

## *CanFASD Issue Paper: Cannabis Use During Pregnancy*

*Kelly D. Harding, PhD and Nancy Poole, PhD  
Canada Fetal Alcohol Spectrum Disorder Research Network*

### **ISSUE:**

In 2018, the Canadian government plans to introduce the Cannabis Act controlling the production, distribution, sale, and possession of cannabis in Canada.<sup>1</sup> The proposed legislation would allow adults to legally possess and use cannabis. With the upcoming legalization, attention has been drawn to the potential effects of cannabis use in a number of domains, including the effects of cannabis use during pregnancy.<sup>2,3</sup>

It is important to note that the legal use of cannabis does not necessarily make it safe. Unlike alcohol, the implications of cannabis use during pregnancy are not adequately researched or interpreted. The serious potential lifelong effects of alcohol exposure in pregnancy are known, yet a safe level of use cannot be established. With cannabis, neither the potential effects nor a safe level of use in pregnancy are known. Thus, it is recommended that similar public health messaging be used: that it is *safest not to use alcohol or cannabis in pregnancy*.

### **BACKGROUND:**

**Prevalence of use** - According to the Canadian Tobacco, Alcohol, and Drugs Survey (CTADS), 10.6% of women in Canada reported past year cannabis use in 2015,<sup>4</sup> and likely is under-reported due to the current illicit status. In one study exploring the outcomes of prenatal cannabis and alcohol exposure on academic achievement, Goldschmidt et al.<sup>5</sup> reported on the frequency of concurrent cannabis and alcohol use during pregnancy. In their study, 14% of women reported heavy use of cannabis (i.e., one or more joints per day) during the first trimester of pregnancy, compared to 5.3% and 5.0% respectively during the second and third trimesters of pregnancy. Comparatively, 18.8% of women reported drinking heavily (i.e., one or more drink per day) during the first trimester, with 2.7% and 3.6% respectively reporting drinking heavily during the second and third trimesters. Consequently, teasing out the complexities of the impacts of cannabis use and alcohol use during pregnancy can be complicated. While it is well understood that alcohol is a teratogen that can permanently affect fetal development, it is not clear if cannabis use during pregnancy will be associated with short or long-term physical, cognitive, behavioural, and/or developmental impairments.

**General effects of use** - While current evidence remains limited, the short- and long-term effects of cannabis on the brain have been explored. Potential effects for all people, including pregnant women can include confusion, sleepiness, impairment (e.g., concentration, memory, judgment, and reaction time), and anxiety, fear, or panic. These effects can affect planning and preparing for a baby by pregnant women, and can also interfere with early attachment between mother and child, along with many other aspects of parenting.

**Polysubstance use** - In Canada, alcohol is the most widely consumed psychoactive drug, and is also the most extensively accessible and promoted.<sup>6</sup> While drugs, such as alcohol, cannabis, tobacco, cocaine, and opioids, are often discussed in isolation, they are rarely used alone, and polysubstance use increases the potential risks of harm and impacts long-term health. For example, when combined, alcohol and cannabis can intensify motor control problems, as a result of alcohol increasing cannabis metabolites in the bloodstream.<sup>6</sup>

## RESEARCH EVIDENCE ON THE SHORT-TERM AND LONG-TERM EFFECTS OF CANNABIS USE IN PREGNANCY:

Research on cannabis use during pregnancy demonstrates some potential negative outcomes associated with heavy use, defined as one or more joints per day.<sup>7</sup> These outcomes include possible effects on conceiving, effects on pregnancy, and effects on the fetus. The existing body of literature also indicates potential adverse effects on breastfeeding and has significant implications for parenting.<sup>8,9</sup>

**Effects on pregnancy** - Most of the existing data on cannabis use during pregnancy reflects cannabis administered by smoking, and not cannabis exposure through other routes of administration. As with tobacco, any form of smoking can disrupt the supply of oxygen and nutrients to the fetus, which *may* result in limitations of fetal growth (e.g., total length, head size, body weight), and *may* lead to outcomes such as premature birth, miscarriage, and stillbirth.<sup>7, 10-12</sup>

The current evidence is limited by an overabundant reliance on self-report to determine cannabis exposure, the presence of confounding variables (i.e., polysubstance use, socioeconomic status, and potency of the cannabis), the dosage and timing of exposure in pregnancy, and the small samples of women who use cannabis prenatally.

