

QnAs with Mary C. Waters

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In 2005, Hurricane Katrina, a massive Category 3 storm, slammed into New Orleans, destroying levees, flooding most of the city, and forcing the relocation of thousands of residents. Some of these residents had been participating in a study of the effects of community college on low-income parents. Katrina proved the undoing of New Orleans as a data site for the original study, but National Academy of Sciences member Mary C. Waters found an unprecedented opportunity lying in the ruins. Waters, a professor of sociology at Harvard University, turned from her work in immigration to focus on the Katrina diaspora. Waters codirects the Resilience in Survivors of Katrina (RISK) Project, a comprehensive longitudinal study of low-income New Orleans residents in the aftermath of the storm. In her Inaugural Article (1), Waters uses the unique circumstances of Katrina to ask the oft-ignored converse of a well-studied phenomenon. Although much is known about the effects of a neighborhood's socioeconomic status on health, how residents' health affects their neighborhood attainment remains unclear.

PNAS: You have undertaken extensive research on racial and ethnic identity, immigration, and the transition to adulthood. How did you come to study Hurricane Katrina's effects on survivors?

Waters: It was a complete accident. I was part of a MacArthur network study, focusing on the transition to adulthood. Others in the network were studying the effect of community colleges on poverty. They were literally in the field doing the one-year follow-ups when the hurricane hit. With their portion of the study ruined, they handed the data off to my colleagues and me. We didn't know anything about disasters, but we knew that, for questions of physical and mental health, it was important to have data before and after. Within six months of the hurricane, we had found 82% of the respondents.

PNAS: How did one of the largest natural disasters in the United States provide a chance to study the effect of baseline health on the socioeconomic profile of the neighborhoods in which people ended up living?

Waters: It's like a natural experiment. People didn't have control over where they

ended up. Most of the city was flooded so there was forced relocation. Our respondents ended up in 31 different states and lots of different neighborhoods. Since people were forced to move, it's better than an experiment. One of the problems with the Moving to Opportunity experiment, which provides vouchers for people to move into higher income areas, is the low take-up rate of the vouchers. With Katrina, people had no choice. They had to move.

PNAS: In addition to the baseline data from 2003 to 2004, you were able to interview the survivors twice more in 2006–2007 and 2009–2010. What happened with this population of 569 young African American adults in the years after Hurricane Katrina?

Waters: Initially, we found that almost half met the criteria for PTSD [posttraumatic stress disorder]. There were widespread psychological effects of living through the trauma of a hurricane. After five years, many had returned to prehurricane health levels. Another study looked at sprawl. New Orleans is a very walkable city, unlike Houston, which is characterized by sprawl and is where many ended up. We found an increase in obesity in people who ended up in less walkable neighborhoods.

In this study, at baseline there was no relationship between health and neighborhood poverty. Four to five years after, there was a significant increase in neighborhood poverty for those in poor health at baseline (1). Differences persisted after adjustment for personal characteristics, such as family structure, economic resources, psychological distress, age, number of children, and welfare and cash assistance, as well as baseline neighborhood poverty, hurricane exposure, and residence in the New Orleans metropolitan area.

PNAS: So those with poor health before the hurricane eventually ended up living in areas with high poverty, but the effect was not immediately evident. What was occurring during the 7–19 months immediately after the hurricane, during which no effects were seen?

Waters: We do have some qualitative data from interviews about that. It was very random where people ended up. It was random which bus you got on as you were leaving



Mary C. Waters. Image courtesy of Romana Vysatova.

New Orleans or which church sponsored you. Over time, people moved to be closer to family or friends or employment. At one year, people hadn't had time to choose a neighborhood so there was still a random distribution.

PNAS: Your Inaugural Article (1) notes that many studies have examined the effects of neighborhoods on residents' health but few have explored how a person's health determines their neighborhood. Why is that?

Waters: It's really hard to tease out these questions. There are lots of things correlated with health: factors that are very hard to control for, like poverty and racial concentration. It's unusual to have a longitudinal study like this. Most studies of disasters follow people for a few months only. We are able to look at how many effects dissipate after a while and how many are lasting. We don't have a very good sense of the means by which health affects neighborhoods. We have speculation that it has something to do with social support. One question we would like to answer at 10 years out, next year in 2015, is if there is

This is a QnAs with a recently elected member of the National Academy of Sciences to accompany the member's Inaugural Article on page 16246.

a greater effect of health on neighborhood than what we found five years after the storm. For instance, over time are people with poor health constrained in decision making? If it stands up, we would expect to see the relationship between baseline health and neighborhood poverty be even stronger 10 years out.

PNAS: Although you note that events that produce a shock-induced mobility like Katrina

are rare, how do you think the results should inform other research questions or policy?

Waters: We want to get neighborhood and health researchers thinking. If people are selecting into poor neighborhoods in part due to poor health, as well as poor neighborhoods contributing to poor health, how can scholars not privilege one kind of causation over another? A natural disaster creates this forced migration, but housing policies, such

as Section 8 vouchers, which give a range of geographic choices to recipients, could also be influenced by health selection processes that limit the ability of poor people to sustain moves to better neighborhoods.

1 Arcaya MC, Subramanian SV, Rhodes JE, Waters MC (2014) Role of health in predicting moves to poor neighborhoods among Hurricane Katrina survivors. *Proc Natl Acad Sci USA* 111:16246–16253.