

2023



Vaping During Pregnancy & Postpartum



centre of excellence
for women's health

IN THIS RESOURCE

Vaping nicotine during pregnancy and postpartum	1
Cannabis use and vaping during pregnancy and postpartum	6
Finding your support system to reduce or stop vaping	11
Tips and tools to managing use and reducing harm	13

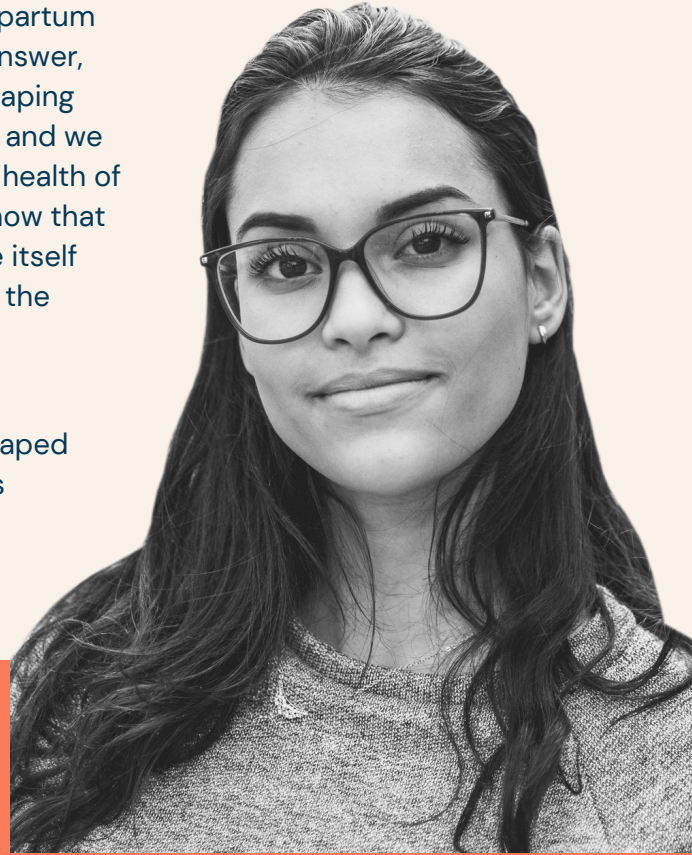
We interviewed 22 women (and surveyed 111) who vaped during pregnancy to ask what they were wondering about.

This resource offers responses to common questions we heard from women who vaped cannabis, nicotine, or both.

Vaping NICOTINE during pregnancy & postpartum

Women who vape nicotine during pregnancy and postpartum have a lot of questions. Many of these are difficult to answer, given the lack of long term research. The research on vaping nicotine during pregnancy and postpartum is evolving, and we still do not know with certainty how vaping affects the health of the woman, the fetus and infant. While most women know that smoking tobacco during pregnancy is harmful, nicotine itself has also been shown to be dangerous for the health of the woman, the fetus, and the infant.

Here are 8 common questions raised by women who vaped nicotine during pregnancy or postpartum with answers based on what we currently know.



I haven't heard about a lot of research on this topic. Does that mean there aren't many negative effects for me or the baby?

01.

Research on nicotine establishes that nicotine is dangerous for women, the fetus and the infant. But vaping research is still new, and a lot of different factors influence health effects. Here are some findings from recent studies:

- Potential effects for the fetus if you vape nicotine during pregnancy:
 - Risk of being small for gestational age (SGA) [1-3]
 - Self-regulation issues, such as how consolable your baby is after crying [4]
 - Issues with motor skills [4, 5]
 - Risk of low birth weight [2, 6]
 - Preterm birth [2]
- Potential effects on your health if you vape nicotine during pregnancy:
 - Addiction: many vapes contain very high levels of nicotine, and nicotine is an addictive substance [7].
 - Lung health: some research indicates your lungs may benefit switching from cigarettes to vaping nicotine in the short term [7, 8] and women we spoke to perceived benefits. However, animal studies reveal negative effects of vaping on lung immunity for both mother and offspring and may also alter lung structure in offspring [9, 10].
 - Heart disease and cancer: researchers are currently looking into the potential longer-term effects, especially risk for cancer and cardiovascular disease, with impacts still unknown [7].

What is better for me and the fetus during pregnancy: vaping, smoking cigarettes, or nicotine replacement therapy (NRT)?

02.

- Nicotine replacement therapy is safer than smoking cigarettes as it eliminates the thousands of chemicals in tobacco smoke.
- Vaping eliminates carbon dioxide and tar, but involves numerous additional agents, flavours, and chemicals that are produced by the vape device and inhaled [11]. We do not know the long-term health effects of this vapour.
- At the moment, vaping appears to be less harmful compared to smoking, but this only applies to those who [already smoke cigarettes](#) [12]. Some women vape nicotine in order to quit smoking. But, if you end up using both vapes and cigarettes this is worse. Dual use increases: the risk of the fetus being small for gestational age (SGA), fetal exposure to nicotine and other toxicants [13], and prolongs your addiction to nicotine.

