

Drinking alcohol before conceiving a child could accelerate their aging—according to new research in mice

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The conditions within a person's home, family and community affect their ability to stay healthy. Scientists studying these [social determinants](#)

[of health](#) are trying to understand whether [nature or nurture](#) has a stronger effect on a person's ability to fight disease.

I am a [developmental physiologist](#) studying the ways that [drinking affects fetal development](#) and lifelong health. Although researchers have long recognized that a father's alcohol abuse negatively affects his children's [mental health and social development](#), it hasn't been clear if paternal drinking has any lasting biological effects on his offspring's physical health.

My lab's recently published research shows that chronic alcohol use from both parents has an enduring effect on the [next generation](#) by [causing their offspring to age faster](#) and become more susceptible to disease.

Fetal alcohol spectrum disorders

According to the National Institutes of Health, [nearly 11% of adults in the U.S.](#) have an [alcohol use disorder](#). Heavy drinking causes [multiple health issues](#), including [liver disease](#), [heart problems](#), declining cognitive function and [accelerated aging](#).

Parents may pass these health problems on to their children. [Fetal alcohol spectrum disorders](#) refer to a wide range of alcohol-related [physical, developmental and behavioral deficits](#) that affect as many as [1 in 20 U.S. schoolchildren](#).

Children with [fetal alcohol spectrum disorders](#) experience an early onset of [adult diseases](#), including type 2 diabetes and heart disease. Cardiovascular disease first appears [during adolescence](#) for people with these disorders, while the rest of the population is affected typically in their 40s and 50s. Children with fetal alcohol spectrum disorders are also more likely [to be hospitalized](#) and have [lifespans that are 40% shorter](#) than children without these conditions.

However, it has been unclear whether these health problems are because of life circumstances—people with fetal alcohol spectrum disorders have high rates of [psychiatric disorders](#), which cause stress that makes them more susceptible to aging and disease—or if their parents' substance use directly causes lasting negative effects to their health. In other words, can a parent's alcohol abuse before conception directly influence their offspring's physical health and lifespan?

Mom and dad drinking

In our study, my colleagues and I used a [mouse model](#) to measure the effects that alcohol use by mom, dad or both parents around the time of conception have on their offspring aging and chronic disease. The mice chose when and how much alcohol to drink.

We found that paternal and maternal drinking both cause harmful changes to their [offspring's mitochondria](#). Mitochondria—often called the battery of the cell—[control many aspects of aging and health](#). Like a cellphone battery, mitochondria deteriorate over time and cause cells to lose their ability to repair damage and control metabolism.

Our experiments in mice show that dad's drinking causes a defect in mitochondrial function that first emerges [during fetal development](#) and [persists into adult life](#), causing the offspring to age faster. For example, paternal alcohol exposure caused a twofold increase in age-related liver disease, suggesting that parental alcohol use—particularly by the father—could have significant implications on aging and age-related diseases.

Importantly, we found that when both parents drank, the effects on their offspring were [worse than when only one parent](#) consumed alcohol. For example, we observed a threefold increase in age-related liver scarring when both parents consumed alcohol.

Treating fetal alcohol syndrome

People with fetal alcohol syndrome [face lifelong challenges](#), including problems with hand-eye coordination and difficulties with memory and attention.

[Early educational interventions](#) for children with fetal alcohol spectrum disorders, like using visual and auditory materials instead of print, can provide additional structure to help facilitate learning.

Although my team and I examined chronic alcohol exposure, we do not know if moderate alcohol use also causes mitochondrial problems. We also don't know if these same effects emerge in people who haven't been diagnosed with fetal alcohol spectrum disorders but whose parents drank heavily. Whether paternal drinking influences human embryonic development is still unclear, although [emerging studies](#) are beginning to suggest it does.

The next step is to explore if interventions that focus on mitochondrial health, [such as exercise](#) and [specific diets](#), can improve health outcomes for people with fetal alcohol spectrum disorders.

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