

Cannabis & Human Milk

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Notes: this handout contains a brief overview of the topic but is not a full representation of the content. It is for personal and educational use only.

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Objectives

- Describe the history of cannabis in the US
- Explain the risk factors of cannabis use while breast/chestfeeding
- Use Trauma Informed, Participant Centered practices to explain recommendations for harm reduction if using cannabis use while breast/chestfeeding

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Cannabis: Genus of flowered plants indigenous to Central Asia and the Indian subcontinent.

Endocannabinoid system (ECS): A group of receptors that make up a very complex regulatory system throughout the brain, body, and central and peripheral nervous systems.

Cannabidiol: Also known as CBD, cannabidiol is one of over 120 molecules called cannabinoids found in the cannabis plant.

Tetrahydrocannabinol (THC): The most common cannabinoid found within the cannabis plant. THC accounts for most of the psychoactive effects.

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Sleep

Mood

Appetite

Memory

Reproduction

"The endocannabinoid system is the most pervasive, diffused and important modulatory system in the brain because it controls the release of pretty much every neurotransmitter"

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Endocannabinoids, endogenous cannabinoids, are molecules made by the body which interact with the ECS.

109 endocannabinoids have been identified so far. The primary endocannabinoids are **anandamide** and **2-archidonyl glycerol (2-AG)**.

There are two main endocannabinoid receptors:

- **CB1** - mostly found in the central nervous system
- **CB2** - mostly found in your peripheral nervous system, especially immune cells

NEURON

IMMUNE CELL

Image: Harvard Publishing

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ADME- THC

- **Absorption:** THC is in the bloodstream within minutes at concentrations of 10-30%. Pulmonary administration provides a quick route to well vascularized organs.
- **Distribution:** THC is highly lipophilic (it likes fatty tissue). Chronic use accumulates in adipose tissue and in all of the major organs, including the brain.
- **Metabolism:** Metabolized mainly in the liver, using many of the same hepatic enzymes which are used to metabolize common medications.
- **Elimination:** THC remains in the blood from as few as 6 minutes to 22 hours. Primary elimination occurs via the fecal and urinary route.

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Cannabis has been used for thousands of years for medicine. Cannabis pollen was found in large amounts in a grave dated to 2100 BCE along with an herb known to bring down fever.

Ancient Egyptians used cannabis and wrote about it as far back as 1700 BCE to treat glaucoma, hemorrhoids, and menstrual pain.

The Greeks used an infusion to treat ear pain and wounds. In Mesopotamia, it was used for depression. Cannabis has been cultivated in China for millennia for use as a fiber, food, and medicine.

Cannabis was a major component in religious practices in ancient India as well as in medicine for problems like insomnia, pain, and gastrointestinal disorders.

Indigenous American people have used cannabis to treat snakebites, as an analgesic, and a birth aid.

Image: The Herbal Center 07

History

- In the 1930s, the Federal Narcotics Bureau implemented stringent drug laws and unreasonably long prison sentences that gave rise to America's prison-industrial complex
- Led by Harry Anslinger, xenophobic, misogynistic, and openly racist, the Bureau waged a war on culture and sought to "restrain the Jazz culture"

Anslinger conflated drug use, race, and music.

"Reefer makes darkies think they're as good as white men. There are 100,000 total marijuana smokers in the U.S., and most are Negroes, Hispanics, Filipinos and entertainers. Their Satanic music, jazz and swing result from marijuana use. This marijuana causes white women to seek sexual relations with Negroes, entertainers and...others."

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Anslinger's efforts culminated in the passage of the **Marijuana Tax Act in 1937**, which effectively made cannabis illegal.



The **Boggs Act of 1951** which required mandatory sentencing and was followed by various state laws further criminalizing drug use built the prison industrial complex we know today.



Image: NYTimes 09

1911 - Prohibition

1973 - Decriminalization

1996 - Medicinal

2012 - Recreational

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Who uses cannabis during the perinatal period?

