

# The key to your health could be in your ZIP code

September 16 2015, by Brian S Schwartz And Annemarie Hirsch

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Where do you live? Mark Strozier/Flickr , CC BY-NC-ND

In January 2015, President Obama launched the [Precision Medicine Initiative](#), a plan to support research into treatment and prevention strategies that take differences [between people](#) – especially genetics –

into account.

However, precision medicine can't just look gene-deep. Where we live – the air we breathe, the water we drink, the environments around us – has a huge impact on our health and even on our DNA.

As a professor of [environmental health sciences](#), epidemiology and medicine and codirector of the Joint Geisinger-JHSPH Environmental Health Institute (EHI), I have been working with [electronic health](#) record data to link such environmental issues as [animal feeding operations](#), agricultural practices, unconventional [natural gas development](#) and [the built environment](#) to such outcomes as drug-resistant infections, diabetes and asthma control, pregnancy outcomes and obesity. Working with Dr Annemarie Hirsch, an epidemiologist in the EHI, we are seeking to discover how to translate these findings into the delivery of more precise clinical care.

Understanding more how our environment and social conditions shape our health could lead to better treatments and better preventive care. But two problems stand in our way before we can do this. The first is that these data aren't being collected. And if we were to start collecting them, [health care](#) providers wouldn't know how to use them.

## **Biology isn't the only thing that makes us different**

We know that our genetics can shape our health, but so can three other important factors. These are social determinants of health and community social and physical environments.

Social determinants of health include income, poverty and inequality. The social environment includes things like crime rates and the affluence of your neighborhood. When we talk about physical environment, we're talking about whether your neighborhood is designed to be walkable, has

access to healthy foods or has heavy industry.

These factors can affect your health in direct and indirect ways. For instance, breathing in a poison from a factory can directly cause asthma or cancer. Living in a neighborhood with access to healthy food within walking distance of your house can indirectly benefit your health.

In fact, many studies have documented that these three factors have a more powerful impact on health than do the individual biologic differences between people. For instance, income and educational attainment are at least as strongly associated [with hypoglycemia](#) in patients with diabetes as known clinical risk factors. Individuals living in neighborhoods with limited healthy eating and physical activity resources have a higher risk of being [diagnosed with type 2 diabetes](#).

Dr Risa Lavizzo-Mourey, president of the Robert Wood Johnson Foundation, [has stated that](#): "We know that a child's life expectancy is predicted more by his ZIP code than his genetic code."

That's not an overstatement. There are dramatic differences in life expectancy across the United States depending on [where you are born](#). The highest-longevity places tend to be in the Northeast and West and [the lowest in the South](#). While genetics and health care are critical, others [have argued](#) that "ZIP code, race, and class trump genetics and healthcare as predictors of health."

## **Cracking the ZNA code**

Dr Francis Collins, NIH director, [recently tweeted](#) that our ZIP code at birth is our "ZNA, "the blueprint for our behavioral and psychosocial make-up," critical determinants of health.

Recent technological advances in geographic information systems (GIS),

including digital software, maps and longitudinal data sets on socioeconomic and environmental factors, can be used to describe multiple aspects of an individual's community and environment. Just like we can sequence a person's DNA, we could use this data to sequence our "ZNA" from birth to death.

As [electronic health records](#) (EHR) become more common, it is possible to link new data collected about environment with patient medical records. And that link has relevance to clinical care and research, and perhaps most importantly, allows an increased focus on prevention.

## **We spend more on treating disease than on preventing it**

In the US, health spending accounts for [17%](#) of gross domestic product, among the highest of any country in the world. But US health outcomes rank in the middle of the pack for western industrialized economies. This disconnect between health care spending and outcomes has often been explained as the difference between clinical medicine and public health.

We spend much more on delivery of clinical services, often at the end of life to very sick patients, than we do on public health. Public health focuses on the health of a whole population, and often on preventing illness from happening in the first place. In trying to achieve its goals, public health considers social determinants of health and social and physical environments.

That's because the causes of disease are often more strongly rooted in factors outside the health care system – like where we live, what we eat, the air we breathe. But the health care system and its providers do not know about these community, economic, environmental, behavioral and

social causes of disease. Right now information is not typically collected nor sought about them.

## **These data are important, but we aren't ready to collect them yet**

Making sure [this valuable information](#) is collected and integrated into routine care could help solve that disconnect. But there are many [hurdles to proposals](#) for putting this information into use.

Right now [health care providers](#) don't get paid for collecting, documenting or using these data. And medical training and clinical care guidelines do not yet teach providers how to incorporate these factors into care, so they would need instruction on what to do with this new social, environmental and community information.

And most clinical risk models do not include environmental, community or social determinants of health. Researchers have noted, for instance, that the [Framingham Risk Score](#), which is used to predict risk of coronary heart disease, leads to underdiagnosis of cardiovascular disease in populations of low socioeconomic status (SES), because it doesn't take SES [into account](#). But integrating SES and other determinants of health in established risk calculators and clinical protocols will require investments by health care systems.

Policymakers and scientists are already meeting to develop a large-scale effort in response to the Precision Medicine Initiative. We believe that it is critical that community, economic, environmental, behavioral and [social determinants](#) of [health](#) are part of these discussions.

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