposed pregnancy: The role of acculturation and interpersonal factors.	Randomized controlled trial	US	7
	Howlett et al.	Assessing the prevalence of alcohol consumption in early pregnancy using blood biomarker analysis: a consistent pattern across north-east England?	Cross-sectional	UK	7
	Hyer et al.	Self-reported alcohol, tobacco, and marijuana use in pregnant women with depressive symptomatology.	Secondary analysis	US	7
Imaz et al.	Substance use during pregnancy and personality dimensions.	Cross-sectional	Spain	7	

Ishitsuka et al.	Determinants of alcohol consumption in women before and after awareness of conception.	Cross-sectional	Japan	8
Janssen & Parslow	Pregnancy persistently reduces alcohol purchases: Causal evidence from scanner data.	Cross-sectional	US	8
Leszko et al.	Are personality traits associated with smoking and alcohol use prior to and during pregnancy?	Cross-sectional	US	8
May et al.	Fetal Alcohol Spectrum Disorders in a Midwestern city: Child characteristics, maternal risk traits, and prevalence.	Mixed-methods	US	8
May et al.	Fetal Alcohol Spectrum Disorders in a Rocky Mountain Region City: Child characteristics, maternal risk traits, and prevalence.	Mixed-methods	US	9
May et al.	Fetal Alcohol Spectrum Disorders in a Southeastern County of the United States: Child characteristics and maternal risk traits.	Mixed-methods	US	9
May et al.	The prevalence, child characteristics, and maternal risk factors for the continuum of fetal alcohol spectrum disorders: A sixth population-based study in the same South African community.	Cross-sectional	South Africa	9
McDonald & Watson	Maternal alcohol intakes before and during pregnancy: Impact on the mother and infant outcome to 18 months.	Cohort	New Zealand	10
Moraes Castro et al.	Marijuana, tobacco, alcohol and cocaine use during pregnancy in 2013 and 2016. A self-report study in Montevideo, Uruguay.	Cross-sectional	Uruguay	10
Ortega-García et al.	My partner and my neighbourhood: The built environment and social networks' impact on alcohol consumption during early pregnancy.	Cohort	Spain	10
Popova et al.	Profile of mothers of children with Fetal Alcohol Spectrum Disorder: A population-based study in Canada.	Cross-sectional	Canada	10
Racine et al.	Maternal substance use in pregnancy: Differential prediction by childhood adversity subtypes.	Cohort	Canada	11
Ramos et al.	Maternal consistency in recalling prenatal experiences at 6 months and 8 years postnatal.	Cohort	US	11
Symons et al.	A reduction in reported alcohol use in pregnancy in Australian Aboriginal communities: A prevention campaign showing promise.	Cross-sectional	Australia	11
Tebeka et al.	Changes in alcohol use and heavy episodic drinking in U.S. women of childbearing-age and peripartum between 2001–2002 and 2012–2013.	Cross-sectional	US	11
Tesfaye et al.	The prevalence and associated factors of alcohol use among pregnant women attending antenatal care at public hospitals Addis Ababa, Ethiopia, 2019.	Cross-sectional	Ethiopia	12
Thompson et al.	Cognitions and behaviors related to risk for alcohol-exposed pregnancies among young adult women.	Cross-sectional	US	12

	Tung et al.	Alcohol use trajectories before and after pregnancy among adolescent and young adult mothers.	Cohort	US	12
	Umer et al.	Prevalence of alcohol use in late pregnancy.	Cross-sectional	US	12
	Ye et al.	Prenatal drinking in the Northern Plains: Differences between American Indian and Caucasian mothers.	Cross-sectional	US	13
	Young-Wolff et al.	Trends and correlates of self-reported alcohol and nicotine use among women before and during pregnancy, 2009–2017.	Cohort	US	13
<b>Level 1 Prevention</b>					
n = 3	Cook et al.	Change over time in Australian newspaper reporting of drinking during pregnancy: A content analysis (2000–2017).	Content analysis	Australia	13
	Smith et al.	Mandatory pregnancy health warning labels on alcohol: Listen to the experts not the industry.	Editorial	Australia	13
	Zhao et al.	The effects of alcohol warning labels on population alcohol consumption: An interrupted time series analysis of alcohol sales in Yukon, Canada.	Time series	Canada	14
<b>Level 2 Prevention</b>					
n = 33	Carey et al.	A brief clinic-based intervention to reduce alcohol misuse and sexual risk behavior in young women: Results from an exploratory clinical trial.	Clinical trial	US	14
	Chang	Maternal substance use: Consequences, identification and interventions.	Narrative review	US	14
	Charron et al.	"It's a very nuanced discussion with every woman": Health care providers' communication practices during contraceptive counseling for patients with substance use disorders.	Qualitative	US	14
	Doherty et al.	Barriers to the implementation of clinical guidelines for maternal alcohol consumption in antenatal services: A survey using the theoretical domains framework.	Cross-sectional	Australia	15
	Erng et al.	Prevention of alcohol-exposed pregnancies and fetal alcohol spectrum disorder among pregnant and postpartum women: A systematic review.	Systematic review	Australia	15
	Graves et al.	Guideline No. 405: Screening and counselling for alcohol consumption during pregnancy	Guideline	Canada	15
	Greenmyer et al.	Pregnancy status is associated with screening for alcohol and other substance use in the emergency department.	Cross-sectional	US	16
	Hanson et al.	Acceptability of an eHealth intervention to prevent alcohol-exposed pregnancy among American Indian/Alaska Native Teens.	Qualitative	US	16
	Hocking et al.	Women's experiences of messages relating to alcohol consumption, received during their first antenatal care visit: An interpretative phenomenological analysis.	Qualitative	Australia	16
	Howlett	An antenatal alcohol service evaluation of the north-east of England and north Cumbria.	Mixed-methods	UK	16

