'Even one cigarette' in pregnancy can raise risk of babies' death, Seattle Children's and Microsoft find

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It's no surprise that smoking during pregnancy is unhealthy for the fetus—just as it's unhealthy for the person smoking. But the powerful

combination of medical research and data science has given new insights into the risks involved, specifically when it comes to babies suddenly dying in their sleep.

The risk of Sudden Unexpected Infant Death (SUID) increases with every cigarette smoked during pregnancy, according to a joint study by Seattle Children's Research Institute and Microsoft data scientists.

Further, while smoking less or quitting during pregnancy can help significantly, a risk of SUID exists even if a person stops smoking right before becoming pregnant, the team demonstrated.

"Any amount of smoking, even one cigarette (per day), can double your risk," said Tatiana Anderson, a post-doctoral research fellow at Children's who worked on the study, published in the journal *Pediatrics*.

Anderson and the rest of the team estimate that smoking during pregnancy is responsible for 800 of the approximately 3,700 SUID deaths in the United States every year. That's 22 percent of all SUID cases.

The team analyzed vast data sets from the Centers for Disease Control and Prevention (CDC) that included every baby born in the United States from 2007 to 2011. In that time span, more than 20 million babies were born and 19,127 died of SUID, which includes Sudden Infant Death Syndrome (SIDS).

The study found that the risk of SUID doubles if a person goes from not smoking to smoking just one cigarette daily throughout pregnancy. At a pack a day (20 cigarettes), the risk is tripled compared to nonsmokers. The odds plateau from there.

The chance of SUID decreases when women quit smoking or smoke

less: Women who tapered their smoking by the [third trimester](link) showed a 12 percent decreased risk. Quitting altogether by the third trimester lowered the risk of SUID by 23 percent.

The biggest predictor of SUID risk was the average number of cigarettes smoked daily throughout the three trimesters of pregnancy, rather than smoking more or less at any particular point.

"Thus, a woman who smoked 20 cigarettes per day in the first trimester and reduced to 10 cigarettes per day in subsequent trimesters had a similarly reduced SUID risk as a woman who averaged 13 cigarettes per day in each trimester," the study states.

Having such precise data about the effects of smoking before and during pregnancy better arms health-care providers to speak with their patients, Anderson said.

"Doctors need to have frank discussions with patients," she said. "Every cigarette you can eliminate on a daily basis will reduce your risk of SUID."

Microsoft data scientists teamed up with the Children's researchers after John Kahan, who heads up customer data and analytics for Microsoft, lost his son Aaron to SIDS in 2003. After Aaron's death, days after he came home from the hospital, Kahan started the Aaron Matthew SIDS Research Guild. In 2016, he climbed Mount Kilimanjaro to raise money for SIDS research.

When he returned from Africa, he found out his team at Microsoft had been working with the available data on infant deaths. Their goal was to use algorithms to analyze the data and help come up with a way to save babies like Aaron from SUID.

Juan Lavista, a member of Kahan's team at that time, is now the senior director of [data science](link) at the AI For Good research lab, which is part of an initiative called AI for Humanitarian Action, launched by Microsoft president Brad Smith. The idea behind the initiative is to use artificial intelligence to tackle some of the world's most difficult problems, and it has allowed Lavista to work on things like the SUID study full time instead of cramming it in around his day job.

Data scientists can use computing power to work with huge data sets to help solve confounding issues like SUID, climate change and immigration, Lavista said.

"There are many problems the world has that, we believe, we can make a difference with AI," he said.

The collaboration has been exciting for Anderson, the Children's research fellow. She says this unusual partnership between the medical world and the technology sector has applications in many different fields.

"I think it is really exciting because it is a concept that absolutely can be used to ask questions outside of SIDS," Anderson said. "Everybody is there because they want to make a difference. It is very much a collaborative effort."

The scientists at Microsoft and Children's aren't stopping with the publication of this study. Lavista said they are delving into other questions surrounding SUID, such as the impact of prenatal care, how the age of an infant relates to sudden death and an examination of what SUID looks like in all 50 states.

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