Marijuana Use During Pregnancy and Breastfeeding

Systematic Literature Review

Retail Marijuana Public Health Advisory Committee
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Marijuana Use During Pregnancy and Breastfeeding

Introduction
Marijuana use in pregnant and breastfeeding mothers is a public health concern due to the potential harmful effects of tetrahydrocannabinol (THC) on the developing fetus - with specific focus on the potential risk for birth defects, abnormal growth and physical development, and perhaps most critically, sub-normal brain development. Adverse effects of alcohol and tobacco consumption during pregnancy are well-documented. While research on fetal health outcomes related to marijuana exposure is limited, there is no known “safe” amount of marijuana use for women during pregnancy. Additionally, biological evidence demonstrates that THC is present in the breast milk of women who use marijuana during the months they are breastfeeding, and there is evidence that infants who drink breast milk containing THC absorb and metabolize THC.

U.S. and international prevalence estimates exist for marijuana use among pregnant women. The National Survey on Drug Use and Health (NSDUH) in 2012-2013 reported 4.9% of pregnant 15-44 year old women used marijuana in the past month.[1] Schaubberger and colleagues reported in 2014 on the prevalence of marijuana use in pregnant women in a private practice in Wisconsin. Two hundred women had urine tests at intake; seven tested positive for marijuana (3.5%).[2] Both Australia and the U.K. report use in pregnant women of 1 to 4%.[3, 4] These estimates provide some quantification of both the at-risk population of children born to woman who use during pregnancy and/or while breastfeeding, and also the population of women on which prevention and education messaging should be targeted.

Marijuana use during pregnancy to reduce symptoms of “nausea during pregnancy” recently has been documented by the Pregnancy Risk Assessment and Monitoring System (PRAMS) data from 2009-2011 by the state of Hawaii and published by Roberson[5]. Of the 2.6% of pregnant women who reported use during pregnancy, 21.2% reported severe nausea. Local research by the Tri County Health Department (TCHD) in Colorado in 2014 supports the findings reported by Hawaii regarding marijuana use for symptom relief of nausea, and also for pain, depression, anxiety and stress. [See Monitoring Changes in Marijuana Use Patterns: Women, Infants, and Children, for more information.]

Key Findings
The potential for adverse outcomes in exposed offspring of marijuana-using mothers prompted the committee to review the available literature on physical, developmental and mental health outcomes. We reviewed the literature for marijuana use during pregnancy and while breastfeeding. Outcomes reviewed included those apparent at birth as well as physical, neurocognitive, and mental health findings throughout childhood and adolescence. We found moderate evidence that maternal use of marijuana during pregnancy is associated with negative effects on exposed offspring, including decreased academic ability, cognitive function and attention. Importantly, these effects may not appear until adolescence. We also found moderate evidence that maternal use of marijuana during pregnancy is associated with decreased growth in exposed offspring.

An important note for all key findings is that the available research evaluated the association between marijuana use and potential adverse health outcomes. This association does not
prove that the marijuana use alone *caused* the effect. Despite the best efforts of researchers to account for confounding factors, there may be other important factors related to *causality* that were not identified. In addition, marijuana use was illegal everywhere in the United States prior to 1996. Research funding, when appropriated, was commonly sought to identify adverse effects from marijuana use. This legal fact introduces both funding bias and publication bias into the body of literature related to marijuana use.

The Retail Marijuana Public Health Advisory Committee recognizes the limitations and biases inherent in the published literature and made efforts to ensure the information reviewed and synthesized is reflective of the current state of medical knowledge. Where information was lacking - for whatever reason - the committee identified this knowledge gap and recommended further research. This information will be updated as new research becomes available.

**Recommendations**

Health care providers’ current collection of information on marijuana use by amount, frequency, and method of use is limited. Adequate assessment of the link between marijuana use during pregnancy and adverse health outcomes, for both pregnant women and their exposed offspring, must begin with consistent, standardized data collection about marijuana use from pregnant women at all their pregnancy-related medical appointments and be followed by collection of accurate birth outcome data. The committee recommended public health monitoring to help clarify the possible contribution of marijuana use to major birth defects.

Educational programs for pregnant women, their families, and health care providers who care for pregnant women are needed to ensure more information is shared about the known health effects, and also about what is unknown at present. Reducing the stigma associated with admitted marijuana use during pregnancy would improve the ability of providers to identify and assist women who would benefit from education about the risks to exposed offspring and therapeutic alternatives to marijuana to treat symptoms during pregnancy. Educational materials about the potential risks of marijuana use during pregnancy should be available and distributed at marijuana dispensaries.