Ko et al.	Obstetrician-gynecologists' practices and attitudes on substance use screening during pregnancy.	Cross-sectional	US	17
Lemola et al.	Midwives' engagement in smoking- and alcohol-prevention in prenatal care before and after the introduction of practice guidelines in Switzerland: Comparison of survey findings from 2008 and 2018.	Before and after	Switzerland	17
Mendoza et al.	Health advice on alcohol consumption in pregnant women in Seville (Spain).	Cross-sectional	Spain	17
Murphy et al.	Preventive health counselling during antenatal care using the pregnancy risk assessment monitoring system (PRAMS) in Ireland.	Secondary analysis	Ireland	17
Odendaal et al.	Smoking and drinking habits of women in subsequent pregnancies after specific advice about the dangers of these exposures during pregnancy.	Cohort	South Africa	18
Olusanya	Alcohol messages disseminated to pregnant women by midwives.	Cross-sectional	US	18
Olusanya & Barry	Dissemination of prenatal drinking guidelines: A preliminary study examining personal alcohol use among midwives in a southwestern us state.	Cross-sectional	US	18
Oni et al.	Barriers and facilitators in antenatal settings to screening and referral of pregnant women who use alcohol or other drugs: A qualitative study of midwives' experience.	Qualitative	Australia	18
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	19
Reid et al.	Outcomes and needs of health and education professionals following Fetal Alcohol Spectrum Disorder-specific training.	Cross-sectional	Australia	19
Shah et al.	Racial/ethnic differences in prenatal and postnatal counseling about maternal and infant health-promoting practices among teen mothers.	Cross-sectional	US	19
Stevens et al.	Multiple tools are needed for the detection of prenatal alcohol exposure: Findings from a community antenatal setting.	Cohort	New Zealand	19
Sword et al.	Screening and intervention practices for alcohol use by pregnant women and women of childbearing age: Results of a Canadian survey.	Cross-sectional	Canada	20
Symons et al.	A reduction in reported alcohol use in pregnancy in Australian Aboriginal communities: A prevention campaign showing promise.	Cross-sectional	Australia	20
Toquinto et al.	Pregnant women's acceptability of alcohol, tobacco, and drug use screening and willingness to disclose use in prenatal care.	Cross-sectional	US	20
Trocin et al.	Prenatal practice staff perceptions of three substance use screening tools for pregnant women.	Qualitative	US	20

	Ujhelyi Gomez et al.	Are psychosocial interventions effective in reducing alcohol consumption during pregnancy and motherhood? A systematic review and meta-analysis.	Systematic review & meta-analysis	UK	21
	Weile et al.	Identification of alcohol risk drinking behaviour in pregnancy using a web-based questionnaire: Large-scale implementation in antenatal care.	Cross-sectional	Denmark	21
	Wise et al.	Changes in behavior with increasing pregnancy attempt time: A prospective cohort study.	Cohort	Canada & US	21
	Wright et al.	Perinatal e-screening and clinical decision support: The Maternity Case-finding Help Assessment Tool (MatCHAT).	Cohort	New Zealand	21
	Yonkers et al.	Abstinence outcomes among women in reproductive health centers administered clinician or electronic brief interventions.	Randomized controlled trial	US	22
	Young-Wolff et al.	Correlates of pregnant women's participation in a substance use assessment and counseling intervention integrated into prenatal care.	Cross-sectional	US	22
	Zinsser et al.	Changing behaviour in pregnant women: A scoping review.	Scoping review	Canada & Germany	22
<b>Level 3 Prevention</b>					
<i>n</i> = 12	Catherine et al.	Nurse home visiting and prenatal substance use in a socioeconomically disadvantaged population in British Columbia: Analysis of prenatal secondary outcomes in an ongoing randomized controlled trial.	Randomized controlled trial	Canada	22
	Erng et al.	Prevention of alcohol-exposed pregnancies and Fetal Alcohol Spectrum Disorder among pregnant and postpartum women: A systematic review.	Systematic review	Australia	23
	Hennelly et al.	The feasibility of 'Mind the Bump': A mindfulness based maternal behaviour change intervention.	Exploratory	UK	23
	Jones et al.	Collaborative working in health and social care: Lessons learned from post-hoc preliminary findings of a young families' pregnancy to age 2 project in South Wales, United Kingdom.	Mixed-methods	UK	23
	Meier & Edginton	The prenatal maternal representations of mothers at risk of recurrent care proceedings in the Family Drug and Alcohol Court: A thematic analysis.	Qualitative	UK	23
	Nagpal et al.	Physical activity may be an adjuvant treatment option for substance use disorders during pregnancy: A scoping review.	Scoping review	Canada	24
	Rutman et al.	Cross-sectoral collaboration working with perinatal women who use substances: Outcomes and lessons from HerWay Home.	Mixed-methods	Canada	24
	Rutman et al.	Multi-service prevention programs for pregnant and parenting women with substance use and multiple vulnerabilities: Program structure and clients' perspectives on wraparound programming.	Mixed-methods	Canada	24