For a thorough review of good to fair quality evidence, including systematic reviews, regarding cannabis use during pregnancy from the beginning of pregnancy through the infant's first month of life, please refer to chapter ten in *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research* (National Academies of Sciences, Engineering, and Medicine, 2017).<sup>13</sup>

**Effects on children** - It has been suggested that maternal cannabis use during pregnancy has subtle effects on children's neurocognitive functioning (see Porath-Waller<sup>14</sup> for a review and developmental infographic). These effects include: deficits in memory, verbal, and perceptual skills; impaired performance in oral and quantitative reasoning and short-term memory; and impaired executive functioning, as well as shortfalls in reading, spelling, and academic achievement. These effects tend to be subtle and are limited by certain age groups.<sup>12</sup> Behaviourally, children born to women who have used cannabis prenatally, especially those who are using in heavy amounts, have been suggested to be more hyperactive, inattentive, and impulsive.<sup>15,16</sup> However, by adolescence, some of these impairments in attention appear to lessen.<sup>17</sup> Additionally, there is some evidence indicating that prenatal cannabis exposure may contribute to an earlier initiation and frequency of subsequent substance use.<sup>18-20</sup>

Evidence on the long-term effects of cannabis use during pregnancy largely comes from three prospective, longitudinal cohort studies that evaluated the outcomes of cannabis use during pregnancy on child development and behaviour, including: the Ottawa Prenatal Prospective Study (OPPS),<sup>21</sup> the Maternal Health Practices and Child Development (MHPCD) Study,<sup>15</sup> and the Generation R Study.<sup>7</sup>

Nevertheless, the results of these studies should be interpreted, and considered, with caution. The available research findings on cannabis use during pregnancy are limited by a number of factors. The existing research demonstrates an association between cannabis use during pregnancy and later life outcomes, but does not indicate causality; confounding factors including polysubstance use, and social and economic factors, may influence these outcomes. In addition, significant effects in these studies were largely associated with heavy, prolonged cannabis use and consequently it is unclear, to what extent, individuals may be impacted by smaller doses of cannabis prenatally.

## IN SUMMARY

The scientific evidence regarding cannabis use during pregnancy is mixed and insufficient.

- Currently, there is limited evidence of an association between maternal cannabis smoking and pregnancy complications for the mother.<sup>22-25</sup>
- There is mixed evidence demonstrating an association between maternal cannabis smoking and lower birth weight of the infant and sudden infant death syndrome.<sup>7,22,26,27</sup>
- There is also conflicting, and inadequate, evidence to support or disprove an association between maternal cannabis smoking and later outcomes, such as cognitive and academic achievement, and later substance use.

## RECOMMENDATIONS:

Based on the current scientific evidence, there is no known safe level of cannabis use for pregnant women. While more research is needed, both in quantity and quality, it is prudent to advise pregnant women and women of childbearing age of the potential long-term adverse developmental and behavioural effects associated with cannabis use during pregnancy. It is also important to warn women of the potential consequences of prenatal substance use in general, including a variety of exposures such as alcohol, tobacco, cannabis, opioids, and illicit drugs.

Until more is known about both the short- and long-term effects of cannabis use across the lifespan (e.g., effects on babies, children, adolescents, and adults), it is safest to avoid cannabis use while pregnant, while breastfeeding, and around children. Undoubtedly there is a critical need for further research addressing the potential long-term outcomes associated with prenatal cannabis exposure. Subsequently, this newfound information would help health care professionals best advise their patients about the potential impacts of cannabis use and would promote the health and well-being of patients and their children.

Developing clinical guidelines for health care professionals on discussing the health effects of cannabis for women and pregnant women will be imperative, and these conversations need to be linked to discussions on the effects of alcohol, tobacco, opioids, and other substances.