In short, it is best to stop using nicotine while you are pregnant (and beyond). The risks you reduce by not smoking cigarettes are summarized in this sheet: [Pregnancy & Quitting Smoking](#). If you are trying to reduce or quit smoking during your pregnancy, talk with a trusted healthcare provider about NRT and other quit tools to take the first steps.

What is known about vaping nicotine as a tool to quit cigarettes?

03.

- There is a lot we don't yet know about the effectiveness of vaping nicotine as a quit strategy. For use during pregnancy, e-cigarettes are [recommended in the UK](#) after NRT has been tried [14], but not in Canada or the USA.
- Vapes contain nicotine in varying amounts (sometimes labels can be inaccurate) and nicotine is an addictive substance [7].
- Many women who vape(d) during pregnancy or postpartum have found vaping to be just as, or more difficult to quit, compared to smoking [15]. The ease of vaping, being able to vape inside without being observed, the hand-to-mouth motion and the addictive nature of nicotine, all ultimately contribute to making quitting vaping challenging.

We do not yet know if vaping is more effective as a quit tool than NRT. While some studies have found vaping to be more effective than NRT, research has found that both vaping and NRT resulted in low rates of long-term abstinence from cigarettes and both had similar rates of negative maternal and fetal health outcomes [16, 17]. Because vaping is so new, much more research is needed to better understand the comparison of vaping and NRT.

Does vaping have fewer chemicals compared to tobacco cigarettes?

04.

- Vapes may deliver fewer chemicals than tobacco cigarette smoke [7], and vapes eliminate the carbon dioxide and tar in tobacco cigarettes.
- The vapour is an aerosol that contains [thousands of ingredients that are potentially harmful or toxic](#).
- Flavours, added chemicals and ingredients, and the heating capacity of the device all influence the number of harms you are exposed to [18]. Choosing vaping devices with lower temperature settings can help, as higher temperatures produce more chemicals [19, 20].
- Animal studies often provide the first indications of impact on humans. Studies on the effects of vaping without nicotine show that:
 - Rats prenatally exposed to nicotine-free vapour were overweight, had inflammation, and the regulatory pathways in their brains were affected [21].
 - Adult mice who were prenatally exposed to nicotine-free vapour had higher markers of stress, inflammation, and fibrosis [22]. However, compared to tobacco cigarette smoke, vapes had better outcomes for offspring kidney health [22].

I've heard there are risks to abrupt smoking cessation during pregnancy which is why I vape. Is this true?

05.

No. Stopping or reducing your use of nicotine at any time during your pregnancy has immediate health benefits for you and your fetus or newborn.

- However, quitting can be difficult, both mentally and physically so there are lots of tips for quitting. Check out this [fact sheet on stress and smoking](#) (Canadian Mental Health Association) and this [webpage on managing withdrawal and triggers](#) (National Cancer Institute, USA).



I know a lot of people who vaped or smoked during pregnancy and their babies are fine. Are there long-term effects of vaping nicotine during pregnancy on the baby?

06.

- There are many factors that impact fetal, infant and child health, including nutrition, alcohol use, poverty, and trauma. However, we know there are long term effects of smoking cigarettes during pregnancy on child health, such as ADHD, behavioural issues and nicotine dependence among young adults [23, 24].
- Smoking tobacco and exposure to nicotine during pregnancy also increases the risk of respiratory infections, asthma, infantile colic, bone fractures, and childhood obesity [25]. There may also be an increased risk for heart issues from prenatal nicotine exposure [26].
- We do not yet know if vaping nicotine will have the same impacts. But the lack of a definite link to longer-term impacts does not mean there are none. It means we don't have enough research, or later health issues may not yet have been linked to vaping or smoking.
- Even if some babies and children appear unharmed, long-term impacts may yet emerge. And not all babies and children will show the same effects, due to other environmental factors.

In short, we don't yet know the long-term effects of vaping nicotine during pregnancy.

What if I vape cannabis and nicotine?

07.

- Prenatal exposure to using both nicotine and cannabis can result in a range of issues such as: higher risk of birth defects [27], small head circumference [27], preterm birth [28], small for gestational age [28], and long-term behaviour problems [29]. Female babies may be especially prone to emotional regulation issues from co-exposure [29, 30].
- Co-using cannabis and nicotine may make it more challenging to quit cannabis use during pregnancy [29, 31].
- Co-use of tobacco and cannabis can also affect the pregnancy. Co-use during the first trimester of pregnancy has been linked to compromised immune function for pregnant women [27]. Additionally, tobacco and cannabis use during pregnancy may negatively affect the placenta, leading to pregnancy complications [32].

Are there any issues with vaping nicotine postpartum or while breastfeeding?

08.

Yes. Nicotine crosses into breastmilk. And the vapour that you exhale contains many chemicals that can be unhealthy for your baby [33]. You can reduce harms by:

- Breastfeeding your baby several hours after vaping when nicotine levels in breast milk are lower [33]. After 90 minutes, nicotine levels drop by half [34].
- Washing your hands and changing your clothes after smoking or vaping and before touching your baby [35].
- Vaping outside or as far away from your baby as possible (and asking friends and family to do the same) and avoiding vaping in the car even when your baby is not present [34, 35].
- Choosing vaping devices with lower temperature settings can also help, as higher temperatures produce more chemicals [36].



