

Study finds unhealthy air quality from wildfires may impact fertility treatments

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As climate change fuels increases in wildfires, researchers at OHSU's Center for Women's Health are investigating the effects of chronic smoke exposure on reproductive health outcomes. Credit: OHSU

As wildfires throughout the West rage on, Oregon Health & Science University researchers have continued to investigate poor air quality's

effects on health, and have discovered potential impacts on reproductive outcomes—including for patients undergoing fertility treatments.

In a study [published](#) in the journal *Fertility & Sterility*, OHSU researchers investigated the impact of unhealthy air quality from the 2020 Oregon [wildfires](#) on outcomes for patients undergoing in vitro fertilization [treatment](#), or IVF. They found patients exposed to wildfire smoke during the development phase of their treatment cycle yielded fewer blastocysts, which are the many-cell embryos that develop from a fertilized egg and can be transferred for pregnancy.

There is a growing body of evidence that chronic exposure to [poor air quality](#), often from heavy pollution or smoking, is associated with impaired [reproductive outcomes](#). As climate change brings more [severe weather](#), including earlier wildfire seasons, OHSU researchers wanted to better understand the effects of an acute, point-in-time exposure. So they looked to the 2020 wildfires, when Oregon's air quality was temporarily some of the worst in the world and broke historical records.

"The unfortunate reality is that we are seeing more wildfires because of climate change, so I worry about how this will continue to affect not only patients undergoing fertility treatments, but all individuals who are trying to conceive," said the study's lead author Molly Kornfield, M.D., assistant professor of reproductive endocrinology and infertility at the OHSU Center for Women's Health.

She notes that with over 200,000 patients nationally undergoing IVF treatments each year, this is an increasing concern among reproductive health and fertility experts.

"Of course, we need to take broader measures to slow [climate change](#) and reduce the impact and extent of these fires," Kornfield said. "But in the immediate term, IVF clinics can further increase the already

aggressive measures they take to protect air quality in the lab."

Air quality crises

The research team conducted a retrospective cohort study of 69 patients who underwent ovarian stimulation and IVF treatment during the six weeks preceding the September 2020 Oregon wildfires, which caused 10 days of unhealthy air quality.

During a standard IVF treatment cycle, patients first receive one to two weeks of hormone injections to stimulate the ovaries and grow eggs. They next undergo an egg retrieval, and then finally, over the course of the next week, the eggs are fertilized by sperm and grown into blastocysts that are either frozen for later use or immediately placed into a uterus in an embryo transfer.

Researchers found that wildfire smoke exposure during the blastocyst development phase yielded fewer blastocysts during that cycle when compared with the [control group](#), whose members had no wildfire smoke exposure. While most IVF cycles still had strong outcomes, providers may consider delaying IVF or embryo transfers for certain high-risk patients, Kornfield said.

Kornfield noted that the Portland metro area typically has excellent air quality, and emphasized that OHSU's fertility lab is outfitted with state-of-the-art air filtration systems. OHSU providers now perform IVF procedures in a new laboratory space with even more optimized air filtration, including a "submarine mode" for air quality emergencies.

Researchers said higher levels of air filtration may be needed in areas more prone to wildfires, including southern, central and eastern Oregon.

"Even in a lab with perfect air quality, patients are still living in the

world and facing high levels of exposure to wildfire smoke," Kornfield said. "Our hope is that this research informs preparedness measures that can ensure the best possible outcomes for our patients when we do face these serious air quality crises."

Looking ahead, researchers will continue to evaluate the effects of air quality on reproductive outcomes, including sperm count and quality; miscarriage rates; and whether transferring embryos affected by [wildfire](#)-polluted air could impact pregnancy outcomes. Researchers are also interested in studying these effects in naturally conceived pregnancies.

"We understand how much time and energy patients put into this process, and we will continue to take any and all measures to optimize fertility treatment outcomes," Kornfield said. "We encourage patients to discuss any concerns with their health team, who can provide personalized, evidence-based recommendations."

More information: Molly Kornfield et al, Unhealthy air quality secondary to wildfires is associated with lower blastocyst yield, *Fertility and Sterility* (2024). [DOI: 10.1016/j.fertnstert.2023.12.026](https://doi.org/10.1016/j.fertnstert.2023.12.026)

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