Health expenditure inequality among foreign-born and U.S.-born adults:

Examining education gradients in health care and structural assimilation indicators

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Introduction

Immigrant-native health disparities have garnered significant attention in recent years, notably because of the growth of the U.S. immigrant population. Between 1990 and 2010, the number of foreign-born U.S. residents nearly doubled from 20 million to 40 million, accounting for 13% of the total U.S. population by the end of the period (Martin and Midgley 2010). While there is evidence that the foreign born may be healthier in some cases than their U.S.-born counterparts, namely the Hispanic or epidemiologic paradox in infant and adult mortality (Abraído-Lanza et al. 1999; Hummer et al. 2007; Markides and Eschbach 2005), more research has focused on why immigrants have poorer or declining health and/or worse health care access. Since the passage of the Immigration and Nationality Act of 1965 that dramatically changed the national origins of immigrants as well as the 1996 welfare reform law that restricted federal public benefits for non-citizens, immigrants' vulnerability and its effect on their often-U.S.-born children has been emphasized (Derose, Escarce, and Lurie 2007).

An often overlooked part of this research compares immigrants' and natives' health care expenditures and considers the reasons for and/or characteristics that influence immigrants' potentially disadvantaged position within the health care system (see Tarraf, Miranda, and Gonzalez 2012). In

addition, few studies have analyzed education gradients in health care or the gradients among diverse (in terms of nativity) race/ethnic groups. With respect to some health outcomes, Hispanics have been found to have relatively weak education differentials in terms of obesity, smoking, low birthweight, and other health outcomes (Acevedo-Garcia, Soobader, and Berkman 2005; Goldman et al. 2006; Kimbro et al. 2008; Sánchez-Vaznaugh et al. 2009). Goldman et al. (2006) found that the education gradients in smoking and work limitations were weaker (less negative) among Mexican immigrants than among U.S.-born Mexican Americans. What these weaker, flatter gradients mean in terms of immigrant-native health disparities and how they will change over time remains largely unanswered.

Using linked data from the Medical Expenditure Panel Survey (MEPS) and National Health Interview Survey (NHIS), the current study examines immigrant-native differences in health care expenditures and seeks to answer the following questions:

1. How are the patterns of health care expenditures by educational attainment, age, and sex among the immigrant population 25 years and older similar to or different from the total U.S.-born population and from U.S.-born non-Hispanic whites?
2. Are the differences in health care spending between immigrants and natives explained by the presence of chronic conditions, health insurance coverage, and/or income?
3. How do the answers to the previous two questions change when the immigrant population is further differentiated by region of birth, years in the U.S., citizenship status, and language ability, respectively?

Background

Since the passage of the Immigration and Nationality Act of 1965 that dramatically changed the national origins of immigrants as well as the 1996 welfare reform law that restricted federal public benefits for non-citizens, the scholarly community has increasingly focused on immigrants' vulnerability

and the characteristics or external barriers that delay structural assimilation (Alba and Nee 1997; Derose et al. 2007). In terms of access to health care, immigrants may experience legal barriers, which could negatively impact the quality and timeliness of health care as well as their overall health status (Derose et al. 2009; Ku and Matani 2001; Kullgren 2003; Ortega et al. 2007; Vargas Bustamante et al. 2012). In most states, legal non-citizens are restricted from accessing public health insurance and other public benefits for the first five years in the U.S., while undocumented immigrants are permanently banned from accessing public benefits. Ku and Matani (2001) revealed that non-citizen adults and children were less likely than native-born citizens to have Medicaid and/or job-based insurance coverage and a usual source of care and were more likely than the native born to be uninsured.

A second barrier to structural assimilation is language ability. Depending on country of origin and the English education infrastructure, immigrants may be unable to speak English fluently upon arrival to the U.S. Their inability to communicate effectively makes it difficult to visit a medical provider. In a study of U.S. Hispanics, DuBard and Gizlice (2008) found that access to health care was far worse for Spanish-speaking Hispanics than for English-speaking Hispanics. 55% of Spanish-speaking Hispanics lacked health insurance and 64% had not visited the doctor for a routine checkup in the past year compared to 23% and 55% of English-speaking Hispanics, respectively. For those that do visit a medical provider, the experience can be frustrating if the medical team does not speak their language or if a formal interpreter is not available. Even when professional or ad hoc interpreters (e.g., nurses, social workers, family members) are in the room, the chance for medical error is high (Flores et al. 2003).