Resources

- Taking Care: A Short Guide to Breastfeeding and Substance Use (Centre of Excellence for Women's Health) ([English](#)) ([French](#))
- A birth parent's guide: Ways to care for your baby who may have been exposed to substances during your pregnancy ([The Pregnancy HUB](#))
- Tobacco use during pregnancy ([CAMH: Pregnets](#))
- Atii! Reduce second-hand smoke ([Pauktuutit Inuit Women of Canada](#))
- Respecting Tobacco ([First Nations Health Authority](#))
- Pregnancy and Quitting Smoking ([QuitNow, BC Lung Foundation](#))
- 7 tips to lower your risk when using nicotine ([Nicotine Dependence Clinic](#))
- [Smoke Free Curious?](#)
- Couples and Smoking ([Centre of Excellence for Women's Health](#))

The long term impact of vaping on woman's and fetal and infant health is unknown. If you are vaping nicotine in order to quit smoking tobacco, a better option is to ask your health care provider about Nicotine Replacement Therapy (NRT) and whether it is right for you.

Disclaimer: The information here is not a substitute for direct medical advice from your health care provider.

CANNABIS use & vaping during pregnancy & postpartum

At the moment, we do not have clear and strong evidence on the effects of cannabis on health, during pregnancy or at any other time. Since legalization of cannabis in 2018 in Canada, research has accelerated in order to help us understand how cannabis affects all aspects of health, including cannabis use during pregnancy and postpartum.

We do know that vaping cannabis is likely safer than smoking cannabis (dried flower). But we don't know how cannabis affects women's health and fetal health during pregnancy, or what long term effects it has on pregnancy outcomes, infant and child health. And we don't yet know the long term effects of vaping as a way to ingest either cannabis or nicotine. In the meantime, while research evolves, it is safest not to use cannabis during pregnancy or postpartum.



Here are 6 questions raised by women who vaped cannabis during pregnancy or postpartum with answers from the research to date.

What are some of the effects on fetal health of using cannabis during pregnancy?

01.

There is emerging evidence that prenatal cannabis exposure has negative maternal and fetal health effects. However, we don't yet have a good understanding of the unique effects of THC and/or CBD on fetal outcomes. Here are some impacts:

- There is some evidence that cannabis use during pregnancy may be associated with a higher incidence of placental abruption [37], while other research has found small protective benefits of cannabis on preeclampsia and gestational diabetes [38].
- Adverse growth outcomes and birth complications may also result from cannabis use during pregnancy, although this link is less conclusive. For more information, the Canadian Centre for Substance Use and Addiction provides updates on the latest research related to prenatal cannabis exposure in the [Clearing the Smoke on Cannabis](#) series.
- Low birth weight is a risk associated with prenatal cannabis exposure [39–41]. This risk increases with heavier cannabis use [42, 43].
- Neurodevelopmental impacts on children exposed to cannabis in utero persist into adulthood [44].
- The specific health effects on fetal development of vaping cannabis during pregnancy are relatively unknown, even though vaping is reported as the second most common way of using cannabis during pregnancy [45]. However, vaping cannabis (and nicotine), while safer than smoking, carries the risks of lung injury and respiratory disease.

My understanding is that cannabis is 'natural' and therefore less harmful than other substances, is that true?

02.

- It is hard to compare the harms of various substances, as they have different effects on the body and brain. But there is a common belief that cannabis is safer because it is a natural plant from the earth.
- While cannabis (and tobacco) are plants, cannabis vapour (and tobacco smoke) contain many chemicals and by products that are not safe for you and your fetus or baby. The cannabis plant itself contains 400 chemicals [46] that are transmitted to the fetus [44].
- Cannabis vape cartridges contain oils extracted from dried flower, as well as flavourants, terpenes, solvents, pesticides, and heavy metals [47]. Similarly, although vaping eliminates carbon dioxide and tar from tobacco smoke, it introduces many chemicals, flavours, and ingredients such as propylene glycol, various metals, and carcinogens in the inhaled aerosol [48].
- The way you consume cannabis matters for harm reduction, and different ways cause a variety of health effects:
 - Inhaled cannabis (smoking, vaping) enters the lungs and passes through the bloodstream to the brain, and can therefore cause lung health and brain development issues [49].
 - It is safer to ingest or use topicals (creams). It can take longer to feel the effects when ingesting (in drinks or food), and therefore it can be easier to take too much, so it is important to 'start low, and go slow' [50, 51].
 - If vaping, it is recommended that you use cannabis flower (dried herb) instead of concentrates or e-liquids which have more added chemicals [18, 20].

I've heard that cannabis helps with morning sickness/nausea and helps increase appetite. Is this true?

03.

