

# Social determinants of health linked to faster genetic aging

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Scientists already knew that cardiovascular health can be affected by social determinants of health that include a person's neighborhood, education, access to healthy foods and economic stability. But new research offers a clue as to why: accelerated biological aging.

For the new study, researchers considered epigenetic age acceleration.

Epigenetics research looks at how the environment can affect the way DNA is read and offers a potential explanation for how one's lived experience can alter the way their genes work. Unlike chronological age, epigenetic age is a measure of those changes in cells, tissues and organ systems.

Researchers analyzed the [health data](#) of 2,932 Black and white adults in the Coronary Artery Risk Development in Young Adults study, or [CARDIA](#), which began in the mid-1980s. The participants were 45 years old on average and had enrolled in CARDIA in their late teens or 20s.

To measure [cardiovascular risk](#), researchers examined an individual's coronary artery calcium level—the amount of plaque in the vessels that supply blood to the heart—and the left ventricular mass index, a measurement of the thickness and efficiency of the heart's left pumping chamber.

During their seventh year of participation, the individuals were measured for certain social determinants of [health](#): residential racial segregation, neighborhood poverty levels, [food insecurity](#), difficulty paying for basic necessities or health care, and the education level of participants or their parents.

Researchers found that by the 25th year of participation, all of the measured social determinants were associated with thicker ventricle muscles in the heart. Food insecurity and difficulty paying for basic necessities and health care also were associated with higher coronary artery calcium levels.

Next, researchers examined DNA in blood samples for epigenetic changes, or whether [social factors](#) may be associated with the age acceleration of genes. Several factors were found to have a notable impact: 32% of the relationship between education and heart muscle

thickness could be explained statistically by epigenetic aging. For residential racial segregation, the relationship was 24%, and for neighborhood poverty, 21%.

The findings suggest epigenetic changes may partly explain why social factors affect heart muscle thickness, lead researcher Havisha Pedamallu said.

"Showing that epigenetic age acceleration accounts for over 30% of the relationship between education and worsened [cardiovascular health](#) is a pretty important finding," said Pedamallu, a medical and public health student at Northwestern University's Feinberg School of Medicine in Chicago. "We're beginning to show that there might be direct biological changes that are a result of social disadvantages."

The [findings](#) were presented earlier this month at the American Heart Association's [Scientific Sessions conference](#) in Philadelphia and are considered preliminary until full results are published in a peer-reviewed journal.

Pedamallu said the results pave the way for future DNA research to explore changes to the genome that worsen heart disease.

"Being able to identify the mechanism that goes on in our bodies would be incredibly important for finding novel ways of detection, treatment and early intervention," she said. "I really hope that more studies can push our medical system, our government and our society to better acknowledge social determinants of health and to put more effort into making them a priority in [health care](#)."

Pedamallu said the study was limited because it didn't show cause and effect, and it also looked at a limited number of social determinants of health. Because the field of epigenetics continues to evolve, more

accurate test methods may be developed in the future, she said.

Dr. Mario Sims, a professor of social medicine, population and public health at the University of California, Riverside School of Medicine, called the research "a fascinating study of things that aren't diagnosed in a regular office visit, things going on underneath the skin that can have a cascading effect on cardiovascular health downstream."

"I think it shows that clinicians, providers and [public health](#) practitioners need to develop ways where these social risk variables are included in their diagnoses," said Sims, who was not involved in the research. "We have to diagnose a person with heart disease from a holistic standpoint (which includes social determinants), not just from a behavioral or clinical risk standpoint."

**More information:** Havisha Pedamallu et al, Social Determinants of Health, Epigenetic Aging, and Subclinical Cardiovascular Disease: The Coronary Artery Risk Development in Young Adults (CARDIA) Study. [www.abstractsonline.com/pp8/?....1/presentation/12503](http://www.abstractsonline.com/pp8/?....1/presentation/12503)

Provided by American Heart Association

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