## REFERENCES:

1. Health Canada. (2016). *A framework for the legalization and regulation of cannabis in Canada: The final report of the task force on cannabis legalization and regulation*. Ottawa, ON: Her Majesty the Queen in Right of Canada. Retrieved from <http://healthycanadians.gc.ca/task-force-marijuana-groupe-etude/framework-cadre/alt/framework-cadre-eng.pdf>.
2. Best Start Resource Centre. (2017). *Risks of cannabis on fertility, pregnancy, and breastfeeding and parenting*. Toronto, ON: Health Nexus. Retrieved from [http://www.beststart.org/resources/alc\\_reduction/RisksOfCannabis\\_A30-E.pdf](http://www.beststart.org/resources/alc_reduction/RisksOfCannabis_A30-E.pdf).
3. Health Canada. (2017). *Health effects of cannabis*. Ottawa, ON: Her Majesty the Queen in Right of Canada. Retrieved from <https://www.canada.ca/content/dam/hc-sc/documents/services/campaigns/27-16-1808-Factsheet-Health-Effects-eng-web.pdf>.
4. Health Canada. (2017). Canadian Tobacco Alcohol and Drugs (CTADS): 2015 summary. Retrieved from <https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey/2015-summary.html>
5. Goldschmidt, L., Richardson, G. A., Cornelius, M. D., & Day, N. L. (2004). Prenatal marijuana and alcohol exposure and academic achievement at age 10. *Neurotoxicology and Teratology*, 26(4), 521-532. <https://doi.org/10.1016/j.nt.2004.04.003>
6. Public Health Agency of Canada. (2016). *The chief public health officer's report on the state of public health in Canada 2015: Alcohol consumption in Canada*. Ottawa, ON: Public Health Agency of Canada. Retrieved from <http://healthycanadians.gc.ca/publications/department-ministere/state-public-health-alcohol-2015-etat-sante-publique-alcool/alt/state-phac-alcohol-2015-etat-aspc-alcool-eng.pdf>.
7. El Marroun, H., Tiemeier, H., Steegers, E. A., Jaddoe, V. W., Hofman, A., Verhulst, F. C., . . . Huizink, A. C. (2009). Intrauterine cannabis exposure affects fetal growth trajectories: The Generation R Study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48(12), 1173-1181. doi: 10.1097/CHI.0b013e3181bfa8ee
8. Ordean, A. (2014). Marijuana exposure during lactation: Is it safe? *Pediatrics Research International Journal*, 2014, 1-6. doi: 10.5171/2014.369374
9. Mourh, J., & Rowe, H. (2017). Marijuana and breastfeeding: Applicability of the current literature to clinical practice. *Breastfeeding Medicine*, 12(10), 582-596. doi: 10.1089/bfm.2017.0020
10. Dekker, G. A., Lee, S. Y., North, R. S., McCowan, L. M., Simpson, N. A. B., & Roberts, C. T. (2012). Risk factors for preterm birth in an international prospective cohort of nulliparous women. *PLoS One*, 7(7). <https://doi.org/10.1371/journal.pone.0039154>
11. Metz, T. D., Allshouse, A. A., Hogue, C. J., Goldenberg, R. L., Dudley, D. J., Varner, M. W., . . . Silver, R. M. (2017). Maternal marijuana use, adverse pregnancy outcomes, and neonatal morbidity. *American Journal of Obstetrics & Gynecology*, 217(4), 478.e1-478.e8. doi: 10.1016/j.ajog.2017.05.050
12. Zhang, A., Marshall, R., Kelsberg, G., & Safranek, S. (2017). What effects – if any – does marijuana use during pregnancy have on the fetus or child? *The Journal of Family Practice*, 66(7), 462-464.
13. National Academies of Sciences, Engineering, and Medicine. (2017). Prenatal, perinatal, and neonatal exposure to cannabis. In *The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research*. Washington, DC: The National Academies Press.

