

Dr. Paul Robinson

Health is the result of many different influences that push and pull on the body. Exercise, diet, and genetics all tangle together in a web that health researchers are working to understand. Researchers are delving into the genome and teasing apart complex biochemical interactions to try to understand human health, but sometimes it is more helpful to zoom out and look at the whole picture. Medical geography does just that, using geographical information to look at social and ecological effects on health. One of the medical geographers visualizing health disparities is Dr. Paul Robinson of Charles Drew University.



“My research is focused on health and social disparities in an urban context,” Dr. Robinson explained. “I’m using geography to understand what factors affect people’s ability to live healthy, happy lives.” Using powerful imaging tools, Dr. Robinson is able to take health data and infer connections and relationships, investigating health disparities and geography, with a special emphasis on the African American urban experience. Dr. Robinson is an Assistant Professor, investigator in the Biomedical Informatics function, and Director of the Medical Geographic Information Systems (GIS) Laboratory at CDU.

A geographer by training, Dr. Robinson was drawn to using his expertise to address health and social issues. “While I was working on my dissertation for my Ph.D. at the University of Southern California, a faculty member at Charles Drew University encouraged me.” Dr. Senait Teklehaimanot, like many researchers in medicine and public health, realized that GIS can be a very powerful tool for studying health-related issues. “But GIS has a very steep learning curve,” Dr. Robinson said. “It is not Microsoft Word—you can’t just start the program and figure it out. They were looking for a geographer to pull in to their team. I got pulled in.”

Dr. Robinson moved into a full-time position at CDU in 2004. He is now director of the Charles Drew University GIS lab and has established collaborative relationships with researchers at California State University, Northridge (CSUN), University of California Los Angeles, and the RAND Corporation in Santa Monica, CA. His research has covered homicide clusters and gang violence in Los Angeles, alcohol outlets in inner cities, and racial and ethnic disparities in preventable hospitalizations in California. “As I’ve learned more what doctors and medical researchers need, I’ve been better able to conceptualize

questions that we can look at with GIS. We could even use the technology to visualize genomic and molecular spaces, where spatial properties and interactions are important.”

Most recently, Dr. Robinson has a grant at the NIH under review that will help fund a project here in Los Angeles. Dr. Robinson will examine how availability of supermarkets and different kinds of food influence behaviors and outcomes related to atherosclerosis in 45-64 year-olds. “Once we understand what products people have access to, we can design more effective interventions,” Dr. Robinson explained.

In medical geography, both temporal and spatial resolution are key to understanding trends. Dr. Robinson explained that health data often comes linked with a zip code, but when you have different populations in one zip code, the resolution of that data are not fine enough. “Ideally, you would like to have something like a street address, to establish geo coordinates,” he said. “If you lose resolution you lose some of your ability to see and understand what is happening.”

Factors in the local environment can group together and create what Dr. Robinson calls ‘neighborhood effects’. In a paper published recently about gang violence, Dr. Robinson argues that these neighborhood effects show that homicide does not increase because there are more ‘bad’ people, but because people are strongly affected by the local environments they are living in. He sees the same kind of pattern in health data. “For example, food security is an issue. Neighborhoods with less diversity in food sources are in a valley of accessibility. Areas with high food diversity also tend to have lower prices and are mountains. In Los Angeles you have valleys downtown and the mountains of West LA.” His data visualizations make this comparison striking.

“We also see fractals in health disparities,” Dr. Robinson said. “That is, the same patterns you see at a global scale or a national scale, you see here in LA County.” He observed the Colorado has the lowest occurrence of obesity, in part because many of the inhabitants of Colorado live at the interface of the Rocky Mountains. The hilly terrain and culture of outdoor activities encourages exercise. Here in Los Angeles, obesity declines as you head into the hills. When people have easier access to hiking trails and parks, they tend to exercise more.

There are many issues that can be investigated using geographic methods. Visualizing the data helps to bring connections to the light that otherwise might remain hidden in the numbers. Once those patterns are understood, change can happen.

“With a greater understanding of statistical relationships between local nutritional environments and disease, we can make policy and public health recommendations,” Dr. Robinson said.