

# A Retrospective Study on the Effects of Marijuana Use in Pregnancy on Early Childhood Development and Health



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## INTRODUCTION

In 2014, Oregon legalized recreational marijuana, rapidly increasing availability across the state. In 2016, Samaritan Health Services started routinely testing expectant mothers for tetrahydrocannabinol (THC), and incidence of pregnant mothers testing positive has been increasing since 2016. Previous studies have established that active metabolites of marijuana have been proven to cross the placenta (citation). Prenatal marijuana use is associated with 1-week shorter gestation (1), lower birth weight (2), higher incidence of stillbirth (2), and physical deformity (1). However, no literature currently exists on the early outcomes of fine and gross motor skills or communication and social development of children exposed to THC in utero. With the increasing number of women testing positive, more research needs to be done to formulate evidence-based guidelines.

## OBJECTIVE

The aim of this study is to compare childhood developmental outcomes (gross motor, fine motor, communication, problem-solving, and personal-social skills) between children of mothers who tested positive vs negative for THC during pregnancy.

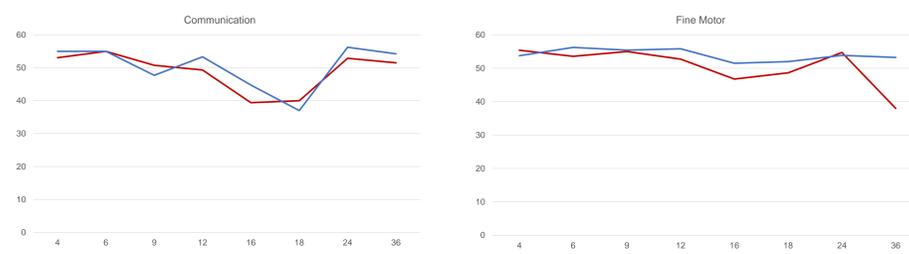
## STUDY DESIGN

A retrospective cohort study was constructed to include mothers within Samaritan Health Services who were tested for THC during pregnancy and delivered an infant in 2016. Mothers who tested positive were matched by age, insurance, delivery hospital, smoking status, and substance use status to mothers who did not test positive for THC. Ages and Stages Questionnaire (ASQ) data was collected from their children's electronic medical records at 4, 6, 9, 12, 18, 24, and 36 months.

## RESULTS

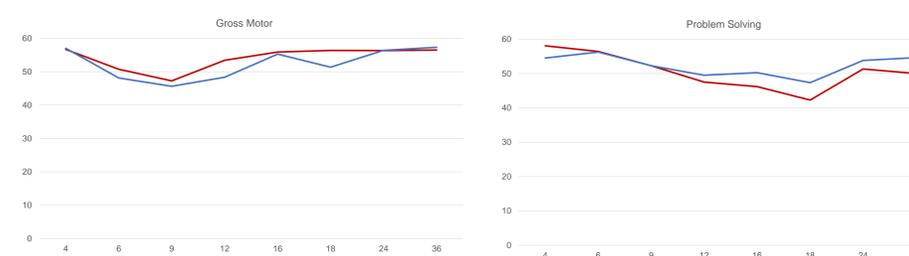
91 mothers and their children were included in each study group. ASQ data was often missing at varying time points, resulting in sample sizes ranging from 23 to 52 at each timepoint. Due to non-normally distributed data, median ASQ scores were compared across groups through Mann-Whitney U tests. Children of mothers who tested positive for THC had significantly lower scores in personal-social skills at 12 months ( $p=0.03$ , median difference=10), communication at 24 months ( $p=0.04$ , median difference=5), and fine motor at 36 months ( $p=0.01$ , median difference=13). Study groups did not significantly differ at any other timepoint.

## RESULTS



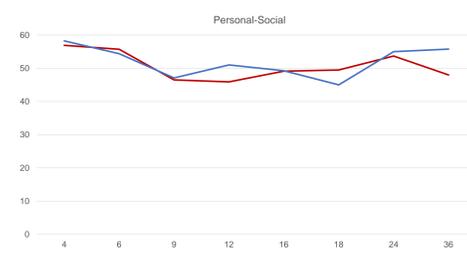
**Fig 1:** Comparison of the communication skills of children exposed to THC in utero (red) with children not exposed to THC in utero (blue) over the course of 40 months.

**Fig 2:** Comparison of the fine motor skills of children exposed to THC in utero (red) with children not exposed to THC in utero (blue) over the course of 40 months.



**Fig 3:** Comparison of the gross motor skills of children exposed to THC in utero (red) with children not exposed to THC in utero (blue) over the course of 40 months.

**Fig 4:** Comparison of the problem-solving skills of children exposed to THC in utero (red) with children not exposed to THC in utero (blue) over the course of 40 months.



**Fig 4:** Comparison of the personal-social skills of children exposed to THC in utero (red) with children not exposed to THC in utero (blue) over the course of 40 months.

## DISCUSSION

Children born to mothers who used marijuana during pregnancy had lower developmental achievement in the following milestones: Personal-social skills, communication, and fine motor. It is uncertain if these differences will persist through childhood, and the results are still preliminary due to the small sample sizes. Data collection is currently being expanded to increase our sample size and track these children further into their lives. We plan to use our study results to shape future medical guidelines and evidence-based counseling by physicians in regard to marijuana usage during pregnancy.

## LIMITATIONS

- ASQ data was often missing for certain months, resulting in sample sizes ranging from 23 to 52 at each timepoint.
- Amount (quantity) of marijuana or THC usage during pregnancy and continued exposure after birth was not collected in this study and cannot be used to determine if there is a continued relationship. Impacts of parenting while under the influence of THC could affect how interactive a parent is with their child; thus, impacting the child's development.
- It is possible that information was not documented in areas of the EMR that were extractable. Missing data may further limit our power in the planned analyses.

## FUTURE DIRECTIONS

- Increase sample size (and therefore power) by continuing data collection in June 2020 for the next group of children who were born in 2017
- Further research will include data regarding the differences in number of non-well child visits

## CITATIONS

- Minnes S, Lang A, Singer L. Prenatal Tobacco, Marijuana, Stimulant, and Opiate Exposure: Outcomes and Practice Implications. *Addict Sci Clin Pract.* 2011;6(1):57-70.
- Metz TD, Stickrath EH. Marijuana use in pregnancy and lactation: a review of the evidence. *Am J Obstet Gynecol.* 2015;213(6):761-778. doi:10.1016/j.ajog.2015.05.025

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