- Some women have reported using cannabis during pregnancy to help with nausea and vomiting [52, 53].
- However, the use of cannabis for treatment of nausea and vomiting during pregnancy is not recommended due to inconclusive results and lack of clinical trials, and because it is transmitted to the fetus [44]. Although some cannabis dispensaries may recommend using cannabis for morning sickness, and it is sometimes used to treat nausea in cancer patients, clinical trials are needed in order to assess the risks and benefits of using cannabis to treat pregnancy-related nausea.
- Many women have mild or short-term nausea during pregnancy, but 1-2% have Hyperemesis Gravidarum (HG) a severe form of vomiting and nausea which threatens both the health of the woman and the development of the fetus. There are case reports of pregnant women with extreme nausea being treated successfully with cannabis [54].
- Cannabis can also cause severe vomiting in a condition called [cannabinoid hyperemesis syndrome](#). This condition can affect any cannabis user but has substantially increased among women in recent years [55].

What if I use both cannabis and nicotine?

04.

- Using both cannabis and nicotine makes it more challenging to quit cannabis use during pregnancy [29, 31].
- The co-use of tobacco and cannabis during the first trimester of pregnancy has been linked to compromised immune function for pregnant women [27]. Tobacco and cannabis use during pregnancy may also negatively affect the placenta, leading to pregnancy complications [32].
- Prenatal exposure to both nicotine and cannabis may result in higher risk of birth defects [27], small head circumference [27], preterm birth [28], small for gestational age [28], and long-term behaviour problems [29]. Female babies may be especially prone to emotional regulation issues from co-exposure [29, 30].

Again, it is best not to use either cannabis or nicotine during pregnancy and postpartum due to both known and unknown impacts on women's and fetal or infant health.

I am using cannabis to help manage my mental health, to relax, and deal with the stresses of pregnancy. How can I balance my personal wellbeing while also keeping my fetus safe?

05.

- Your mental health matters a lot. However, it may be worth looking at other ways to maintain your mental health and well-being.
- It may be useful to consider grounding and mindfulness activities as an alternative to cannabis use to help with the stresses of pregnancy. Please see [Some alternatives to using cannabis to cope with stress](#) (Centre of Excellence for Women's Health) for some ideas.

Are there any issues with vaping cannabis postpartum or while breastfeeding?

06.

- Breastfeeding is recommended as the best option for feeding your baby. So it is hard to resolve this question as there are some health issues connected to cannabis use and breastfeeding.
- Cannabis is transmitted to the baby through breastmilk, and is metabolized by the baby, with elements appearing in their urine and feces [44]. There is not yet clear and consistent research on the impacts of breastfeeding and using cannabis.
- The effects of cannabis are dose-related which means that the impact will be different for a baby exposed to cannabis occasionally compared to a baby frequently exposed to a lot of cannabis [44].
- The vapour exhaled after vaping cannabis contains many chemicals and very little is known about the impact of these chemicals. However, second-hand cannabis smoke has been linked to sudden infant death syndrome [44].

Reducing Harms

If you do vape cannabis during pregnancy or postpartum there is a lot to consider, especially as the evidence is not yet fully developed on these questions. Here are some ideas for reducing harms.

During pregnancy:

- Use smaller amounts of cannabis, with a lower amount of THC, & avoid synthetic cannabis products (such as K2 or Spice)[19, 56].
- Use less frequently [44].
- Choosing vape devices with lower levels of THC [57].

Postpartum:

THC and CBD have been detected in breastmilk after inhaling cannabis, and THC has been detected in the breastmilk after taking edibles [58].

- Reduce cannabis use as the concentration of THC found in breastmilk is affected by frequency of use [59].
- Avoid breastfeeding within 1 hour after using cannabis, when the highest concentrations of THC have been detected [60, 61].
- Wash your hands and change your clothing after vaping, and before breastfeeding, as this can help reduce the effects of harmful chemicals in smoke or vapour [56].
- Vape outside or as far away from your baby as possible (and asking friends and family to do the same). Second hand cannabis smoke can be harmful to the infant [44] and we don't yet know the effects of second hand exposure to vapour.

Disclaimer: The information here is not a substitute for direct medical advice from your health care provider.

Resources

- Knowing your Limits with Cannabis: A practical guide to assessing your cannabis use (Canadian Centre on Substance Use and Addiction)
- Canada's lower-risk cannabis use guidelines (Government of Canada)
- Sex, Gender & Vaping (Centre of Excellence for Women's Health)
- Taking Care: A Short Guide to Breastfeeding and Substance Use (Centre of Excellence for Women's Health) (English) (French)
- The Ways Women Use Cannabis (Centre of Excellence for Women's Health)
- Some alternatives to using cannabis to cope with stress (Centre of Excellence for Women's Health)
- Is cannabis safe during preconception, pregnancy and breastfeeding? (Government of Canada)
- Frequently Asked Questions: Cannabis, Pregnancy and Breastfeeding (SOGC)
- Cannabis, pregnancy and breastfeeding infographic (SOGC)
- Evidence Brief: Health Effects of Cannabis Exposure in Pregnancy and Breastfeeding (Public Health Ontario)
- How to read a cannabis label (Get Sensible)
- Let's Talk about Ujarak: a Cannabis Harm Reduction Toolkit (Pauktuutit Inuit Women of Canada)



Vaping During Pregnancy & Postpartum

Finding your support system to reduce or stop vaping

It can be very difficult to quit, or cut back on vaping. People in our lives can not only influence our use, but they can support us when we are ready to practice new approaches at cutting back. Who is in your circle of support?

