

How Men's Cannabis Use Could Affect Their Kids' Health

Research on pot and sperm quality, gene expression, and child development.

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KEY POINTS

- Paternal consumption of marijuana prior to conception has been found in rodent studies to alter offspring brain development.
- Children whose fathers consumed marijuana during their partner's pregnancy may be at higher risk of psychotic symptoms.
- Pot consumption can trigger epigenetic changes in gene expression, which fathers can pass along to their children.
- Not all human studies of pot's effects on male fertility are consistent. A dose-dependent relationship between pot and male fertility may exist.

Decades of research have shown us how mothers' consumption of marijuana during pregnancy can affect the health and development of their children. Fetal exposure to tetrahydrocannabinol (or THC, the active ingredient in marijuana) [has been linked](#) to lower birth weights and [birth defects](#), higher aggression, and poorer attention in infants as well as impulse control, anxiety, attention and memory issues in older children.

But what about fathers' pot smoking (or edible eating) habits? A growing body of research suggests a dad's intake of THC also affects the mental and physical health of his future child. Here's a look at what recent studies tell us.

How Pot Affects Sperm and Erectile Function

THC's effects on a man's future children begin with his pre-conception pot habits. That is: how much marijuana he's consumed in the days, months, and years leading up to impregnating his partner. A man's pot consumption can affect the size, shape, and function of his sperm, as well as his testosterone levels, according to [a 2021 systematic review](#) published in *Cureus*. Impairments in these aspects of male reproductive health have been found among marijuana users, especially if their intake is "heavy" (that

is: greater than once per week). Despite an increased perception of pleasure during sexual activity while stoned, marijuana can also contribute to erectile dysfunction, [another systematic review](#) (published in 2019 in the journal *Andrology*) observed. All of these factors can raise a man's risk of infertility.

Not all findings on reproductive health outcomes of male marijuana users are consistent, however. A 2021 *Therapeutic Advances in Urology* study, for example, [found that](#) among 409 American men struggling with infertility, those who *never* consumed marijuana tended to produce sperm with lower motility (read: movement efficiency) than current or former marijuana consumers. (Former or current users in the study were, however, more likely to produce abnormally shaped sperm as well as lower sperm volumes.)

[Another study](#), conducted in 2019 and published in *Human Reproduction*, found something equally perplexing: Among 662 men struggling with fertility, “never” marijuana smokers had lower sperm concentrations than current or former marijuana smokers. The study authors reasoned that this might reflect pot’s potential “dose-dependent, non-linear” relation to male reproductive health, similar to [alcohol’s effects](#) on cardiovascular outcomes: Moderate amounts may improve testicular functioning as well as sperm quality and production; excess amounts usually prove deleterious.

[Some researchers](#) have found evidence that these observed alterations in sperm following cannabis consumption are caused (at least in part) by the binding of THC to cannabinoid receptors on sperm and testicular cells. [Others point to](#) the increased production of reactive oxygen species (or ROS) that marijuana consumption can trigger and its ability to damage sperm cell structure and function.

Paternal Marijuana Use's Impact on Fetal and Child Development

What happens once a man who uses marijuana conceives a child with his partner? [A 2018 study](#) published in the journal *Schizophrenia Research* found that a father’s consumption of marijuana during his partner’s pregnancy predicted a higher likelihood of their child displaying psychotic-like symptoms. This could be due to second-hand smoke and is not all that surprising.

More concerning is a 2020 *Toxicological Sciences* study from Duke University Medical Center, [that found](#) offspring of male rats injected with THC every day for a month showed significant brain developmental abnormalities reminiscent of those observed in human babies exposed to toxic chemicals in the womb, like neurotoxic pesticides. Specifically, the pups showed “slowed development and permanently suppressed function of acetylcholine pathways—which are involved in learning, memory, attention, emotional function and reward,” Dr. Theodore Slotkin, Ph.D., lead author of the study, explained.

Slotkin has [also found](#) that offspring of male rats exposed (before their offspring's conception) to cannabis smoke "exhibit impaired activity in their dopamine pathways, potentially rendering them more susceptible to addiction later in life," Slotkin added.

Though the exact mechanism by which paternal THC exposure achieves these effects on offspring hasn't yet been identified, Slotkin pointed out that THC consumption alters the methylation of genes within sperm cells, which in turn alters the expression of genes (DNA stretches that code for proteins) contained within sperm cells—a process known as epigenetic modification. Those differently expressed genes (and the proteins they will or will not be able to give rise to, as a result of epigenetic modification) are then passed on to offspring. Given that humans and rats share similar brain circuitry, and that both species show epigenetic changes in sperm upon exposure to cannabis smoke, Slotkin believes these rodent findings have worrisome implications for our own species.

Another route by which paternal pot consumption may impact a child's health and development is the influence of sperm quality and gene expression on placental development. The placenta is an organ formed during pregnancy that provides growing fetuses with nutrients and oxygen, and removes waste from their blood. Intriguingly, its makeup [appears to be](#) dominated by paternal genes (introduced by sperm). Not surprisingly, impaired placental development [impairs fetal](#) development [and viability](#). A [2018 study](#) in mice found that males' pre-conception exposure to harmful chemicals which altered their sperm quality and gene expression sired offspring whose placentas exhibited abnormalities during fetal development. As a result, those offspring were more likely to be born prematurely.

There isn't yet enough research determining to what degree marijuana consumption can affect placental development via its effects on sperm in humans. We also don't know how comparable marijuana's effects on sperm are to the harmful chemicals the mice in this study were exposed to. But given marijuana's observed negative impact on sperm cells in humans and, like various neural pathways, the similarities in [placental physiology](#) we share with mice, it's not unlikely that a man's marijuana consumption could influence placental development via marijuana-induced alterations in sperm.

The Takeaway

Accumulating evidence suggests that a man's lifetime cannabis consumption can influence his fertility as well as the health and development of his future children. While occasional use may not have terrible consequences, prospective fathers (and their partners) should be mindful of how marijuana use, especially [in the months leading up to](#) conception, can affect sperm—and the expression of genes those sperm pass on to offspring.