- People with severe nausea during pregnancy, compared with other pregnant women, are significantly more likely to use cannabis
- The top reasons people report using cannabis during pregnancy are depression, anxiety, stress, pain, nausea and vomiting
- Prevalence is over 4.9%, raising to 8.5% in the 18–25 year-old age range among pregnant people
- InfantRisk Center online survey:
 - 88% smoked, 48% vaped, and 36% took cannabis orally
 - Only 44% of parents took timing of use into consideration
 - 89% reported using cannabis for health related reasons.

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Cannabis and Lactation Research

- Studies prior to 2018 were flawed and biased
- Studies reflect cultural bias
- Research was lacking due to legal status and limitations on testing pregnant and lactating people
- With legalization for medicinal and recreational use, ethical and high-quality research opportunity has become an option

THCA → THC → Metabolites

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Organizational recommendations

- **Lactmed (National Institutes of Health)**
"Because breastfeeding can mitigate some of the effects of smoking and little evidence of serious infant harm has been seen, it appears preferable to encourage mothers who use cannabis to continue breastfeeding and reducing or abstaining from cannabis use while minimizing infant exposure to the smoke."
- **Academy of Breastfeeding Medicine**
"At this time, although the data are not strong enough to recommend not breastfeeding with any marijuana use, we urge caution."
- **American Academy of Pediatrics - The Transfer of Drugs and Therapeutics Into Human Breast Milk**
"Therefore, with the exception of radioactive compounds requiring temporary cessation of breastfeeding, the reader will be referred to LactMed to obtain the most current data on an individual medication."

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Harm Reduction Considerations

- THC concentrations in products are rising which increases risk, lowest possible dose
- Timing reduces risks
- Smoking anything around baby increases SIDS risks (other adults, too!)
- Cognizance: in addition to transfer into milk or remnants on parents' clothing, we should consider if parents are able to properly care for infants while intoxicated.
- Infant screening and consequences
- THC may inhibit gonadotrophin, prolactin, growth hormone, and thyroid stimulating hormone release
- Co-sleeping, bed sharing risks
- Parents who are shamed for using cannabis wean sooner, lack of human milk = risks

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Counseling

- Participant Centered Education (PCE) focuses on people's capacities, strengths and developmental needs – not solely on their problems, risks, or negative behaviors. Participant centered services **emphasize collaboration with the participant**, giving them the freedom to choose options that work for them.
- OARS
Open-ended questions. Affirmations. Reflections. Summaries.
- Principles of the PCE model:
Respect – includes respect for participant's time, culture & living circumstances
Empathy – key to understanding client's particular needs & key to successful interpersonal interaction
Individualize – tailoring information to the particular needs and goals of your client
Motivate – finding different strategies to encourage clients to engage in healthy activities

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Trauma Informed

A trauma informed approach often includes:

- **Safety** – ensuring the physical and emotional safety
- **Trustworthiness & transparency** – respectful and professional. Building relationships
- **Collaboration & mutuality** – choice, patients are provided clear messages about their power to make decisions
- **Empowerment & choice** – allow for validation and affirmation
- **Cultural, historical & gender issues** – culturally responsive, respects traditional cultures, addresses historical trauma

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Discussion Guide

Using non-judgmental approach:

- Ask about the frequency and amount of use
- Ask about cannabis helps them
- Ask who cares for the child when the parent is using cannabis
- Come up with harm reduction strategies which support the family
- Validate the parent's feelings *without* validating their choice of substance use
- Talk to parent about alternatives during breast/chestfeeding
- Offer services/counseling resources
- For daily users, discuss benefits of screening for developmental milestones

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Abbey, James. Infant Risk Center website: BF and Marijuana Thread. Accessed Feb 4, 2015. <https://www.infantrisk.com/forum/showthread.php?t=197-BF-and-marijuana>

Academy of Breastfeeding Medicine Protocol Committee. (2019). ABM Clinical protocol #21: Guidelines for breastfeeding and Substance Use Disorder. *Breastfeeding Medicine*, 10(3). DOI: 10.1089/bfm.2015.9992

American Academy of Pediatrics (2004). Legalization of marijuana: Potential impact on youth. *Pediatrics*, 113, 1825. Retrieved from <http://pediatrics.aappublications.org/content/113/4/1825.full.pdf.html>

Astley SJ, Little EE. Maternal marijuana use during lactation and infant development at one year. *Neurotoxicol Teratol* 1990;12(2):161-8.