The committee identified several research gaps, including the need for more research regarding the effects of different forms of marijuana (e.g., smoked, edible, tinctures), increased marijuana potency, and cannabinoids such as cannabidiol (CBD) on the health of exposed offspring. More research also is needed regarding the possible association between the use of marijuana and increased risk of miscarriage, as well as infant health risks from use by breastfeeding moms.
### Table 1:
Findings Summary: Effects on exposed offspring of maternal marijuana use during pregnancy and breastfeeding

<table>
<thead>
<tr>
<th>Substantial</th>
<th>Moderate</th>
<th>Limited</th>
<th>Insufficient</th>
<th>Mixed</th>
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</thead>
<tbody>
<tr>
<td>Decreased growth</td>
<td>Stillbirth</td>
<td>Psychosis symptoms</td>
<td>Preterm delivery</td>
<td></td>
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<tr>
<td>Decreased IQ scores in young children</td>
<td>SIDS (evidence of no association)</td>
<td>Breastfeeding and SIDS</td>
<td>Low birth weight</td>
<td></td>
</tr>
<tr>
<td>Decreased cognitive function</td>
<td>Increased depression symptoms</td>
<td>Initiation of future marijuana use</td>
<td>Small for gestational age</td>
<td></td>
</tr>
<tr>
<td>Decreased academic ability</td>
<td>Delinquent behavior</td>
<td></td>
<td>Decreased birth weight</td>
<td></td>
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<tr>
<td>Attention problems</td>
<td>Isolated simple ventricular septal defects</td>
<td></td>
<td>Newborn behavior issues</td>
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<td></td>
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<td></td>
<td>Breastfeeding and infant motor development</td>
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<td>Birth defects including NTD, gastroschisis</td>
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<td></td>
<td></td>
<td></td>
<td>Frequency of use during adolescence</td>
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</table>
Marijuana Use During Pregnancy and Breastfeeding

Evidence Statements
Evidence statements are based on systematic scientific literature reviews performed by Colorado Department of Public Health and Environment staff with oversight and approval by the Retail Marijuana Public Health Advisory Committee.

Birth Outcome Risks of Marijuana Use During Pregnancy

Birth Defects -
1. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with birth defects. [6-8]

2. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with neural tube defects such as anencephaly. [9-11]

3. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with gastroschisis. [9, 12]

4. We found LIMITED evidence that maternal use of marijuana during pregnancy is associated with isolated, simple ventricular septal defects (heart defects). [13]

Preterm Delivery
5. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with preterm delivery. [3, 7, 14-18]

SIDS
6. Based on LIMITED evidence, there does not appear to be an association between maternal use of cannabis during and after pregnancy and SIDS. [19-21]

Stillbirth
7. We found LIMITED evidence that maternal use of marijuana during pregnancy is associated with an increased risk of stillbirth. [22]

Decreased Birth Weight
8. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with decreased birth weight. [6, 7, 14, 24-29]

Low Birth Weight (birth weight <2,500g regardless of gestational age)
9. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with low-birth weight infants. [3, 16, 17, 23]
Marijuana Use During Pregnancy and Breastfeeding

Small for Gestational Age (birth weight less than 10th percentile for gestational age)
10. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with infants being born small for gestational age.\textsuperscript{[3, 7, 18]}

Effects of Prenatal Marijuana Use on Exposed Offspring
11. We found INSUFFICIENT evidence that maternal marijuana use during pregnancy is associated with initiation of marijuana use by the exposed offspring during adolescence.\textsuperscript{[30]}

12. We found MIXED evidence for whether or not maternal marijuana use during pregnancy is associated with frequency of marijuana use by the exposed offspring during adolescence.\textsuperscript{[30, 31]}

13. We found MIXED evidence for whether or not maternal use of marijuana during pregnancy is associated with newborn behavior issues.\textsuperscript{[32-35]}

14. We found MODERATE evidence that maternal use of marijuana during pregnancy is associated with decreased growth in exposed offspring.\textsuperscript{[36, 37]}

15. We found MODERATE evidence that maternal use of marijuana during pregnancy is associated with attention problems in exposed offspring.\textsuperscript{[38-41]}

16. We found MODERATE evidence that maternal use of marijuana during pregnancy is associated with decreased IQ scores in exposed offspring.\textsuperscript{[42, 43]}

