



COMMITTEE OPINION

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Committee on Obstetric Practice

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Marijuana Use During Pregnancy and Lactation

ABSTRACT: *Cannabis sativa* (marijuana) is the illicit drug most commonly used during pregnancy. The self-reported prevalence of marijuana use during pregnancy ranges from 2% to 5% in most studies. A growing number of states are legalizing marijuana for medicinal or recreational purposes, and its use by pregnant women could increase even further as a result. Because of concerns regarding impaired neurodevelopment, as well as maternal and fetal exposure to the adverse effects of smoking, women who are pregnant or contemplating pregnancy should be encouraged to discontinue marijuana use. Obstetrician–gynecologists should be discouraged from prescribing or suggesting the use of marijuana for medicinal purposes during preconception, pregnancy, and lactation. Pregnant women or women contemplating pregnancy should be encouraged to discontinue use of marijuana for medicinal purposes in favor of an alternative therapy for which there are better pregnancy-specific safety data. There are insufficient data to evaluate the effects of marijuana use on infants during lactation and breastfeeding, and in the absence of such data, marijuana use is discouraged.

Recommendations

The American College of Obstetricians and Gynecologists recommends the following:

- Before pregnancy and in early pregnancy, all women should be asked about their use of tobacco, alcohol, and other drugs, including marijuana and other medications used for nonmedical reasons.
- Women reporting marijuana use should be counseled about concerns regarding potential adverse health consequences of continued use during pregnancy.
- Women who are pregnant or contemplating pregnancy should be encouraged to discontinue marijuana use.
- Pregnant women or women contemplating pregnancy should be encouraged to discontinue use of marijuana for medicinal purposes in favor of an alternative therapy for which there are better pregnancy-specific safety data.
- There are insufficient data to evaluate the effects of marijuana use on infants during lactation and breastfeeding, and in the absence of such data, marijuana use is discouraged.

Introduction

Cannabis sativa (marijuana) is the illicit drug most commonly used during pregnancy. The self-reported prevalence of marijuana use during pregnancy ranges from 2% to 5% in most studies but increases to 15–28% among young, urban, socioeconomically disadvantaged women (1–5). Higher rates of use are found when querying women at the time of delivery rather than at prenatal visits because some users may not seek prenatal care (5). Notably, 48–60% of marijuana users continue use during pregnancy, with many women believing that it is relatively safe to use during pregnancy and less expensive than tobacco (3, 4, 6). A growing number of states are legalizing marijuana for medicinal or recreational purposes, and its use by pregnant women could increase even further as a result.

The medicinal and psychoactive properties of marijuana are mediated by compounds called cannabinoids, which are absorbed from the lungs when smoked or from the gastrointestinal tract when ingested. Tetrahydrocannabinol (THC) is a small and highly lipophilic molecule that is distributed rapidly to the brain and fat. Metabolized by the liver, the half-life of THC varies from 20–36 hours in occasional users to 4–5 days in



heavy users and may require up to 30 days for complete excretion. In animal models, THC crossed the placenta, producing fetal plasma levels that were approximately 10% of maternal levels after acute exposure. Significantly higher fetal concentrations were observed after repetitive exposures (7). Limited human data suggest that THC also appears in breast milk (8).

It is difficult to be certain about the specific effects of marijuana on pregnancy and the developing fetus, in part because those who use it often use other drugs as well, including tobacco, alcohol, or illicit drugs, and in part because of other potential confounding exposures. Marijuana smoke contains many of the same respiratory disease-causing and carcinogenic toxins as tobacco smoke, often in concentrations several times greater than in tobacco smoke (9). Adverse socioeconomic conditions, such as poverty and malnutrition, may contribute to outcomes otherwise attributed to marijuana. For example, one population-based study reported that pregnant marijuana users were more often underweight and had lower levels of education, had a lower household income, and were less likely to use folic acid supplementation than nonusers (2). Another study found that marijuana-exposed women are more likely to experience intimate partner violence, an additional risk factor for adverse pregnancy outcomes (10). Studies evaluating marijuana use during pregnancy often account for these confounders using data stratification or multivariate analysis. Studies of marijuana exposure during pregnancy are potentially subject to reporting and recall bias, often relying on self-reported habits, including frequency, timing, and amount of marijuana use. Additional confounding issues may arise from marijuana potency that has, in general, increased with time (11).