PARTNERS

While some partners can be supportive in reducing and quitting use, others can enable or stigmatize vaping or exercise coercive control over vaping. Sometimes partners engage in substance use together as a habit or ritual, in which case finding support may be more difficult, or take discussion and negotiation.

What are some new rituals you and your partner could engage in? What are some of the supports (practices, words) that they could do to help reduce your vaping in pregnancy and while breastfeeding?

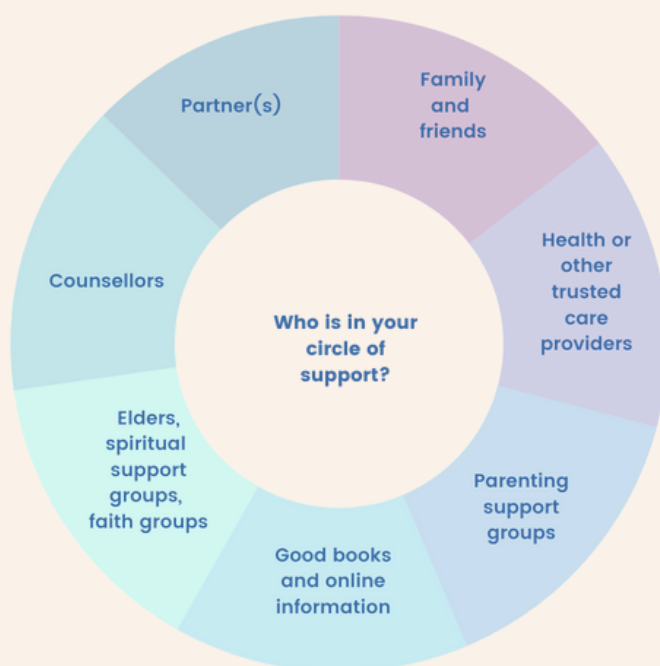


Image adapted from Centre of Excellence for Women's Health and the Sex, Gender & Cannabis Hub.

FRIENDS & SOCIAL SETTINGS

Social settings are often where we pick up vaping, restart, or increase use. This can sometimes be out of social anxiety, boredom, or stress. Friends can sometimes be judgemental when it comes to vaping which can contribute to these feelings. On the other hand, they also can be supportive and understanding, particularly if they have had similar experiences to you and know where you are coming from. Some online mom communities can be another source of support.

Are there certain social settings or friends that trigger cravings and use? Which settings/friends do you feel safest/most supported by? Are you connected to any social settings/groups/friends that are also looking to reduce or quit their use?



FAMILY

Family histories and dynamics can affect your vaping and other substance use. But some family members can be a source of loving support for reducing harms, and some may have had similar experiences to yours.

Are there certain family gatherings, family members, or dynamics that trigger cravings and vaping? Are there boundaries you think could be helpful to avoid these triggers? Have any of your family members reduced and stopped their use either currently or in the past, and may have helpful tips?

SERVICE PROVIDERS

Many of us have very different experiences with health and social service providers during pregnancy, depending on: personal compatibility, the type of provider you are working with (i.e., midwife, doctor, nurse, Indigenous Knowledge Keeper, social worker), and your personal experiences during pregnancy. If you have a provider who you trust and feel safe with, it can be helpful to discuss vaping with them.

Does your care provider(s) ask questions about your health, in addition to the health of the baby? Does your care provider make you feel judged, or do they create a welcoming environment where you feel able to ask them questions? Would you feel comfortable asking your care provider about vaping?

ELDERS/SPIRITUAL/COMMUNITY LEADERS:

Sometimes family, friends, partners, and service providers can feel too involved in your pregnancy for you to feel comfortable to share and open up about your vaping. [Elders](#) and community leaders can be another source of support to turn to when seeking support to reduce or quit vaping.

Are there leaders in your community you feel safe to turn to for guidance and support? Even if you don't want to discuss vaping directly, are there certain practices, tips, or routines they may be able to share that support a healthy pregnancy?

Vaping During Pregnancy & Postpartum

Tips and tools to managing use and reducing harm

What are some of the benefits and drawbacks you experience from vaping? Do you think any of the following ideas could be a helpful place to start trying to reduce harms and manage cravings?

Grounding and mindfulness activities

01.

- Taking a mindful moment or trying a grounding activity when you are feeling the urge to vape can help to allow the moment to pass without acting on it.
- [This sheet on grounding activities](#) offers some ideas.
- [Pregnancy and sleep](#)
- [Sleep support](#) through mindfulness
- [Some alternative to using cannabis to manage stress](#)

Social Support

02.

It can be helpful to identify who is in your [circle of support](#) and bring them into your efforts to quit or reduce vaping.

Counselling Resources

03.

- If you are vaping to manage mental health, physical health, or to support smoking cessation, finding a counsellor that you trust can be helpful and supportive.
- [Wellness Together Canada](#) for free mental health and substance use support.
- [Healing in Colour Directory](#) for therapists committed to anti-racist approaches.