Immigrants' legal and language barriers are linked to their relatively short duration in the U.S., either in terms of the absolute number of years or as a percentage of their lifetime. Numerous studies have supported number of years in the U.S. as a barrier to health care (Lebrun 2012; Leclere, Jensen, and Biddlecom 1994; Thamer et al. 1997). This relationship reflects immigrants' unfamiliarity with their new environment and lack of social support in addition to legal barriers to care and English language

deficiency. Where to obtain health insurance, where to go to the doctor and how to get there are examples of questions that immigrants may not have the resources to answer right away.

Education gradients in health: The immigrant case

Education gradients in health, part of the larger socioeconomic gradients in health literature, have been widely cited for a number of health behaviors and health outcomes (Adler and Newman 2002; Elo 2009; Herd, Goesling, and House 2007). In general, higher educational attainment, as measured by years of education or degrees obtained, corresponds to a healthier lifestyle and better physical health. Mirowsky and Ross (2003) claim that education is related to increased cognition, decision-making, and a sense of personal control, or so-called 'learned effectiveness'. These skills or resources enable individuals to "coalesce health-producing behaviors into a coherent lifestyle, and…a sense of control over outcomes in one's own life encourages a healthy lifestyle and conveys much of education's effect" (Mirowsky and Ross 2003: 25). Relatedly, a team of epidemiologists has described education, or socioeconomic status broadly, as a 'fundamental cause of disease' (Link and Phelan 1995; Phelan, Link, and Tehranifar 2010; Phelan and Link 2005). As such, the relationship between education and health persists despite shifting disease regimes because of certain resources and privileges – knowledge, political power, money, social support, etc. – that accrue to more highly educated people.

With respect to immigrants in the U.S., education gradients in health, and particularly in health care, have received little scrutiny. However, this appears to be changing. Recent work has demonstrated a weaker or flatter gradient than expected among immigrants and Mexicans for a range of health behaviors and outcomes, including obesity, smoking, low birthweight, asthma, and hypertension (Acevedo-Garcia et al. 2005; Kimbro et al. 2008; Sánchez-Vaznaugh et al. 2009; Sharma et al. 2003). Concerning potential mechanisms for these flatter gradients, the 'imported social gradients' hypothesis has come out of the cross-national approach to studying immigrant health issues (Acevedo-Garcia et al.

2012; Buttenheim et al. 2010; Smith and Goldman 2007). The hypothesis posits that social gradients in health will differ by country of origin and by the country's level of development. Immigrants, then, bring a specific health gradient with them when they immigrate to the U.S. Although not intended to test the 'imported social gradients' hypothesis, the current paper incorporates region of origin to determine if there are differences in education gradients in health care across these groups.

Another topic of inquiry regarding immigrants' education gradients in health is the role of assimilation in modifying or reshaping education gradients. One recent study of Mexican immigrants to the U.S. found that for women, long-stay Mexicans and U.S.-born Mexicans exhibited negative gradients in obesity as is traditionally observed among NHW while short-stay Mexican women with more education saw a spike in obesity prevalence (Buttenheim et al. 2010). Whether education gradients in health care among immigrants vary by citizenship status and language ability has not previously been studied. The current study aims to document these differences in education gradients in health care so as to better understand the characteristics that potentially jeopardize immigrants' well-being.

Hypotheses

The above discussion leads to the following hypotheses regarding nativity status and related characteristics of immigrants, education, and health care expenditures: [H1] Immigrants will spend less money on health care than the U.S. born, and specifically U.S.-born non-Hispanic whites. [H2] Foreign-born individuals will exhibit a weaker education gradient in health care expenditures than the U.S. born. [H3] Chronic condition status, insurance coverage, and income, to a lesser extent, will attenuate the relationship between nativity status and health care expenditures (mediation). [H4] Immigrants from regions with the greatest degree of health selection or difference in health beliefs, recent immigrants, non-English speakers, and non-citizens will have the least amount of health care expenditures.

The immigrant-native gap in health care expenditures is likely to widen with age, since immigrants may be diagnosed with expensive chronic conditions at a slower pace than the U.S. born owing to immigrant health selection and positive immigrant traits (e.g., greater social support, healthier lifestyle behaviors, etc.). In addition, older immigrants, especially those who migrated at later ages, may rely more on their children and other relatives for support than on the formal health care system (Angel et al. 1999).

Sex differences in health care expenditures between immigrants and natives are not anticipated. However, to the extent that male bias is present in less-developed regions of the world (Ahmed et al. 2000), it is possible that men may spend more money on health care than women in some immigrant families. In the U.S., among the U.S. born, women traditionally use more health care services and therefore spend more money than men (Cylus et al. 2011). Pregnancy and women's high life expectancy are reasons for women's greater health care utilization across the life course.

