Study finds air pollution reaches placenta during pregnancy

September 17 2019, by Lauran Neergaard

In this Aug. 7, 2018 file photo, a doctor performs an ultrasound scan on a pregnant woman at a hospital in Chicago. A new study released Tuesday, Sept. 17, 2019, suggests when a pregnant woman breathes in air pollution, it can travel beyond her lungs to the placenta that guards her fetus. During pregnancy, particle pollution is linked to premature births and low birth weight, but scientists don't understand why. (AP Photo/Teresa Crawford, File)

A new study suggests when a pregnant woman breathes in air pollution, it can travel beyond her lungs to the placenta that guards her fetus.

Pollution composed of tiny particles from car exhaust, factory smokestacks and other sources is dangerous to everyone's health, and during pregnancy it's been linked to premature births and low birth weight. But scientists don't understand why, something that could affect care for women in highly polluted areas. One theory is that the particles lodge in mom's lungs and trigger potentially harmful inflammation.

Tuesday, Belgian researchers reported another possibility, that any risk might be more direct.

A novel scanning technique spotted a type of particle pollution—sootlike black carbon—on placentas donated by 28 new mothers, they reported in *Nature Communications*.

The placenta nourishes a developing fetus and tries to block damaging substances in the mother's bloodstream. The Hasselt University team found the particles accumulated on the side of the placenta closest to the fetus, near where the umbilical cord emerges.

That's not proof the soot actually crossed the placenta to reach the fetus—or that it's responsible for any ill effects, cautioned Dr. Yoel Sadovsky of the University of Pittsburgh Medical Center, a leading placenta expert who wasn't involved with the new research.

And it's a small study.

Still, "just finding it at the placenta is important," Sadovsky said. "The next question would be how much of these black carbon particles need to be there to cause damage."

Scientists already had some clues from animal studies that particles could reach the placenta, but Tuesday's study is a first with human placentas. The Belgian researchers developed a way to scan placenta samples using ultra-short pulses from a laser that made the black carbon particles flash a bright white light, so they could be measured.

The researchers included placentas from 10 mothers who lived in areas with high pollution and 10 others from low areas. The higher the exposure to pollution, the more particles the researchers counted in the placentas.

"As the fetal organs are under full development, this might have some health risks," said Hasselt environment and public health specialist Tim Nawrot, the study's senior author. He is doing additional research to try to tell.

More information: Hannelore Bové et al. Ambient black carbon particles reach the fetal side of human placenta, *Nature Communications* (2019). DOI: 10.1038/s41467-019-11654-3