Physical activity and healthy eating

04.

- [The Canada Food Guide](#) can be a great place to start.
- [Going for a walk or practicing yoga](#) can be great ways to get your body moving while also nurturing mental wellness.
- Exercise and Pregnancy Helpline: 1-866-937-7678

Reminders of the benefits of not vaping

05.

Creating a list of the benefits you experience when you don't vape can be helpful in reminding you of your goals.

Connecting to Indigenous culture

06.

Connecting to culture can support a sense of purpose and belonging, helping us turn to our communities for support rather than using substances to cope.

- Learn about [traditional midwifery](#) practices in Inuit communities
- Pauktuutit Inuit Women of Canada's [Cannabis Self-Assessment Tool](#)
- [Respecting Tobacco](#)

REFERENCES

1. Cardenas, V.M., et al., Dual use of cigarettes and electronic nicotine delivery systems during pregnancy and the risk of small for gestational age neonates. *Annals of Epidemiology*, 2020. 52: p. 86–92.e2.
2. Kim, S. and S.C. Oancea, Electronic cigarettes may not be a "safer alternative" of conventional cigarettes during pregnancy: evidence from the nationally representative PRAMS data. *BMC Pregnancy & Childbirth*, 2020. 20(1): p. N.PAG–N.PAG.
3. Cardenas, V.M., et al., Use of Electronic Nicotine Delivery Systems (ENDS) by pregnant women I: Risk of small-for-gestational-age birth. *Tobacco Induced Diseases*, 2019. 17: p. 44.
4. Froggatt, S., N. Reissland, and J. Covey, The effects of prenatal cigarette and e-cigarette exposure on infant neurobehaviour: A comparison to a control group. *EClinicalMedicine*, 2020. 28: p. 100602.
5. Sifat, A.E., et al., Prenatal electronic cigarette exposure decreases brain glucose utilization and worsens outcome in offspring hypoxic-ischemic brain injury. *Journal of Neurochemistry*, 2020. 153(1): p. 63–79.
6. Noel, A., et al., In utero exposures to electronic-cigarette aerosols impair the Wnt signaling during mouse lung development. *American Journal of Physiology – Lung Cellular & Molecular Physiology*, 2020. 318(4): p. L705–L722.
7. Klein, M.D., N.A. Sokol, and L.R. Stroud, Electronic Cigarettes: Common Questions and Answers. *American Family Physician*, 2019. 100(4): p. 227–235.
8. Cibella, F., et al., Lung function and respiratory symptoms in a randomized smoking cessation trial of electronic cigarettes. *Clin Sci (Lond)*, 2016. 130(21): p. 1929–37.
9. Chen, H., et al., Maternal E-Cigarette Exposure in Mice Alters DNA Methylation and Lung Cytokine Expression in Offspring. *American Journal of Respiratory Cell & Molecular Biology*, 2018. 58(3): p. 366–377.
10. Aslaner, D.M., et al., E-cigarette vapor exposure in utero causes long-term pulmonary effects in offspring. *Am J Physiol Lung Cell Mol Physiol*, 2022. 323(6): p. L676–L682.
11. Bhatt, J.M., M. Ramphul, and A. Bush, An update on controversies in e-cigarettes. *Paediatr Respir Rev*, 2020. 36: p. 75–86.
12. Shmerling, R.H. Can vaping damage your lungs? What we do (and don't) know. *Diseases & Conditions*, Harvard Health Publishing, 2022.
13. Clemens, M.M., et al., Use of electronic nicotine delivery systems by pregnant women II: Hair biomarkers for exposures to nicotine and tobacco-specific nitrosamines. *Tobacco Induced Diseases*, 2019. 17: p. 50.
14. Using e-cigarettes to stop smoking. *Quit Smoking*, National Health Service October 10, 2022 [cited 2023 April 12]; Available from: <https://www.nhs.uk/live-well/quit-smoking/using-e-cigarettes-to-stop-smoking/>.
15. Chiang, S.C., et al., E-cigarettes and smoking cessation: a prospective study of a national sample of pregnant smokers. *BMC Public Health*, 2019. 19(1): p. 964.
16. Hajek, P., et al., Electronic cigarettes versus nicotine patches for smoking cessation in pregnancy: a randomized controlled trial. *Nat Med*, 2022. 28(5): p. 958–964.
17. Hartmann-Boyce, J., et al., Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev*, 2021. 4(4): p. CD010216.
18. Centre of Excellence for Womens Health. Sex, Gender and Cannabis: Nicotine Vaping in Youth. 2019; Available from: <https://sexgendercannabishub.ca/wp-content/uploads/2021/03/Sex-Gender-and-Cannabis-Nicotine-Vaping-in-Youth.pdf>.
19. Nathoo, T., Stinson, J., Poole, N., & and L. Wolfson. Taking Care: A short guide to breastfeeding and substance use. 2021; Available from: https://sexgendercannabishub.ca/wp-content/uploads/2022/02/Taking-care-English_WEB.pdf.
20. Risks of Vaping. 2023, Health Canada. Available from: <https://www.canada.ca/en/health-canada/services/smoking-tobacco/vaping/risks.html>.
21. Chen, H., et al., Modulation of neural regulators of energy homeostasis, and of inflammation, in the pups of mice exposed to e-cigarettes. *Neuroscience Letters*, 2018. 684: p. 61–66.
22. Li, G., et al., Impact of maternal e-cigarette vapor exposure on renal health in the offspring. *Annals of the New York Academy of Sciences*, 2019. 1452(1): p. 65–77.
23. Cornelius, M.D., L. Goldschmidt, and N.L. Day, Prenatal cigarette smoking: Long-term effects on young adult behavior problems and smoking behavior. *Neurotoxicol Teratol*, 2012. 34(6): p. 554–9.

