

Marijuana Use During Pregnancy: Short and Long-Term Effects

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Therese Grant, Ph.D.

**Professor, Department of Psychiatry & Behavioral Sciences
UW School of Medicine**

Legal Does Not Mean Safe

- The fact that marijuana use is now legal in Washington State does not mean it's a safe drug.
- As more states consider legalization and more research is being done, more questions about marijuana safety arise.

The health risks of marijuana use are not the same for all people. A group of special concern is pregnant and parenting women because of potential short and long-term effects of prenatal marijuana exposure on the baby.



Does Marijuana Cross the Placenta?

THC is the main chemical compound in marijuana, and it crosses the placenta rapidly.

THC can be detected in mother's urine for weeks, depending on potency, frequency of use, metabolism, and other factors.

Concentrations in the fetus are about 1/3 of the levels found in the mother.

How Common is Marijuana Use During Pregnancy?

After tobacco and alcohol, marijuana is the most commonly used drug during pregnancy.

Nationally, 10.9% of pregnant women report using marijuana in the past year, with 3.9% using it in the past month. Among pregnant women who used marijuana in the past year, 16.2% used almost daily.

Study Design Challenges



Most pregnant women who use marijuana also use tobacco, alcohol, or other drugs that have harmful (often long-term) effects on the developing child.

All studies agree – it's very difficult to measure these exposures and isolate the effects of marijuana.

Human and animal studies: Lifestyle factors (e.g., nutrition, health status, social networks) also play a critical role in determining effects of marijuana.

	Nicotine	Alcohol	Marijuana	Opiates	Cocaine	Methamphetamine
Short-term effects /birth outcome						
Fetal growth	Effect	Strong effect	No effect	Effect	Effect	Effect
Anomalies	No consensus on effect	Strong effect	No effect	No effect	No effect	No effect
Withdrawal	No effect	No effect	No effect	Strong effect	No effect	*
Neurobehavior	Effect	Effect	Effect	Effect	Effect	Effect
Long-term effects						
Growth	No consensus on effect	Strong effect	No effect	No effect	No consensus on effect	*
Behavior	Effect	Strong effect	Effect	Effect	Effect	*
Cognition	Effect	Strong effect	Effect	No consensus on effect	Effect	*
Language	Effect	Effect	No effect	*	Effect	*
Achievement	Effect	Strong effect	Effect	*	No consensus on effect	*

* Limited or no data available.

Study Design Challenges

Most studies rely on maternal self-report, which may underestimate use.

Most studies don't take **potency** into account. THC levels are up to 7 times greater now than in the 1970s and 1980s.

Impact of Marijuana Legalization in Colorado on Prenatal Marijuana Use

	2012	2014
Meconium positive for THC	10.6%	11.7%
Among exposed infants, mean concentrations of THC in meconium*	213 ng/g	361 ng/g

*** Neonates in 2014 had significantly greater exposure as indicated by THC concentrations.**

Possible Effects of Prenatal Exposure on the Infant

- *Stillbirth.* Pregnant women who smoke marijuana have 2.3 times the risk compared to women who do not smoke marijuana during pregnancy.
- *Growth.* Effects have been reported for decreased birth weight and small gestational age. Findings vary depending on study design and whether other prenatal drug use is taken into account.

Possible Effects on the Infant

- *Neurobehavior.* Most studies report some subtle effects on the brain functioning of newborns: deficits in regulatory behavior and habituation (ability to quickly decrease sensitivity to noise, light, etc., and thus avoid overstimulation), higher levels of irritability, excitability, increased startle response and tremors.
- *Sudden Infant Death Syndrome (SIDS).* No association, though studies report conflicting results due to problems measuring postnatal exposure.

2015 Meta-analysis*

A summary of 24 studies on effects of marijuana use during pregnancy found:

- some increase in maternal anemia
- decrease in infant birth weight
- increase in placement of newborns in the neonatal intensive care unit

Limitations: most studies relied on self-report and included women who used alcohol and/or tobacco during pregnancy. No information on potency, dose, timing, or frequency of mj use.

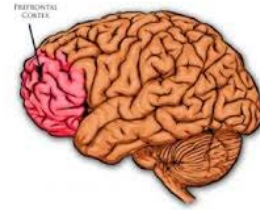
*881 titles/abstracts accepted for screening; 24 systematically reviewed

Possible Long-term Effects

Behavior, cognition, and academic achievement

- Prenatal marijuana exposure is associated at age 10 years with deficits in behavioral functioning: inattention, impulsivity, and subtle learning and memory deficits.
- No apparent effect on overall IQ, but possible effects on achievement in reading and spelling by age 10.
- Animal studies: hyperactivity, memory deficits

Possible Long-term Effects



Executive function (EF). EF is a higher order neurological process that includes the ability to organize stored information, integrate new information, plan, foresee consequences, solve problems.

Prenatal marijuana exposure is associated with deficits in some aspects of EF in adolescents, e.g., problem-solving skills requiring sustained attention and visual memory, analysis, and integration.

Why might some aspects of EF be affected by prenatal marijuana exposure while others are not? Regions of the prefrontal area of the brain are responsible for EF, and development of the prefrontal lobes continues after pregnancy and into late adolescence.

Child Development and Quality of Maternal-Child Interaction

A baby learns to develop healthy emotional attachments with others by interacting with a mother who notices and responds to the baby's signals, who is mentally and emotionally available. Successful mother-baby attachment requires back-and-forth, two-way interaction.

If a baby's neurologic system is impaired by prenatal substance exposure, or the mother's attention and functioning are affected by ongoing substance use, the critical work of mother-baby attachment and emotional development may be compromised.

Marijuana and Breastfeeding



The risks to the infant outweigh the benefits.

- THC can accumulate in breast milk in high concentrations and THC can be found in the infant urine for up to 3 weeks.
- Babies exposed may show signs of sedation, reduced muscle tone, poor sucking. Risks vary widely (e.g., decreased child motor development at age one year), and effects depend on contaminants in the marijuana, amount used, potency.
- American Academy of Pediatrics: *Women who use marijuana should not breastfeed.*

Accidental Use of Marijuana by Children

- Research in Colorado found after medical marijuana legalization there was a significant increase in the number of children < age 12 admitted to ERs due to unintentional marijuana ingestion (over half the cases involved medical marijuana “edibles”).
- Most of the children showed significant central nervous system effects, e.g., lethargy, drowsiness, or ataxia/unsteadiness. Half were admitted to hospital.

The source of the marijuana in most cases was the grandparents.



Often the use of marijuana was not initially provided because of perceived stigma and reluctance to report, so children underwent multiple (sometimes unnecessary) tests, procedures, and imaging during their ER evaluation.

What We Know

- ➔ Marijuana is not a safe drug to use during pregnancy. A number of potential negative outcomes have been identified: stillbirth, impaired infant growth and neurobehavioral deficits, and deficits in adolescent executive functioning.
- ➔ Studying prenatal marijuana effects is fraught with methodological challenges, e.g., assessing dose/exposure to the fetus, and measuring /controlling for other prenatal exposures . Self report and biologic samples are both problematic.
- ➔ 2016 Cannabis Science and Policy Summit: *“There is a presence of negatives in the absence of positives.”*

What We Still Need to Know

Given the increasing potency of marijuana, were children assessed in earlier research studies exposed prenatally to much lower “doses” of THC? Do the findings from these early studies underestimate the effects in today’s world?

Almost all studies conclude there is a need

- for more and better research to fully describe the *continuum of effects* of prenatal marijuana exposure
- for policy makers to be aware of the unintended consequences of state-level marijuana policy