Effects of Marijuana Use on Pregnancy

Cannabinoids, whether endogenous or plant derived, exert their central nervous system effects via cannabinoid receptor type 1. Animal models demonstrate that endocannabinoids play key roles in normal fetal brain development, including in neurotransmitter systems, and neuronal proliferation, migration, differentiation, and survival (12). Human fetuses exhibit central nervous system cannabinoid receptor type 1 as early as 14 weeks of gestation, with increasing receptor density with advancing gestational age, which suggests a role for endocannabinoids in normal human brain development (13, 14).

Studies using laboratory animals show that in utero exogenous cannabinoid exposure may disrupt normal brain development and function (12). Manifestations of in utero exposure include impaired cognition and increased sensitivity to drugs of abuse (15). Of further concern, supraphysiologic fetal cannabinoid exposure can potentiate brain susceptibility to the apoptotic effects of ethanol (16), highlighting concerns for polysubstance abuse and suggesting that exposure to exogenous

cannabinoids could negatively affect brain development. Studies noted that children who were exposed to marijuana in utero had lower scores on tests of visual problem solving, visual-motor coordination, and visual analysis than children who were not exposed to marijuana in utero (17–20). Additionally, prenatal marijuana exposure is associated with decreased attention span and behavioral problems and is an independent predictor of marijuana use by age 14 years (21–23). Effects of prenatal marijuana exposure on school performance are less clear. Although one longitudinal study found no significant effect on several measures of cognition and school performance among primarily middle socioeconomic class children aged 5–12 years (24, 25), another longitudinal investigation of children of mostly urban, lower socioeconomic means observed poorer reading and spelling scores and lower teacher-perceived school performance (26).

Available evidence does not consistently suggest that marijuana causes structural anatomic defects in humans. In one large study, the adjusted odds ratio for marijuana users who gave birth to newborns with a major birth defect was not statistically significant. However, the study did not address timing of marijuana exposure during pregnancy (27). A later study identified cases of marijuana use during the month before or the first three months of pregnancy, with nonusers serving as controls. There were no significant differences in the adjusted odds for 20 major anomalies examined among users versus nonusers. However, when the analysis was restricted to marijuana use in the first month of pregnancy, the odds of anencephaly in the offspring of users was significantly increased to 2.5 (95% confidence interval [CI], 1.3–4.9) (28). This finding may be confounded, however, by the separate observation that marijuana users are less likely to take supplemental folic acid than nonusers (2), as well as by the aforementioned multiple-comparisons issue and the possibility of type 1 errors (incorrect rejection of a null hypothesis).

Most studies examining perinatal and infant mortality do not demonstrate increased mortality among offspring of marijuana users (29, 30). However, a study that examined the association between stillbirth at 20 weeks of gestation or later and illicit drug use and cigarette smoking during pregnancy found that THC was significantly associated with stillbirth (odds ratio 2.34, 95% CI, 1.13–4.81), though this finding was somewhat confounded by the effect of cigarette smoking (31).

Several studies evaluated newborn birth weights and multiple biometric parameters after in utero marijuana exposure. Most reports found no increase in low birth weight (less than 2,500 g) infants (2, 5, 30, 32, 33), whereas two studies observed such an association (10, 34). However, several other studies noted statistically significantly smaller birth lengths and head circumferences as well as lower birth weights among exposed offspring (29, 35–37). These findings were more pronounced among women who used more marijuana, particularly during the



first and second trimesters (29, 36, 38). The clinical significance of these observations remains uncertain. Most reports do not show an association between marijuana use and preterm birth (2, 10, 32, 33), with the exception of one study that found a modest increase in preterm birth among users (odds ratio 1.5, 95% CI, 1.1–1.9) (34).

Although there are limitations to the data on marijuana use during pregnancy—animals are frequently poor surrogates, and studies in humans often are heavily confounded by polysubstance use and lifestyle issues—worrisome trends do emerge. Therefore, because of concerns regarding impaired neurodevelopment, as well as maternal and fetal exposure to the adverse effects of smoking, women who are pregnant or contemplating pregnancy should be encouraged to discontinue marijuana use. Because the effects of marijuana use may be as serious as those of cigarette smoking or alcohol consumption, marijuana also should be avoided during pregnancy. Before pregnancy and in early pregnancy, all women should be asked about their use of tobacco, alcohol, and other drugs, including marijuana and other medications used for nonmedical reasons. Women reporting marijuana use should be counseled about concerns regarding potential adverse health consequences of continued use during pregnancy. It is important to emphasize that the purpose of screening is to allow treatment of the woman's substance use, not to punish or prosecute her. Seeking obstetric–gynecologic care should not expose a woman to criminal or civil penalties for marijuana use, such as incarceration, involuntary commitment, loss of custody of her children, or loss of housing (39). Addiction is a chronic, relapsing biological and behavioral disorder with genetic components, and marijuana use is addictive in some individuals. Drug enforcement policies that deter women from seeking prenatal care are contrary to the welfare of the mother and fetus (40).

