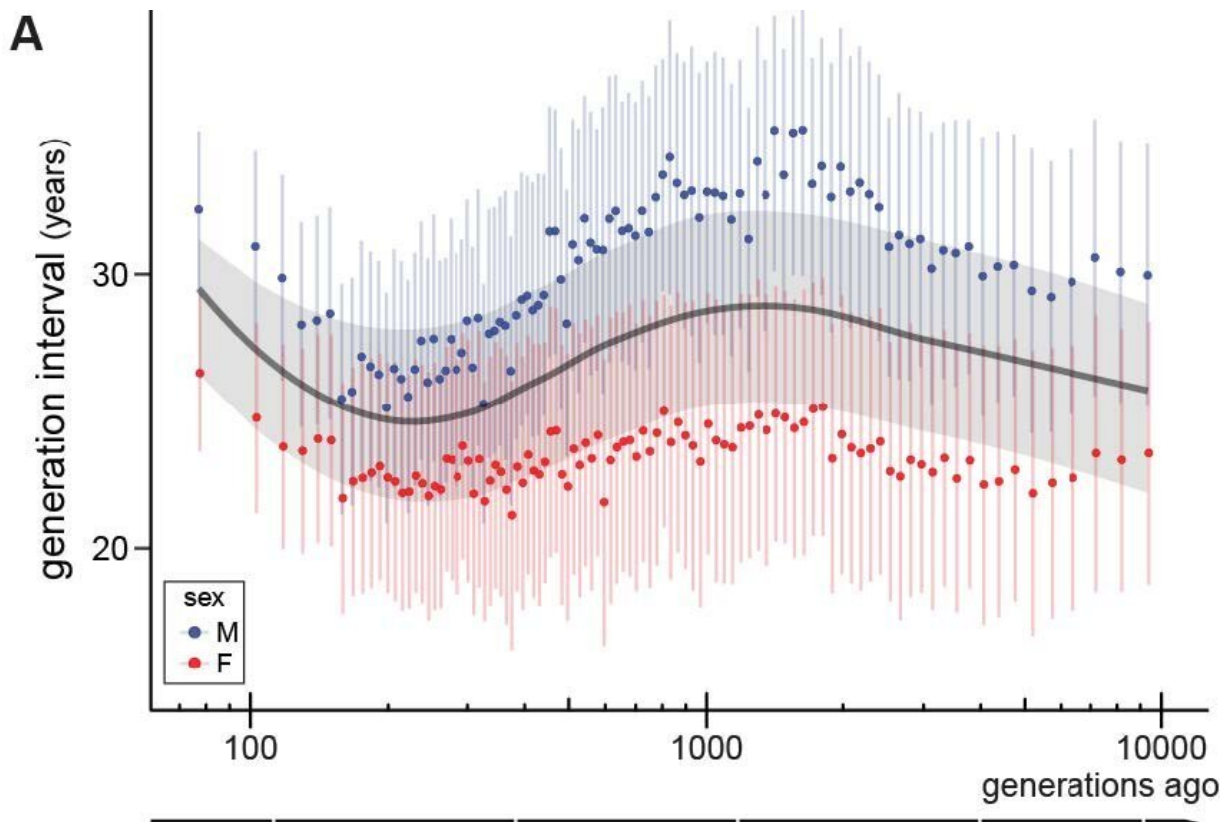


Study reveals average age at conception for men versus women over past 250,000 years

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Graphs showing the average age at conception for men versus women over the past 250,000 years. Credit: Hahn, Wang, et. al., Indiana University

The length of a specific generation can tell us a lot about the biology and social organization of humans. Now, researchers at Indiana University

can determine the average age that women and men had children throughout human evolutionary history with a new method they developed using DNA mutations.

The researchers said this work can help us understand the [environmental challenges](#) experienced by our ancestors and may also help us in predicting the effects of future environmental change on [human societies](#).

"Through our research on [modern humans](#), we noticed that we could predict the age at which people had children from the types of DNA mutations they left to their children," said study co-author Matthew Hahn, Distinguished Professor of biology in the College of Arts and Sciences and of computer science in the Luddy School of Informatics, Computing and Engineering at IU Bloomington. "We then applied this model to our human ancestors to determine what age our ancestors procreated."

According to the study, [published today in *Science Advances*](#) and co-authored by IU post-doctoral researcher Richard Wang, the average age that humans had children throughout the past 250,000 years is 26.9. Furthermore, fathers were consistently older, at 30.7 years on average, than mothers, at 23.2 years on average, but the age gap has shrunk in the past 5,000 years, with the study's most recent estimates of maternal age averaging 26.4 years. The shrinking gap seems to largely be due to mothers having children at older ages.

Other than the recent uptick in maternal age at childbirth, the researchers found that parental age has not increased steadily from the past and may have dipped around 10,000 years ago because of [population growth](#) coinciding with the rise of civilization.

"These mutations from the past accumulate with every generation and

exist in humans today," Wang said. "We can now identify these mutations, see how they differ between male and female parents, and how they change as a function of parental age."

Children's DNA inherited from their parents contains roughly 25 to 75 new mutations, which allows scientists to compare the parents and offspring, and then to classify the kind of mutation that occurred. When looking at mutations in thousands of children, IU researchers noticed a pattern: The kinds of mutations that children get depend on the ages of the mother and the father.

Previous genetic approaches to determining historical generation times relied on the compounding effects of either recombination or mutation of modern human DNA sequence divergence from ancient samples. But the results were averaged across both males and females and across the past 40,000 to 45,000 years.

Hahn, Wang and their co-authors built a model that uses de novo mutations—a genetic alteration that is present for the first time in one family member as a result of a variant or mutation in a germ cell of one of the parents or that arises in the fertilized egg during early embryogenesis—to separately estimate the male and female generation times at many different points throughout the past 250,000 years.

The researchers were not originally seeking to understand the relationship of gender and age at conception over time; they were conducting a broader investigation about the number of [mutations](#) passed from parents to [children](#). They only noticed the age-based mutation patterns while seeking to understand differences and similarities between these patterns in humans versus other mammals, such as cats, bears and macaques.

"The story of human history is pieced together from a diverse set of

sources: written records, [archaeological findings](#), fossils, etc.," Wang said. "Our genomes, the DNA found in every one of our cells, offer a kind of manuscript of human evolutionary history. The findings from our [genetic analysis](#) confirm some things we knew from other sources (such as the recent rise in parental age), but also offer a richer understanding of the demography of ancient humans. These findings contribute to a better understanding of our shared history."

Additional contributors to this research were Samer I. Al-Saffar, a graduate student at IU at the time of the study, and Jeffrey Rogers of the Baylor College of Medicine.

More information: Richard Wang, Human generation times across the past 250,000 years, *Science Advances* (2023). [DOI: 10.1126/sciadv.abm7047](#).
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