March 2018

14. Porath-Waller, A. J. (2015). *Clearing the smoke on cannabis: Maternal cannabis use during pregnancy - an update*. Ottawa, ON: Canadian Centre on Substance Abuse. Retrieved from <http://www.ccsa.ca/Resource%20Library/CCSA-Cannabis-Maternal-Use-Pregnancy-Report-2015-en.pdf>.
15. Day, N. L., Leech, S. L., & Goldschmidt, L. (2011). The effects of prenatal marijuana exposure on delinquent behaviors are mediated by measures of neurocognitive functioning. *Neurotoxicology and Teratology*, 33(1), 129-136. doi: 10.1016/j.ntt.2010.07.006
16. Goldschmidt, L., Day, N. L., & Richardson, G. A. (2000). Effects of prenatal marijuana exposure on child behavior problems at age 10. *Neurotoxicology and Teratology*, 22(3), 325-336.
17. Fried, P. A., Watkinson, B., & Gray, R. (2003). Differential effects of cognitive functioning in 13- to 16-year-olds prenatally exposed to cigarettes and marijuana. *Neurotoxicology and Teratology*, 25(4), 427-436.
18. Day, N. L., Goldschmidt, L., & Thomas, C. A. (2006). Prenatal marijuana exposure contributes to the prediction of marijuana use at age 14. *Addiction*, 101(9), 1313-1322. doi: 10.1111/j.1360-0443.2006.01523.x
19. Porath, A. J., & Fried, P. A. (2005). Effects of prenatal cigarette and marijuana exposure on drug use among offspring. *Neurotoxicology and Teratology*, 27(2), 267-277.
20. Sonon, K. E., Richardson, G. A., Cornelius, J. R., Kim, K. H., & Day, N. L. (2015). Prenatal exposure predicts marijuana use in young adulthood. *Neurotoxicology and Teratology*, 47, 10-15. doi: 10.1016/j.ntt.2014.11.003
21. Fried, P. A. (1995). The Ottawa Prenatal Prospective Study (OPPS): Methodological issues and findings--it's easy to throw the baby out with the bath water. *Life Sciences*, 56(23-24).
22. Gunn, J. K. L., Rosales, C. B., Center, K. E., Nuñez, A., Gibson, S. J., Christ, C., & Ehiri, J. E. (2016). Prenatal exposure to cannabis and maternal and child health outcomes: A systematic review and meta-analysis. *BMJ Open*, 6(4), e009986. <http://dx.doi.org/10.1136/bmjopen-2015-009986>
23. Leemaqz, S. Y., Dekker, G. A., McCowan, L. M., Kenny, L. C., Myers, J. E., Simpson, N. A., . . . the SCOPE Consortium. (2016). Maternal marijuana use has independent effects on risk for spontaneous preterm birth but not other common late pregnancy complications. *Reproductive Toxicology*, 62, 77-86. doi: 10.1016/j.reprotox.2016.04.021
24. Varner, M. W., Silver, R. M., Rowland Hogue, C. J., Willinger, M., Parker, C. B., Thorsten, V. R., . . . the Eunice Kennedy Shriver National Institute of Child Health and Human Development Stillbirth Collaborative Research Network. (2014). Association between stillbirth and illicit drug use and smoking during pregnancy. *Obstetrics and Gynecology*, 123(1), 113-125. doi: 10.1097/AOG.0000000000000052
25. Warshak, C. R., Regan, J., Moore, B., Magner, K., Kritzer, S., & Van Hook, J. (2015). Association between marijuana use and adverse obstetrical and neonatal outcomes. *Journal of Perinatology*, 35(12), 991-995. doi: 10.1038/jp.2015.120
26. Fergusson, D. M., Horwood, L. J., Northstone, K., & the Avon Longitudinal Study of Pregnancy and Childhood Study Team. (2002). Maternal use of cannabis and pregnancy outcome. *British Journal of Obstetrics and Gynaecology*, 109(1), 21-27.
27. Conner S. N., Bedell, V., Lipsey, K., Macones, G. A., Cahill, A. G., & Tuuli, M. G. (2016). Maternal marijuana use and adverse neonatal outcomes: A systematic review and meta-analysis. *Obstetrics & Gynecology*, 128(4), 713-723. doi: 10.1097/AOG.0000000000001649.