

Migration, Population Mixing and Mortality: A Spatial Analysis

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Abstract

Population mixing can have dramatic health effects, as seen with the Spanish introduction of smallpox to New World inhabitants. Health effects can also be subtle, especially given the long latency of some diseases (e.g., cancers). In this paper we investigate how measures of population mixing relate to the relative health of populations at the county level. Assessment of the stable population is necessary to correctly determine the “at-risk” population for either the incidence or prevalence of morbidity/mortality within a population. Further, understanding population migration flows can reveal the role that “place” versus the “population” (or community) play in morbidity and mortality outcomes. We categorize the dataset by non-metro versus metro and, separately, healthy (persistently low mortality) versus unhealthy (persistently high mortality) counties. Using all-causes-of-mortality as the health outcome, we test the importance of county-level population stability, in-migration and out-migration.

Our results are generally supportive of both the population mixing literature and our initial hypotheses. We have shown that both population stability and in-and out-migration rates are correlated with county level mortality rates, supporting conclusions reached by Davey Smith et al. (1998). Additionally, our research supports the conclusion that population mixing must be accounted for in the calculation of incidence or prevalence rates, per Boyle et al. (2002), Morgan et al. (2000), Marmot (1993/1994) and Polissar (1980).

Second, our findings parallel a study of U.S. county-to-county migration by the poor, which found evidence that “the migration patterns of both the poor and non-poor tended to maintain and reinforce the pre-existing spatial concentration of poverty,” (Nord, 1998:329). Our analyses have demonstrated that both in- and out-migration rates to a county are negatively associated with mortality, while population stability rates in the county are positively associated

with mortality, a finding strongly supportive of the conclusions of Brimblecombe et al (2000). A notable exception to our expected hypothesis is the finding that both in- and out-migration are not currently beneficial to county-level mortality rates in relatively unhealthy counties, whereas population stability remains associated with higher mortality in that group of counties.

These findings are particularly of note given the increasing population mobility in the U.S., as well as the increasing reliance on county-level health measures as a means of allocating health resources. It is important to quantify the role and magnitude that population mixing may play in effecting county-level rates that are later used for policy making. The reader is cautioned to note that the data set links migration for only two points in time (1985 and 1990) and does not attempt to link other possible years or multiple moves. Thus, this research is merely the initiation in terms of assessing the actual impact of population flows on spatially based health measures.

In sum, both in- and out-migration rates are negatively associated with mortality rates except in unhealthy places, while population stability (non-movers) is positively associated with mortality rates no matter how counties are grouped. This finding supports previous research from other countries, indicating that healthy people move from unhealthy places while unhealthy people remain in unhealthy places. This is also supportive of parallel research in the migration patterns of the poor, in which migration is found to maintain and reinforce spatial concentrations of poverty. We conclude that population stability reinforces ill-health status of county populations while in- and out-migration is correlated with improving county-level health status. In future research we will examine migration patterns between counties as a means of identifying flows between healthy and unhealthy places.