Effects of Marijuana Use on Lactation

There are insufficient data to evaluate the effects of marijuana use on infants during lactation and breastfeeding, and in the absence of such data, marijuana use is discouraged (41). Breastfeeding women should be informed that the potential risks of exposure to marijuana metabolites are unknown and should be encouraged to discontinue marijuana use. The American College of Obstetricians and Gynecologists' Breastfeeding page, available at <http://www.acog.org/About-ACOG/ACOG-Departments/Breastfeeding>, provides more resources about breastfeeding for clinicians and patients.

Medical Marijuana

Because marijuana is neither regulated nor evaluated by the U.S. Food and Drug Administration, there are no approved indications, contraindications, safety precautions, or recommendations regarding its use during pregnancy and lactation. Likewise, there are no standardized formulations, dosages, or delivery systems. Smoking, the

most common route of administration of THC, cannot be medically condoned during pregnancy and lactation. Therefore, obstetrician–gynecologists should be discouraged from prescribing or suggesting the use of marijuana for medicinal purposes during preconception, pregnancy, and lactation. Rather, pregnant women or women contemplating pregnancy should be encouraged to discontinue use of marijuana for medicinal purposes in favor of an alternative therapy for which there are better pregnancy-specific safety data. High-quality studies regarding the effects of marijuana and other cannabis products on pregnancy and lactation are needed.

References

1. El Marroun H, Tiemeier H, Jaddoe VW, Hofman A, Verhulst FC, van den Brink W, et al. Agreement between maternal cannabis use during pregnancy according to self-report and urinalysis in a population-based cohort: the Generation R Study. *Eur Addict Res* 2011;17:37–43. [PubMed] ↩
2. van Gelder MM, Reefhuis J, Caton AR, Werler MM, Druschel CM, Roeleveld N. Characteristics of pregnant illicit drug users and associations between cannabis use and perinatal outcome in a population-based study. *National Birth Defects Prevention Study. Drug Alcohol Depend* 2010;109:243–7. [PubMed] ↩
3. Passey ME, Sanson-Fisher RW, D'Este CA, Stirling JM. Tobacco, alcohol and cannabis use during pregnancy: clustering of risks. *Drug Alcohol Depend* 2014;134:44–50. [PubMed] [Full Text] ↩
4. Beatty JR, Svikis DS, Ondersma SJ. Prevalence and perceived financial costs of marijuana versus tobacco use among urban low-income pregnant women. *J Addict Res Ther* 2012;3:1000135. [PubMed] [Full Text] ↩
5. Schempf AH, Strobino DM. Illicit drug use and adverse birth outcomes: is it drugs or context? *J Urban Health* 2008;85:858–73. [PubMed] [Full Text] ↩
6. Moore DG, Turner JD, Parrott AC, Goodwin JE, Fulton SE, Min MO, et al. During pregnancy, recreational drug-using women stop taking ecstasy (3,4-methylenedioxy-N-methylamphetamine) and reduce alcohol consumption, but continue to smoke tobacco and cannabis: initial findings from the Development and Infancy Study. *J Psychopharmacol* 2010;24:1403–10. [PubMed] [Full Text] ↩
7. Hutchings DE, Martin BR, Gamagaris Z, Miller N, Fico T. Plasma concentrations of delta-9-tetrahydrocannabinol in dams and fetuses following acute or multiple prenatal dosing in rats. *Life Sci* 1989;44:697–701. [PubMed] ↩
8. Perez-Reyes M, Wall ME. Presence of delta9-tetrahydrocannabinol in human milk. *N Engl J Med* 1982;307:819–20. [PubMed] ↩
9. Moir D, Rickert WS, Levasseur G, Larose Y, Maertens R, White P, et al. A comparison of mainstream and sidestream marijuana and tobacco cigarette smoke produced under two machine smoking conditions. *Chem Res Toxicol* 2008;21:494–502. [PubMed] [Full Text] ↩
10. Alhusen JL, Lucea MB, Bullock L, Sharps P. Intimate partner violence, substance use, and adverse neonatal outcomes



