

Father's alcohol consumption before conception linked to brain and facial defects in offspring

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According to the U.S. Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects

in their unborn child. Now, research at Texas A&M University demonstrates that a father's alcohol consumption before conception also links to growth defects that affect the development of his offspring's brain, skull and face.

Research investigating [fetal alcohol syndrome](#) (FAS) exclusively examines maternal alcohol exposure. However, because men drink more and are more likely to binge drink than women, Dr. Michael Golding, an associate professor in the School of Veterinary Medicine & Biomedical Sciences' Department of Veterinary Physiology & Pharmacology, and his team set out to challenge the existing dogma, using a mouse model to examine what happens when either the mother, the father, or both parents consume alcohol.

In a new article published in the *Journal of Clinical Investigation*, Golding and his team found that male alcohol consumption before conception caused FAS brain and facial growth defects.

"We found that male exposures actually drive certain craniofacial differences much stronger than maternal exposures do, so this programming effect that's coming through sperm has a profound effect on the organization of the face and the growth and proportion of different facial features," Golding said. "When it was the dad drinking, we saw a profound shift in the organization of the face."

According to the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH), FAS is a fetal disorder caused by maternal alcohol consumption during pregnancy.

FAS is hard to diagnose, but when doing so, doctors currently look for [abnormal facial features](#); lower-than-average weight, height or both; central nervous system problems such as a small head size, problems with attention and hyperactivity or poor coordination; and verification of

maternal alcohol use during pregnancy.

"When doctors suspect a child has FAS, they sit down with the mother to confirm the diagnosis by discussing her drinking habits during pregnancy," Golding said. "It's not uncommon for the mother to deny consuming alcohol while pregnant. When they do, there's this stigma or this notion that women are lying about their alcohol use."

Golding said this research reveals a potential blind spot in the current diagnostic criteria for FAS, the most severe form of Fetal Alcohol Spectrum Disorder (FASD), which requires documentation of maternal alcohol use during pregnancy.

"Our research proves there's a plausible alternative explanation—the father's contribution, which has never been examined before," he said. "In this study, we call into question the dismissal of the mother's denial and really examine the capacity of male alcohol use to induce FAS growth defects."

Golding explained that findings from his holistic approach that examines both parents' contributions to FAS reveal the need for two critical changes.

"First is the recognition of the importance of male health in pregnancy outcomes and fetal health," he said.

Golding pointed out that paternal health before conception is a novel consideration in terms of pregnancy outcomes and fetal health; as a result, raising awareness of the role a father's health plays in his offspring's health is just as important as awareness of the mother's contributions from preconception and through gestation.

"Research examining fetal health is overwhelmingly focused on maternal

health," he said. "I'm not saying that this is not appropriate; I'm just saying it's not the complete picture and we need some balance.

"The second," he said, "is the fact that both parents are responsible for preventing alcohol-related birth defects."

FAS has significant, life-changing consequences for children.

Because their study identified FAS-related craniofacial differences in offspring born to fathers who regularly consumed alcohol at or more than the legal limit, Golding pointed out that both parents should commit to limiting or omitting their alcohol consumption before trying to become pregnant.

Ultimately, Golding emphasizes that the first step in this process is expanding messaging outreach about the reproductive dangers of alcohol use to both parents.

"Change the alcohol warning label to remove the maternal emphasis and put it on both parents to say, 'The decision to consume this beverage can have significant, life-changing consequences to a future child,'" he said. "Right now, the warning label only conveys part of the story. We must get that message out into the world as quickly as possible."

More information: Kara N. Thomas et al, Preconception paternal ethanol exposures induce alcohol-related craniofacial growth deficiencies in fetal offspring, *Journal of Clinical Investigation* (2023). [DOI: 10.1172/JCI167624](https://doi.org/10.1172/JCI167624)

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