

Pregnant mothers influence fetal growth through genetics rather than maternal height

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Transmitted genes, rather than growth limitations caused by actual differences in maternal height, are the key means by which a mother's height influences her baby's birth weight and length, according to a new study published this week in *PLOS Medicine*. The report from Ge Zhang and Louis Muglia of Cincinnati Children's Hospital Medical Center and the March of Dimes Prematurity Research Center Ohio Collaborative and colleagues does, however, suggest that maternal height can directly mediate duration of gestation.

Compared to tall [mothers](#), short mothers tend to deliver their babies at earlier gestational ages, with lower birth weights and lengths. To understand whether these associations were causative, Zhang and

colleagues analyzed infant size and genetic data, including [single nucleotide polymorphisms](#) (SNPs), which mark differences between individuals in genes related to specific characteristics (such as height) obtained from 3,485 Nordic mother/baby pairs. The researchers conducted a type of analysis called Mendelian Randomization, which probed for associations between genetically predicted maternal height and duration of gestation, newborn length, and newborn weight. Birth length and weight were significantly associated with the maternal transmitted height-associated SNPs (p-values 8.08E-05 and 4.02E-12), but the associations with the non-transmitted SNPs were far less significant (p-values 0.0405 and 0.404). However, gestational age was significantly but modestly associated with the maternal non-transmitted SNPs (p-value 0.0424).

The use of the mother's non-transmitted alleles (specific variants of genes) in causal inference is an important advantage of the study. Because non-transmitted alleles will influence fetal growth exclusively via the characteristics of the mother, while transmitted alleles act within both mother and fetus, the study of non-transmitted alleles is central to teasing out the direct role of maternal height in [fetal growth](#). However, confirmation in additional cohorts is warranted, as the study participants here may not have been broadly representative of their populations. Additionally, these findings may not be generalizable to low- and middle- income countries, where nutrition-related factors may substantially restrict growth. The authors state, "[d]isentangling these different mechanisms underlying the association between maternal height and pregnancy outcomes is important, as the knowledge may enhance our understanding of the genetic and environmental etiology of these important pregnancy outcomes and how they impact health."

More information: Zhang G, Bacelis J, Lengyel C, Teramo K, Hallman M, Helgeland Ø, et al. (2015) Assessing the Causal Relationship of Maternal Height on Birth Size and Gestational Age at

Birth: A Mendelian Randomization Analysis. *PLoS Med* 12(8): e1001865. DOI: [10.1371/journal.pmed.1001865](https://doi.org/10.1371/journal.pmed.1001865)

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