23. Cornelius, M.D., L. Goldschmidt, and N.L. Day, Prenatal cigarette smoking: Long-term effects on young adult behavior problems and smoking behavior. *Neurotoxicol Teratol*, 2012. 34(6): p. 554–9.
24. Cornelius, M.D., et al., Long-term effects of prenatal cigarette smoke exposure on behavior dysregulation among 14-year-old offspring of teenage mothers. *Matern Child Health J*, 2012. 16(3): p. 694–705.
25. Anonymous, Tobacco and Nicotine Cessation During Pregnancy: ACOG Committee Opinion Summary, Number 807. *Obstetrics & Gynecology*, 2020. 135(5): p. 1244–1246.
26. Watanabe, H. and N.S. Parikh, Maternal Use of Snus in Pregnancy and Early Childhood Blood Pressure: A Warning for e-Cigarettes? *Journal of the American Heart Association*, 2019. 8(21): p. e014416.
27. Ashford, K., et al., Associations of first trimester co-use of tobacco and Cannabis with prenatal immune response and psychosocial well-being. *Neurotoxicology and teratology*, 2019. 73: p. 42–48.
28. Nguyen, V.H.H., K. G., Prenatal Cannabis Use and Infant Birth Outcomes in the Pregnancy Risk Assessment Monitoring System. *The Journal of Pediatrics*, 2022. 240: p. 87–93.
29. De Genna, N.M., L.R. Stroud, and R.D. Eiden, Co-use of tobacco and marijuana during pregnancy: Impact on nervous system development. *Neurotoxicology & Teratology*, 2019. 74: p. 106807.
30. Wong, S.P.W., et al., Risk Factors and Birth Outcomes Associated with Teenage Pregnancy: A Canadian Sample. *Journal of pediatric & adolescent gynecology*, 2020. 33(2): p. 153–159.
31. Peters, E.N., A.J. Budney, and K.M. Carroll, Clinical correlates of co-occurring cannabis and tobacco use: a systematic review. *Addiction*, 2012. 107(8): p. 1404–17.
32. Cajachagua-Torres, K.N., Marrounb, H. E., Reissb, I. K. M., & Jaddoe, V. W. V, Maternal preconception and pregnancy tobacco and cannabis use in relation to placental developmental markers: A population-based study. *Reproductive Toxicology*, 2022. 110: p. 70–77.
33. Napierala, M., et al., Tobacco smoking and breastfeeding: Effect on the lactation process, breast milk composition and infant development. A critical review. *Environ Res*, 2016. 151: p. 321–338.
34. Smoking and Breastfeeding. [cited 2023 April 24]; Available from: <https://illi.org/breastfeeding-info/smoking-and-breastfeeding/>.
35. Breastfeeding: Tobacco and E-Cigarettes. *Breastfeeding and Special Circumstances* February 16, 2021 [cited 2023 April 24]; Available from: <https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/vaccinations-medications-drugs/tobacco-and-e-cigarettes.html#print>.
36. Public Health Agency of Canada. Ten Valuable Tips for Successful Breastfeeding. 2022; Available from: <https://www.canada.ca/en/public-health/services/health-promotion/childhood-adolescence/stages-childhood/infancy-birth-two-years/breastfeeding-infant-nutrition/valuable-tips-successful-breastfeeding.html>.
37. Rodriguez, C.E., et al., Marijuana use in young mothers and adverse pregnancy outcomes: a retrospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*, 2019. 126(12): p. 1491–1497.
38. Corsi, D.J., et al., Association Between Self-reported Prenatal Cannabis Use and Maternal, Perinatal, and Neonatal Outcomes. *JAMA*, 2019. 322(2): p. 145–152.
39. Joseph-Lemon, L.T., H.; Verostick, L.; Shizuka Oura, H.; Jolles, D. R., Outcomes of Cannabis Use During Pregnancy Within the American Association of Birth Centers Perinatal Data Registry 2007–2020: Opportunities Within Midwifery-Led Care. *Journal of Perinatal & Neonatal Nursing*, 2022. 36(3): p. 264–273.
40. Howard, D.S., et al., Cannabis Use Based on Urine Drug Screens in Pregnancy and Its Association With Infant Birth Weight. *J Addict Med*, 2019. 13(6): p. 436–441.
41. Campbell, E.E., et al., Socioeconomic Status and Adverse Birth Outcomes: A Population-Based Canadian Sample. *J Biosoc Sci*, 2018. 50(1): p. 102–113.
42. Grzeskowiak, L.E., et al., The deleterious effects of cannabis during pregnancy on neonatal outcomes. *Medical journal of Australia*, 2020. 212(11): p. 519–524.
43. Nguyen, V.H. and K.G. Harley, Prenatal Cannabis Use and Infant Birth Outcomes in the Pregnancy Risk Assessment Monitoring System. *J Pediatr*, 2022. 240: p. 87–93.
44. Badowski, S. and G. Smith, Cannabis use during pregnancy and postpartum. *Canadian Family Physician | Le Médecin de famille canadien* 2020. 66(2): p. 98–103.
45. Young-Wolff, K.C., et al., Routes of cannabis administration among females in the year before and during pregnancy: Results from a pilot project. *Addictive behaviors*, 2020. 100: p. 106125–106125.
46. Atakan, Z., Cannabis, a complex plant: different compounds and different effects on individuals. *Ther Adv Psychopharmacol*, 2012. 2(6): p. 241–54.