	Sadicario et al.	Caring for women with substance use disorders through pregnancy and postpartum during the covid-19 pandemic: Lessons learned from psychology trainees in an integrated obgyn/substance use disorder outpatient treatment program.	Descriptive	US	24
	Salameh & Hall	Depression, anxiety, and substance use disorders and treatment receipt among pregnant women in the united states: A systematic review of trend and population-based studies.	Systematic review	US	25
	Salameh et al.	Likelihood of mental health and substance use treatment receipt among pregnant women in the USA.	Secondary analysis	US	25
	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.	Secondary analysis	US	25
<b>Level 4 Prevention</b>					
<i>n = 7</i>	Abatemarco et al.	The use of mindfulness dialogue for life in substance use disorder treatment in the time of COVID-19	Descriptive	US	26
	Baker & Christian	An exploratory study to investigate alcohol consumption among breast-feeding mothers.	Secondary analysis	UK	26
	Damashek et al.	Engagement in home visiting services during the transition from pregnancy to postpartum: A prospective mixed methods pilot study.	Mixed-methods	US	26
	Ivers et al.	Mothers experiences of the Parenting under Pressure program (PuP) in a residential therapeutic community: A qualitative study.	Qualitative	Ireland	27
	O'Malley et al.	A promising approach in home visiting to support families affected by maternal substance use.	Implementation study	US	27
	Ritland et al.	Culturally safe, strengths-based parenting programs supporting indigenous families impacted by substance use—A scoping review.	Scoping review	Canada	27
	Rutman et al.	Multi-service prevention programs for pregnant and parenting women with substance use and multiple vulnerabilities: Program structure and clients' perspectives on wraparound programming.	Mixed-methods	Canada	27
<b>Systemic, destigmatizing and ethical considerations</b>					
<i>n = 14</i>	Edwards et al.	Applying ethical principles when discussing alcohol use during pregnancy.	Innovation from the field	US	27
	Gonçalves Caires & Santos	Malformation and death x alcoholism: perspective of Nursing the Theory of Transitions for alcoholic pregnant women.	Qualitative	Brazil	28
	Greenmyer et al.	Fetal Alcohol Spectrum Disorder: A systematic review of the cost of and savings from prevention in the United States and Canada.	Systematic review	Canada & US	28
	Hanson et al.	The importance of understanding social context in the reduction of AEP risk among Native Women.	Commentary	US	28
	Heslehurst et al.	The effectiveness of smoking cessation, alcohol reduction, diet and physical activity	Systematic review	Canada	28

	interventions in changing behaviours during pregnancy: A systematic review of systematic reviews.			
Martin et al.	Drowning our sorrows: Clinical and ethical considerations of termination in alcohol-affected pregnancy.	Debate	Australia	29
McCormack & Monk	Considering prenatal alcohol exposure in a developmental origins of health and disease framework.	Editorial	US	29
McQuire et al.	The causal web of Foetal Alcohol Spectrum Disorders: A review and causal diagram.	Narrative synthesis	UK	29
Mello et al.	Gendered conceptions of preconception health: A thematic analysis of men's and women's beliefs about responsibility for preconception health behavior.	Qualitative	US	29
Messina et al.	Fetal alcohol spectrum disorders awareness in health professionals: Implications for psychiatry.	Cross-sectional	Italy	30
Oei	Alcohol use in pregnancy and its impact on the mother and child.	Narrative review	Australia	30
Pedruzzi et al.	'We do what we can as soon as we can' Alcohol and Other Drug workforce perspectives on preventing and responding to prenatal alcohol exposure	Qualitative	Australia	30
Roberts et al.	Variations by education status in relationships between alcohol/pregnancy policies and birth outcomes and prenatal care utilization: A legal epidemiology study.	Cross-sectional	US	30
Roizen et al.	Understanding the social stigma of fetal alcohol spectrum disorders: From theory to interventions	Literature search	The Netherlands	31

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