Balley JR et al. Fetal disposition of Δ9-tetrahydrocannabinol (THC) during late pregnancy in the rhesus monkey. *Toxicology and Applied Pharmacology*. Volume 90, Issue 2, 15 September: 15-20. 1992.

Benjamin, Dianne 2019 "Did Native Americans Smoke Weed?" WikiLeaf

Berke et al. Prenatal Substance Abuse: Short- and Long-term Effects on the Exposed Fetus. AAP Technical Report, 2013. doi:10.1542/peds.2013.3931

Brooks, Elizabeth, et al. "The clinical implications of legalizing marijuana: are physician and non-physician providers prepared?." *Addictive behaviors* 72 (2017): 1-7.

Committee on Obstetric Practice. Committee opinion no. 722: marijuana use during pregnancy and lactation. *Obstet Gynecol*. 2017;130:e205-e209.

Cossu G, Ledent C, Fattore L, Imperato A, Bohme GA, Parnetti M et al. Cannabinoid CB1 receptor knockout mice fail to self-administer morphine but not other drugs of abuse. *Behav Brain Res* 2001; 118: 41-45.

Δ9-tetrahydrocannabinol (THC), 11-Hydroxy-THC, and 11-Nor-9-carboxy-THC. Plasma Pharmacokinetics during and after Continuous High-Dose Oral THC. *Clin. Chem.* 55: 2180-9. December 2009. doi:10.1373/clinchem.2008.121119. PMID: 19833841.

Disher, Melanie et al. Prenatal Marijuana Exposure and Neonatal Outcomes in Jamaica: An Ethnographic Study. *Pediatrics*. 1994; vol 93, No 2, pp. 254-260.

EMCDDA. European Drug Report 2015: Trends and Developments. JUNE, 2015. <http://www.emcdda.europa.eu/publications/edr/trends-developments/2015>

Fernandez-Ruiz, J et al. Cannabinoids and gene expression during brain development. *Neurotoxicity Research*. 2004; vol. 6, no. 5, pp. 389-401. 2004.

Fried PA, Makin JE. Neonatal behavioural correlates of prenatal exposure to marijuana, cigarettes and alcohol in a low risk population. *Neurotoxicol Teratol*. 1987;9(1):1-7.

Fride, E, J. Benqman, and T. C. Kirkham. Endocannabinoids and food intake: newborn sucking and appetite regulation in adulthood. *Experimental Biology and Medicine*. 2005; vol. 230, no. 4, pp. 225-234.

Fride, E, A. Foxo, E. Rosenberg, et al. Milk intake and survival in newborn cannabinoid CB1 receptor knockout mice: evidence for a "CB3" receptor. *European Journal of Pharmacology*. 2005; vol. 461, no. 1, pp. 29-34.

Fride, E. Multiple roles for the endocannabinoid system during the earliest stages of life: pre- and postnatal development. *Journal of Neuroendocrinology*. 2008; vol. 20, supplement 1, pp. 75-81. 2008.

Golvis-Ropetz I, et al. The endocannabinoid system and the regulation of neural development: potential implications in psychiatric disorders. *Eur. Arch. 2009; Psychiatry Clin. Neurosci.* 259(7), 371-382.

• 18

Gairry, A., Rigoud, V., Amirouche, A., Fauroux, V., Aubry, S., & Serreau, R. (2009). Cannabis and breastfeeding. *Journal of Toxicology*, Doi: 10.1155/2009/594149.

Geetha MA, Lesscher HB, van Ree JM. Drug dependence and the endogenous opioid system. *Eur Neuropsychopharmacol* 2003; 13: 424-434.

Ghosh, Tula, et al. "The public health framework of legalized marijuana in Colorado." *American journal of public health* 106.1 (2016): 21-27.

Chazand S, Mathes Simonin F, Kiehl K, Maldonado R. Motivational effects of cannabinoids are mediated by mu-opioid and kappa-opioid receptors. *J Neurosci* 2002; 22: 1146-1154.

Grispoon, Lester 2005 "History of Cannabis as a Medicine."

Globerstein M.F. Pharmacokinetics and pharmacodynamics of cannabinoids. *Clin Pharmacol* 2003; 42(4): 307-40.

