

# Common pregnancy complications may slow development of infant in the womb, study finds

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Gestational diabetes and preeclampsia may be linked to slower biological development in infants, according to a new study led by USC.

The research, published today in *JAMA Network Open*, found that newborns exposed to these two pregnancy complications were biologically younger than their chronologic gestational age. The infants' biological or "epigenetic" age is based on molecular markers in their cells.

The results raise intriguing questions about how common pregnancy complications may affect infants and health outcomes later in childhood. Could they create developmental delays? Could some exposures advance biological age prematurely, even in the womb? What about stressors such as exposures to [environmental pollution](#)?

"In aging research, if your epigenetic 'clock' shows an [older age](#) than your chronological age—due to exposures to various stressors—that's viewed as bad, as putting people at increased risks for illness," said corresponding author Carrie Breton, a professor of population and public health sciences at the Keck School of Medicine of USC. "We wondered how far back we could take this concept; could we take it to the womb?"

"In this case we found the opposite—[pregnancy complications](#) led to babies with a younger [biological age](#). This raises a ton of questions about the impact later in life. This is a fairly new metric and very little is known about it."

For the study, researchers collected DNA samples from 1,801 newborns from 12 cohorts across the U.S. The participants were born between 1998 and 2008 to mothers who had preeclampsia, [gestational diabetes](#) or hypertension during pregnancies and compared to pregnancies without any of these complications.

The researchers used these samples to evaluate each infant's epigenetic age. They then compared the epigenetic age to the infant's [chronological age](#) at birth, measured in pregnancy weeks.

The researchers found that babies who were exposed to preeclampsia or gestational diabetes while they were developing in the womb were biologically younger than babies without the exposures, indicating that these exposures may have slowed down the babies' biological development. The difference was more noticeable in female babies compared to male babies. Exposure to hypertension didn't have a measurable impact.

"In the future, we plan to continue our research with a larger sample of participants and investigate whether these biological changes detected at birth are linked to [health outcomes](#) later in childhood," said Breton. "If so, doctors and researchers could use that knowledge to develop targeted interventions that can reduce the adverse effects of preeclampsia and gestational diabetes on children's health."

**More information:** Analysis of pregnancy complications and epigenetic gestational age of newborns, *JAMA Network Open* (2023). [DOI: 10.1001/jamanetworkopen.2023.0672](https://doi.org/10.1001/jamanetworkopen.2023.0672)

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