17. We found MODERATE evidence that maternal use of marijuana during pregnancy is associated with reduced cognitive function in exposed offspring.\textsuperscript{[44-46]}

18. We found MODERATE evidence that maternal marijuana use during pregnancy is associated with decreased academic ability of exposed offspring.\textsuperscript{[47-49]}

19. We found LIMITED evidence that maternal use of marijuana during pregnancy is associated with increased depression symptoms in exposed offspring.\textsuperscript{[50]}

20. We found INSUFFICIENT evidence to suggest that maternal marijuana use during pregnancy is associated with psychosis symptoms in exposed adolescent offspring.\textsuperscript{[51]}

21. We found LIMITED evidence that maternal marijuana use during pregnancy is associated with delinquent behaviors in exposed offspring.\textsuperscript{[52]}
Marijuana Use and Breastfeeding

22. Biological evidence shows that THC is present in the breast milk of women who use marijuana.\[53\]

23. Biological evidence shows that infants who drink breast milk containing THC absorb and metabolize the THC.\[53\]

24. We found MIXED evidence for whether or not an association exists between maternal use of marijuana while breastfeeding and motor development in exposed infants.\[54, 55\]

25. We found INSUFFICIENT evidence to determine whether or not infant exposure to marijuana (either from maternal marijuana use during breastfeeding or infant exposure to marijuana smoke) is associated with SIDS.\[20\]

Public Health Statements

Public health statements are plain language translations of the major findings (Evidence Statements) from the systematic literature reviews. These statements have been officially approved by the Retail Marijuana Public Health Advisory Committee.

1. There is no known safe amount of marijuana use during pregnancy.

2. THC can pass from mother to the unborn child through the placenta.

3. The unborn child is exposed to THC used by the mother.

4. Maternal use of marijuana during pregnancy is associated with negative effects on exposed offspring, including decreased academic ability, cognitive function and attention. These effects may not appear until adolescence.

5. Marijuana use during pregnancy may be associated with an increased risk of heart defects (isolated simple ventricular septal defects) in exposed offspring.

6. Marijuana use during pregnancy may be associated with an increased risk of stillbirth.

7. There is conflicting research for whether or not marijuana use during pregnancy is associated with increased marijuana use in exposed offspring.

8. Marijuana use during pregnancy may be associated with increased depression symptoms and delinquent behaviors in exposed offspring.

9. There are negative effects of marijuana use during pregnancy regardless of when it is used during pregnancy.

10. THC can be passed from the mother’s breast milk, potentially affecting the baby.
Public Health Recommendations
Public health recommendations have been suggested and approved by the Retail Marijuana Public Health Advisory Committee with the goals of: 1) improving knowledge regarding population-based health effects of retail marijuana use, 2) developing and targeting public health education and prevention strategies for high-risk sub-populations.

Data Quality Issues
- Need for standardization of data collection on dose, amount, frequency and method of marijuana use
- Need to separate and account for other drug use

Surveillance
- Better data on prevalence of marijuana use in pregnant and breastfeeding women
- Enhanced surveillance for birth outcomes
- Collection of reported marijuana use in electronic health records
- Data collection to identify specific populations for public health intervention (geography, income, race, etc.)

Education
- Education of health care providers
- Education of pregnant women
- Public education
- Educational materials provided at dispensaries

Research Gaps
The Retail Marijuana Public Health Advisory Committee identifies important gaps in the scientific literature that may impact public health policies and prevention strategies. Colorado should support unbiased research to help fill the following research gaps identified by the committee.

- Effect of cannabidiol (CBD) and other cannabinoids
- Effect of consumption of edibles or by vaping
- Contribution of smoking marijuana to its health effects
- Effect on miscarriage
- Marijuana use and breastfeeding;
  - Effect on growth and weight gain in infants
  - Length of time THC remains in breast milk
  - Replication of presence of THC in breast milk, including comparison of amount of THC in breast milk to maternal blood THC levels
- Studies to correlate urine THC levels with presence of THC in breast milk
Marijuana Use During Pregnancy and Breastfeeding

- Pair self-report with biomarker testing in Colorado
- Impact of potency on health effects
- Reasons for use of marijuana during pregnancy/breastfeeding
Marijuana Use During Pregnancy and Breastfeeding

References


Marijuana Use During Pregnancy and Breastfeeding


Marijuana Use During Pregnancy and Breastfeeding