Gunn, JKL, Rosales CB, Center KE, et al. Prenatal exposure to cannabis and maternal and child health outcomes: a systematic review and meta-analysis. *BMJ Open*. 2016;4(4):e009784.

Hakroy T, Kelmsoe E, Barstad K, Mulder J. Endocannabinoid functions controlling neuronal specification during brain development. *Mol. Cell Endocrinol*. 284(1-2 Suppl. 1): S84-S90 (2008).

Hale, TW. Infant Risk Center Website: marijuana and breastfeeding thread. Accessed Feb 4, 2015.

<https://www.infantrisk.com/forum/showthread.php?p=192>: marijuana and breastfeeding [http://marijuana

Hale, T. Medications and mothers' milk (2014). Amarillo, Texas: Hale Publishing, Hale, T., & Hartman, P. (2004). *Textbook of Human Lactation*. Amarillo, Texas: Hale Publishing.

Hasekawa, Ayo, et al. "The medicinal use of cannabis and cannabinoids—an international cross-sectional survey on administration forms." *Journal of psychoactive drugs* 45.3 (2013): 199-210.

High Times Website. The Strongest Strain on Earth 2016. Accessed 2/2017. <http://hightimes.com/strains/the-strongest-strains-on-earth-2016/>

Holland, Cynthia L., et al. "Anything above marijuana takes priority": Obstetric providers' attitudes and counseling strategies regarding perinatal marijuana use." *Patient education and counseling* 99.9 (2016): 1446-1451.

Holland, Julie. "The Pot Book: A Complete Guide to Cannabis"

Huestis, MA; Neuringer, EJ; Cone, EJ (1995). "Blood cannabinoids. II. Models for the prediction of time of marijuana exposure from plasma concentrations of delta 9-tetrahydrocannabinol (THC) and 11-nor-9-carboxy-delta 9-tetrahydrocannabinol (THCCOOH)." *Journal of analytical toxicology* 18 (5): 283-90. doi:10.1093/jat/18.5.283. PMID: 13382016.

Huestis MA. Human cannabinoid pharmacokinetics. *Chem Biodivers*. 2007 Aug; 4(8):1770-804. Review. PubMed PMID: 17712819

Hill ML, Reed K. Pregnancy, breast-feeding, and marijuana: A review article. *Obstet Gynecol Surv*. 2013;68(7):10-8. PMID: 25101905

Huestis, M et al. Blood Cannabinoids. I. Absorption of THC and Formation of 11-OH-THC and THCCOOH During and After Smoking Marijuana. *Journal of Analytical Toxicology*. 1995. Vol. 18. Pp. 275-285. <http://www.cannabis.org/health/education/abug/abug18huestis.html>

Izzo AA, Borrelli F, Capasso R, Di Marzo V, Mechoulam R. 2009 Non-psychoactive plant cannabinoids: new therapeutic opportunities from an ancient herb. *Trends Pharmacol Sci*.

Jacques, JC et al. Cannabis, the pregnant woman and her child: weeding out the myths. *Journal of Perinatology*. 2014; 34: 417-424. doi:10.1098/pg.2013.180

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Jakabek, David, et al. "An MRI study of white matter tract integrity in regular cannabis users: effects of cannabis use and age." *Psychopharmacology* 233.19-20 (2016): 3627-3637.

Jarviski, Marja, et al. "Public health messages about perinatal marijuana use in an evolving policy context." *Substance abuse* 38.1 (2017): 48-54.

Johnson JR, Jernison TA, Peal MA, Falls RL (1984). "Stability of delta 9-tetrahydrocannabinol (THC), 11-hydroxy-THC, and 11-nor-9-carboxy-THC in blood and plasma." *Journal of analytical toxicology* 8 (3): 202-4. doi:10.1093/jat/8.3.202. PMID: 6094914.

Julio-Aranda D, DiBella J, Marwan, et al. Neurobiological consequences of maternal cannabis on human fetal development and its neuropsychological outcome. *Eur Arch Psychiatry Clin Neurosci* 2009; 259:395-412.

