

# Effects of prenatal smoking on infant neurodevelopment may be worse than feared: study

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In one of the largest studies of its kind to date, researchers have found that babies born to mothers who smoke while pregnant face substantial delays in early neurological development, and the effects may be stronger than researchers had previously thought.

According to the study, published in the *Journal of Human Capital*, smoking may cause as much as a 40 percentage point increase in the probability of being at risk of developmental problems in babies between 3 and 24 months old. The effects were strongest among children from [poor families](#), the research found.

"This study underscores the dangers of prenatal smoking," said George Wehby, a professor at the University of Iowa's College of Public Health and the study's lead author. "We hope it also highlights the need for continued efforts to discourage expectant mothers from smoking."

Study subjects were recruited from health clinics in Argentina, Brazil, and Chile. In all, nearly 1,600 children were included, making this one of the largest studies of prenatal smoking and neurodevelopment. The researchers surveyed mothers about their smoking habits, and neurological screening, which included [cognitive tests](#) and assessments of communication and basic [neurological function](#), were administered to children by trained physicians.

Nearly 11 percent of mothers in the sample had smoked during pregnancy.

Part of the reason smoking affects poor children to a greater degree is that poor mothers who smoke tend to do so in greater quantity, the study found. But the number of [cigarettes](#) doesn't fully explain the difference. "Being of higher [socioeconomic status](#) may offset some of the adverse smoking effects through better [health behaviors](#) and improved access to [prenatal care](#)," Wehby said.

Previous studies have found similar adverse effects of prenatal smoking, but no previous work has tried to isolate the smoking effect from other potentially confounding factors, the researchers say. For example, mothers who smoke may also be more likely to drink and engage in other activities that could harm their babies. If that's the case, then studies may overestimate the [adverse effects](#) of cigarettes. On the other hand, women who have high risk pregnancies have an extra incentive to avoid smoking, but still have babies with reduced neurodevelopment. If that's the case, then studies may underestimate the effects of smoking.

Wehby and his team used a statistical technique that helps to account for these biases, which are difficult to observe directly. They took advantage of differences in smoking behaviors across the geographic locations of the mothers. Geographic differences in smoking are expected to be caused by variation in cigarettes prices and smoking policies, but are unlikely to be related to the unobservable individual-level preference for taking risk. This control allows the researchers to pin-point the smoking effect specifically.

With the controls in place, the smoking effect was found to be stronger than without them, suggesting previous studies that didn't use such controls had actually underestimated the effects of smoking.

Despite increased awareness of the dangers of smoking, rates of prenatal smoking remain surprisingly high. According to the Centers for Disease Control and Prevention, 12 percent of pregnant American women reported that they smoked while pregnant in 2005.

"Given the importance of early child health and neurodevelopment for future wellbeing, targeted interventions to reduce prenatal [smoking](#) may result in significant improvements in child development and long-run human capital," Wehby said.

**More information:** George L. Wehby, Kaitlin Prater, Ann Marie McCarthy, Eduardo E. Castilla, Jeffrey C. Murray, "The Impact of Maternal Smoking during Pregnancy on Early Child Neurodevelopment." *Journal of Human Capital* 5:2 (Summer 2011).

Provided by University of Chicago

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