

Historic migration patterns are written in Americans' DNA

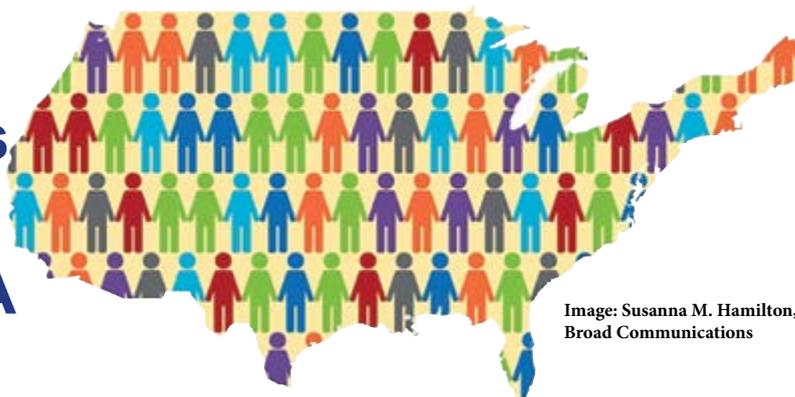


Image: Susanna M. Hamilton, Broad Communications

Genetic, geographic, and demographic data from more than 30,000 Americans reveal more genetic diversity within ancestry groups than previously thought.

Tom Ulrich | Broad Institute

March 5, 2020

The following press release was issued today by the Broad Institute of MIT and Harvard.

Studies of DNA from ancient human fossils have helped scientists to trace human migration routes around the world thousands of years ago. But can modern DNA tell us anything about more recent movements, especially in an ancestrally diverse melting pot like the United States?

To find out, researchers from the Broad Institute of MIT and Harvard, Massachusetts General Hospital (MGH), and [Massachusetts Institute of Technology \(MIT\)](#) analyzed data provided by more than 32,000 Americans as part of the National Geographic Society's Genographic Project.

This project, launched in 2005, asked Americans to provide their DNA along with their geographic and demographic data, including birth records and family histories, to learn more about human migration.

The research team found distinct genetic traces within many American populations that reflect the nation's complicated history of immigration, migration, and mixture.

Writing in the [American Journal of Human Genetics](#), the team also reported subtle but potentially important levels of diversity within certain groups, such as the Hispanic population.

They also call on genetics researchers to increase the ancestral diversity of the participants in their studies so that their findings capture more of the genetic diversity in US populations. This will help ensure that precision medicine will benefit as many people as possible in the US.

"Understanding the genetic structure of the US is important because it helps illuminate distinctions between populations that studies might not otherwise account for," said Alicia Martin. Alicia Martin is a geneticist in the Broad Institute's [Program in Medical and Population Genetics](#), a research

fellow in MGH's Analytical and Translational Genetics Unit, and co-senior author of the study with [Carlo Ratti](#), director of MIT's [Sensible City Lab](#).

"If we want genetic technologies to benefit everyone, we need to rethink our current approach for genetic studies because at the moment, they typically miss a huge swath of American diversity."

Martin, Ratti, and their colleagues, including study first author [Chengzhen Dai](#) of MIT's Department of [Electrical Engineering and Computer Science](#), partnered with the Genographic project. They wanted to understand the geographic patterns of genetic ancestry and admixture across the US over time, and learn how much people's genetics across the US reflect historic demographic events.

Some findings caught the researchers by surprise. For instance, their analysis revealed a striking diversity in the geographic origins of participants who identified as Hispanic or Latino.

The genetic patterns of these participants indicated a complex mixture of European, African, and Native American ancestries that varied widely depending on where participants lived, whether they were in California, Texas or Florida, for example.

Results like this, Martin noted, could hold implications for precision medicine as it becomes available to more and more Americans.

"There are subtle genetic differences within ancestry groups that arise from their population history," she said. "Those differences will be important but challenging to account for, especially as genetic testing is used by more diverse groups of patients than have been studied so far."