Kenney, Sean et al. Cannabinoid receptors and their role in regulation of the serotonin transporter in human placenta. *American Journal of Obstetrics and Gynecology*. 1999; Vol 181(5): 491-497.

Konoff-Cohen H, Lam-Kruglick P. Maternal and paternal recreational drug use and sudden infant death syndrome. *Arch Pediatr Adolesc Med*. 2001; 155:765-70. PMID: 11434841

Kopog NK, Mechoulam R. Cannabinoids in health and disease. *Dialogues Clin Neurosci*. 2007;9(4):413-30. Review. PubMed PMID: 18286001

Kurtz, J., Markoff, J., McNall, B., & Shimahara, S. (2011). 14 legal marijuana states and DC. Retrieved from www.Procon.org Lopez-Quintero C, Pérez de los Cobos J, Haan DS, et al. Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Drug Alcohol Depend*. 2011; 115:120-30. Manun, H, et al. Intrauterine Cannabis Exposure Affects Fetal Growth Trajectories: The Generation R Study. *J. Am. Acad. Child Adolesc. Psychiatry*. 2009; 48:12.

Marche E, Escuder D, Palles CR et al. Simultaneous analysis of frequently used licit and illicit psychoactive drugs in breast milk by liquid chromatography tandem mass spectrometry. *J Pharm Biomed Anal*. 2011. PMID: 21330091

Mechoulam R. 2005 Part cannabinoids: a neglected pharmacological treasure trove. *Br J Pharmacol*.

Moore DO, Turner JD, Parroti AC et al. Outing pregnancy, recreational drug-using women stop taking ecstasy (3,4-methylenedioxymethylamphetamines) and reduce alcohol consumption, but continue to smoke tobacco and cannabis: initial findings from the Development and Infancy Study. *J Psychopharmacol*. 2010; 24(9): 1403-1410.

National Academies of Sciences, Engineering, and Medicine. 2017. The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research. Washington, DC: The National Academies Press. doi: 10.17226/24425.

National Institute on Drug Abuse. NIDA Website DrugFacts: Marijuana. Accessed Feb 4, 2015. <http://www.drugabuse.gov/publications/drugfacts/marijuana>

Novotne, Francisco et al. 2020. "Cannabis Use in Pregnant and Breastfeeding Women: Behavioral and Neurobiological Consequences (Part I)." *Psychiatry*

Nesto, Richard and Ken Mackie. Endocannabinoid system and its implications for obesity and cardiometabolic risk. *European Heart Journal Supplements*. 2008; 10 (Supplement B): S34-S41. doi:10.1093/eurheartj/ehn102

Perez-Raya M, Weil MJ. Presence of delta-9-tetrahydrocannabinol in human milk [letter]. *N Engl J Med* 1982; 307(13):819-20.

Robber, Jeffrey C., Sytae Elinga, and Charles Kaplan. "Understanding data: contamination concerns of cannabis concentrates and cannabinoid transfer during the act of dabbing." *The Journal of toxicology: clinical sciences* 40.6 (2015): 797-803.

• 20

Ranganathan M, Bradley G, Pittman B, et al. The effects of cannabinoids on serum cortisol and prolactin in humans. *Psychopharmacology (Berl)*. 2009;203(4):737-744.

Richardson GA, Ryan C, Willford J, Day NE, Goldschmidt L. Prenatal alcohol and marijuana exposure: effects on neuropsychological outcomes at 10 years. *Neurotoxicol Teratol*. 2002;24(3):309-320.

Rigucci, s et al. Effect of high-potency cannabis on corpus callosum microstructure. *Psychological Medicine*. Cambridge University Press. 2015. doi:10.1017/S0033291715002462

Rosenberg, PatrickW, Hurdiele, Marijuana use and maternal experiences of severe nausea during pregnancy in Hawai'i. *Hawaii J Med Public Health*. 2014;73(9):283-287.

Ronayne, James Patrick, Anthony Heard, and James William Arlison. "Clearing the air: discrepant policy and practice concerning neonatal cannabinoid exposure." *World Journal of Pediatrics* 13.1 (2017): 5-7.