- among urban women. *J Pediatr* 2013;163:471–6. [PubMed] [Full Text] ↵
11. Mehmedic Z, Chandra S, Slade D, Denham H, Foster S, Patel AS, et al. Potency trends of Delta9-THC and other cannabinoids in confiscated cannabis preparations from 1993 to 2008. *J Forensic Sci* 2010;55:1209–17. [PubMed] ↵
 12. Campolongo P, Trezza V, Ratano P, Palmery M, Cuomo V. Developmental consequences of perinatal cannabis exposure: behavioral and neuroendocrine effects in adult rodents. *Psychopharmacology (Berl)* 2011;214:5–15. [PubMed] [Full Text] ↵
 13. Mato S, Del Olmo E, Pazos A. Ontogenetic development of cannabinoid receptor expression and signal transduction functionality in the human brain. *Eur J Neurosci* 2003;17:1747–54. [PubMed] ↵
 14. Biegón A, Kerman IA. Autoradiographic study of pre- and postnatal distribution of cannabinoid receptors in human brain. *Neuroimage* 2001;14:1463–8. [PubMed] ↵
 15. Szutorisz H, DiNieri JA, Sweet E, Egervari G, Michaelides M, Carter JM, et al. Parental THC exposure leads to compulsive heroin-seeking and altered striatal synaptic plasticity in the subsequent generation. *Neuropsychopharmacology* 2014;39:1315–23. [PubMed] [Full Text] ↵
 16. Hansen HH, Krutz B, Sifringer M, Stefovská V, Bittigau P, Pragst F, et al. Cannabinoids enhance susceptibility of immature brain to ethanol neurotoxicity. *Ann Neurol* 2008;64:42–52. [PubMed] ↵
 17. Willford JA, Chandler LS, Goldschmidt L, Day NL. Effects of prenatal tobacco, alcohol and marijuana exposure on processing speed, visual-motor coordination, and inter-hemispheric transfer. *Neurotoxicol Teratol* 2010;32:580–8. [PubMed] [Full Text] ↵
 18. Fried PA, Watkinson B. Visuo-perceptual functioning differs in 9- to 12-year olds prenatally exposed to cigarettes and marijuana [published erratum appears in *Neurotoxicol Teratol* 2000;22:267]. *Neurotoxicol Teratol* 2000;22:11–20. [PubMed] ↵
 19. Fried PA, Watkinson B, Gray R. Differential effects on cognitive functioning in 13- to 16-year-olds prenatally exposed to cigarettes and marijuana. *Neurotoxicol Teratol* 2003;25:427–36. [PubMed] ↵
 20. Chandler LS, Richardson GA, Gallagher JD, Day NL. Prenatal exposure to alcohol and marijuana: effects on motor development of preschool children. *Alcohol Clin Exp Res* 1996;20:455–61. [PubMed] ↵
 21. Fried PA, Watkinson B. Differential effects on facets of attention in adolescents prenatally exposed to cigarettes and marijuana. *Neurotoxicol Teratol* 2001;23:421–30. [PubMed] ↵
 22. Day NL, Goldschmidt L, Thomas CA. Prenatal marijuana exposure contributes to the prediction of marijuana use at age 14. *Addiction* 2006;101:1313–22. [PubMed] ↵
 23. Goldschmidt L, Day NL, Richardson GA. Effects of prenatal marijuana exposure on child behavior problems at age 10. *Neurotoxicol Teratol* 2000;22:325–36. [PubMed] ↵
 24. Fried PA, O'Connell CM, Watkinson B. 60- and 72-month follow-up of children prenatally exposed to marijuana, cigarettes, and alcohol: cognitive and language assessment. *J Dev Behav Pediatr* 1992;13:383–91. [PubMed] ↵
 25. Fried PA, Watkinson B, Siegel LS. Reading and language in 9- to 12-year olds prenatally exposed to cigarettes and marijuana. *Neurotoxicol Teratol* 1997;19:171–83. [PubMed] ↵
 26. Goldschmidt L, Richardson GA, Cornelius MD, Day NL. Prenatal marijuana and alcohol exposure and academic achievement at age 10. *Neurotoxicol Teratol* 2004;26:521–32. [PubMed] ↵