47. Guo, W., et al., Major Constituents of Cannabis Vape Oil Liquid, Vapor and Aerosol in California Vape Oil Cartridge Samples. *Front Chem*, 2021. 9: p. 694905.
48. What Is in E-cigarette Aerosol? Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults. Centers for Disease Control and Prevention November 10, 2022 [cited 2023 April 12]; Available from: https://www.cdc.gov/tobacco/basic_information/e-cigarettes/Quick-Facts-on-the-Risks-of-E-cigarettes-for-Kids-Teens-and-Young-Adults.html#:~:text=The%20e%2Dcigarette%20aerosol%20that,to%20a%20serious%20lung%20disease.
49. Canadian Centre on Substance Use and Addiction (CCSA). Knowing your limits with cannabis. 2022; Available from: <https://www.ccsa.ca/sites/default/files/2022-04/CCSA-Knowing-Your-Limits-with-Cannabis-Guide-2022-en.pdf>.
50. Centre of Excellence for Womens Health. The Ways Women Use Cannabis. 2022. Available from: <https://cewh.ca/wp-content/uploads/2022/12/The-Ways-Women-Use-Cannabis.pdf>
51. Cannabis: Lower your risks. 2019, Health Canada. Available from: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/resources/lower-your-risks.html>.
52. Young-Wolff, K.C., et al., Trends in marijuana use among pregnant women with and without nausea and vomiting in pregnancy, 2009–2016. *Drug & Alcohol Dependence*, 2019. 196: p. 66–70.
53. Young-Wolff, K.C., et al., Association of Nausea and Vomiting in Pregnancy With Prenatal Marijuana Use. *JAMA Internal Medicine*, 2018. 178(10): p. 1423–1424.
54. Koren, G. and R. Cohen, The use of cannabis for Hyperemesis Gravidarum (HG). *J Cannabis Res*, 2020. 2(1): p. 4.
55. Myran, D.T., et al., Changes in Emergency Department Visits for Cannabis Hyperemesis Syndrome Following Recreational Cannabis Legalization and Subsequent Commercialization in Ontario, Canada. *JAMA Network Open*, 2022. 5(9).
56. Public Health Sudbury & Districts. Cannabis: Preconception, pregnancy, and breastfeeding. N.D.; Available from: <https://www.phsd.ca/health-topics-programs/cannabis/cannabis-preconception-pregnancy-and-breastfeeding/>.
57. Cannabis Use During Pregnancy & Lactation: Practice Resource for Health Care Providers. 2020, Perinatal Services BC. Available from: <http://www.perinataleservicesbc.ca/Documents/Resources/HealthPromotion/cannabis-in-pregnancy-practice-resource.pdf>
58. Moss, M.J., et al., Cannabis use and measurement of cannabinoids in plasma and breast milk of breastfeeding mothers. *Pediatr Res*, 2021. 90(4): p. 861–868.
59. Graves, L., Cannabis and breastfeeding. *Paediatr Child Health*, 2020. 25(Suppl 1): p. S26–S28.
60. Ordean, A. and G. Kim, Cannabis Use During Lactation: Literature Review and Clinical Recommendations. *J Obstet Gynaecol Can*, 2020. 42(10): p. 1248–1253.
61. Drugs and Lactation Database (LactMed). National Library of Medicine (USA) 2022[cited 2023 April 12]; Available from: <https://www.ncbi.nlm.nih.gov/books/NBK501587/>

This resource was derived from the Cannabis and Nicotine Vaping in Pregnancy and Postpartum project where we surveyed and interviewed women, in part to guide the development of resources that reflect their experiences. We are very grateful to all of the women who helped contribute to this work.

Financial contribution provided by the Canadian Institutes for Health Research (CIHR).

Visit the Centre of Excellence for Women's Health website for more information: www.cewh.ca as well as our Sex, Gender & Cannabis hub: www.sexgendercannabishub.ca



The Centre of Excellence for Women's Health respectfully acknowledges the First Nations, Inuit, and Métis peoples as the first inhabitants and traditional custodians of the lands where we live, learn, and work.