Rowe, Hilary et al. Maternal Medication, Drug Use, and Breastfeeding. *Pediatr Clin N Am*. 2013; 60: 275-294 <http://dx.doi.org/10.1016/j.pcl.2012.10.009>

Russo E, B. (2014). Clinical Endocannabinoid Deficiency Reconsidered: Current Research Supports the Theory in Migraine, Fibromyalgia, Irritable Bowel, and Other Treatment-Resistant Syndromes. *Cannabis and Cannabinoid Research*, 1(1), 154-165. <https://doi.org/10.1089/can.2014.0006>

Russo, E. Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects. *British Journal of Pharmacology*. 2011; Volume 163, Issue 7, pages 1344-1364. DOI: 10.1111/j.1476-5381.2011.01238.x

Schueler W, Burkman LJ, Lippes J, et al. Neurosteroid and sex hormones in human reproductive fluids. *Chem Phys Lipids*. 2002;121:211-27. PMID: 12505702

Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2013 National Survey on Drug Use and Health: Summary of National Findings. NSDUH Series H-48, HHS Publication No. (BNA) 14-4863. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2014.

Stanton, Kara R. et al. 2020. "Management of Cannabis Use in Breastfeeding Women: The Untapped Potential of International Board-Certified Lactation Consultants' Breastfeeding Medicine"

Sullivan, Nicholas, Sytae Elinga, and Jeffrey C. Robber. "Determination of pesticide residues in cannabis smoke." *Journal of toxicology* 2013 (2013).

Tennes K, Arivable N, Blackard C, et al. Marijuana: prenatal and postnatal exposure in the human. *NIDA Res Monogr* 1985; 59:48-60.

Tarfaletti G, Monts CV, Alpar A, et al. Miswiring the brain: Δ9-tetrahydrocannabinol disrupts cortical development by inducing an SCG10/β-catenin-2 degradation pathway. *EMBO J* 2014; 33:668-85.

U.S. Department of Health and Human Services. The Surgeon General's Call to Action to Support Breastfeeding. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General; 2011.

• 21

Vaiverde O, Noble F, Besio F, Dauge V, Fournie-Zaluskı MC, Roques BP, Delfaz9. tetrahydrocannabinol releases and facilitates the effects of endogenous enkephalins: reduction in morphine withdrawal syndrome without change in rewarding effect. *Eur J Neurosci* 2001; 13: 1816-1824.

Varela-Nallar, L et al. Wnt1 signaling in the regulation of adult hippocampal neurogenesis. *Frontiers in Cellular Neuroscience*, 26 June 2013 | doi: 10.3389/fncel.2013.00102.

Volkow, Nora et al. Adverse Health Effects of Marijuana Use. *The New England Journal of Medicine*. 2014; 370:2219-27. DOI: 10.1056/NEJvnl402209

Volkow ND, Compton WM, Wargo EM. The Risks of Marijuana Use During Pregnancy. *JAMA*. 2017;317(2):129-130. doi:10.1001/jama.2016.18612

Wang X, Dow-Edwards D, Anderson V, Miskolczi H, Hurd TL. In utero marijuana exposure associated with abnormal amygdala dopamine D(2) gene expression in the human fetus. *Biol Psychiatry* 2004. 56: 909-915.

Wang et al. Discrete opioid gene expression impairment in the human fetal brain associated with maternal marijuana use. *The Pharmacogenomics Journal*. (2008) 8: 255-264.

Wei, Binjian, et al. "Sensitive Quantification of Cannabinoids in Milk by Alkaline Saponification-Solid Phase Extraction Combined with Isotope Dilution UPLC-MS/MS." *ACS Omega* 1.4 (2016): 1307-1313.

Western Australian Centre for Evidence-Based Nursing & Midwifery. BREASTFEEDING GUIDELINES FOR SUBSTANCE USING MOTHERS. Webpage. Written January 2007. Accessed 2/1/2015. https://purnkum.files.wordpress.com/2013/05/infant_feeding_guideline.pdf

Wong et al. SOGC Clinical Practice Guideline: Substance Use in Pregnancy. *J Obstet Gynaecol Can* 2011;33(4):367-384.

Wu, Chao-Shan et al. Lasting impacts of prenatal cannabis exposure and the role of endogenous cannabinoids in the developing brain. *Future Neurol*. 2011; 6(4) pp 459- 480.