 27. Linn S, Schoenbaum SC, Monson RR, Rosner R, Stubblefield PC, Ryan KJ. The association of marijuana use with outcome of pregnancy. *Am J Public Health* 1983;73:1161–4. [PubMed] [Full Text] ↵
 28. van Gelder MM, Reefhuis J, Caton AR, Werler MM, Druschel CM, Roeleveld N. Maternal periconceptional illicit drug use and the risk of congenital malformations. National Birth Defects Prevention Study. *Epidemiology* 2009;20:60–6. [PubMed] [Full Text] ↵
 29. Fergusson DM, Horwood LJ, Northstone K. Maternal use of cannabis and pregnancy outcome. ALSPAC Study Team. Avon Longitudinal Study of Pregnancy and Childhood. *BJOG* 2002;109:21–7. [PubMed] [Full Text] ↵
 30. Ostrea EM Jr, Ostrea AR, Simpson PM. Mortality within the first 2 years in infants exposed to cocaine, opiate, or cannabinoid during gestation. *Pediatrics* 1997;100:79–83. [PubMed] [Full Text] ↵
 31. Varner MW, Silver RM, Rowland Hogue CJ, Willinger M, Parker CB, Thorsten VR, et al. Association between stillbirth and illicit drug use and smoking during pregnancy. Eunice Kennedy Shriver National Institute of Child Health and Human Development Stillbirth Collaborative Research Network. *Obstet Gynecol* 2014;123:113–25. [PubMed] [Obstetrics & Gynecology] ↵
 32. Bada HS, Das A, Bauer CR, Shankaran S, Lester BM, Gard CC, et al. Low birth weight and preterm births: etiologic fraction attributable to prenatal drug exposure. *J Perinatol* 2005;25:631–7. [PubMed] [Full Text] ↵
 33. Shiono PH, Klebanoff MA, Nugent RP, Cotch MF, Wilkins DG, Rollins DE, et al. The impact of cocaine and marijuana use on low birth weight and preterm birth: a multicenter study. *Am J Obstet Gynecol* 1995;172:19–27. [PubMed] [Full Text] ↵
 34. Hayatbakhsh MR, Flenady VJ, Gibbons KS, Kingsbury AM, Hurrión E, Mamun AA, et al. Birth outcomes associated with cannabis use before and during pregnancy. *Pediatr Res* 2012;71:215–9. [PubMed] [Full Text] ↵
 35. Gray TR, Eiden RD, Leonard KE, Connors GJ, Shisler S, Huestis MA. Identifying prenatal cannabis exposure and effects of concurrent tobacco exposure on neonatal growth. *Clin Chem* 2010;56:1442–50. [PubMed] [Full Text] ↵
 36. El Marroun H, Tiemeier H, Steegers EA, Jaddoe VW, Hofman A, Verhulst FC, et al. Intrauterine cannabis exposure affects fetal growth trajectories: the Generation R Study. *J Am Acad Child Adolesc Psychiatry* 2009;48:1173–81. [PubMed] ↵
 37. Zuckerman B, Frank DA, Hingson R, Amaro H, Levenson SM, Kayne H, et al. Effects of maternal marijuana and cocaine use on fetal growth. *N Engl J Med* 1989;320:762–8. [PubMed] ↵
 38. Hurd YL, Wang X, Anderson V, Beck O, Minkoff H, Dow-Edwards D. Marijuana impairs growth in mid-gestation fetuses. *Neurotoxicol Teratol* 2005;27:221–9. [PubMed] ↵



39. Alcohol abuse and other substance use disorders: ethical issues in obstetric and gynecologic practice. Committee Opinion No. 633. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2015;125:1529–37. [PubMed] [*Obstetrics & Gynecology*] ↩
40. Substance abuse reporting and pregnancy: the role of the obstetrician-gynecologist. Committee Opinion No. 473. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2011;117:200–1. [PubMed] [*Obstetrics & Gynecology*] ↩
41. Reece-Stremtan S, Marinelli KA. Guidelines for breastfeeding and substance use or substance use disorder, revised 2015. ABM Clinical Protocol #21. Academy of Breastfeeding Medicine. *Breastfeed Med* 2015;10:135–41. [PubMed] [Full Text] ↩

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