Methods

Data source

Secondary data analysis will be performed using publicly available data from the 2008-2012 Medical Expenditure Panel Survey (MEPS) merged with the 2007-2011 National Health Interview Survey (NHIS). MEPS is a nationally representative survey of health services utilization and cost conducted by the Agency for Healthcare Research and Quality. It draws respondents from the previous year's NHIS sample. NHIS, on the other hand, collects a broad range of nationally representative health-related data with a greater focus on physical health outcomes and health behaviors. Following previous research (Mohanty et al. 2005; Stimpson, Wilson, and Eschbach 2010), the current study will link MEPS and NHIS to take advantage of the rich socioeconomic, physical health, and immigrant-specific variables in NHIS and health care expenditures in MEPS.

Variables

The outcome variable, health care expenditures, was operationalized as total annual health care expenditures adjusted for inflation to 2014 dollars. Expenditures in MEPS are comprised of direct payments for health care, including out-of-pocket payments and payments by private insurance, Medicaid, Medicare, and other sources.

The key independent variable is nativity status. A respondent was defined as foreign born if he or she was born outside of the U.S. For the purposes of this study, the terms "foreign born" and "immigrant" are used synonymously. The sample was further differentiated by region of origin, which resulted in six regions: (1) U.S.; (2) Mexico; (3) Central America, Caribbean Islands, and South America; (4) Europe, Russia, and former USSR areas; (5) Asia, Southeast Asia, and Indian subcontinent; and (6) Elsewhere, including Africa and the Middle East. Immigrants were also categorized according to the number of years they had lived in the U.S. Given the salience of the 'five-year bar' in public policy, which requires legal immigrants to live in the country for five years before receiving most public benefits, the variable was divided as follows: (1) less than five years; (2) five to ten years; and (3) ten or more years. In additional analyses, immigrants were categorized by their language ability and citizenship status to clarify the health and health care patterns of immigrants. Language ability combined whether the respondent spoke English at home and whether he or she was comfortable speaking English. The resulting categories were: (1) not comfortable speaking English; (2) comfortable speaking English, but does not speak English at home; and (3) speaks English at home. For citizenship status, U.S. citizens were coded "1".

In terms of the moderators or variables interacting with nativity status, education was measured as the highest level of education achieved. Respondents were categorized as follows: (1) less than high school; (2) high school diploma or GED; (3) some college or associate's degree; (4) bachelor's degree or higher. Age was measured continuously and ranged from 25 to 85+ years. Sex was dichotomized, where females were coded "1".

The hypothesized mediators of the relationship between nativity status and health care expenditures included chronic condition prevalence, type of health insurance (any private, public, or none) and income. Chronic condition prevalence was measured by whether the respondent had at least one of the following conditions: asthma and/or emphysema, cancer, diabetes, hypertension or other heart problem, and stroke. Income was measured as family income as a percentage of the poverty line and divided into five categories: (1) poor/negative (less than 100% FPL); (2) near poor (100 to 125% FPL); (3) low income (125 to 200% FPL); (4) middle income (200 to 400% FPL); and (5) high income (more than or equal to 400% FPL).

Race/ethnicity, family structure, and having a usual source of care were included as control variables. Race/ethnicity incorporated racial and Hispanic identity as follows: (1) Hispanic; (2) non-Hispanic white; (3) non-Hispanic black; (4) non-Hispanic Asian; and (5) all non-Hispanic others. Family structure, measured by marital status, distinguished respondents who were married, widowed, divorced and/or separated, never married, and cohabiting. Usual source of care accounted for respondents' usual location of health care (office, emergency room, or other hospital).

Analytic strategy

A generalized linear model (GLM) with a conditional gamma distribution and natural logarithm link function will measure associations between nativity status and the other independent variables and health care expenditures. Past research on methods of modeling highly heteroskedastic, positively skewed variables, like expenditures data, has not agreed on best practice (Diehr et al. 1999; Dunn et al. 2003). However, Dunn et al. (2003) acknowledge that for understanding the effect of individual covariates on total costs, it is advantageous to use a one-part model because it generates a single regression coefficient for each variable. As part of sensitivity analyses, the two-part model will be used to differentiate variables that are associated with having any health care expenditure versus the level of expenditure for those who had non-zero expenditures.

The first research question will be addressed by a multivariate model with nativity status and education, age, and sex as the key independent variables, the latter three of which will be entered individually and in interaction with nativity status (Model 1). Next, to answer the second research question, health insurance and income will be added to the first model to test mediation (Model 2). For the third research question, the same two models will be used; however, nativity status will be further differentiated by region of birth, years in the U.S., citizenship status, and English language proficiency, one at a time for a total of eight models. Control variables will be entered in all models.

Stata 13 will be used to generate all statistical analyses. Stata's survey procedures adjust for stratification, clustering, and weighed data and can be used in conjunction with a variety of statistical models, including logistic regression (svy: logit) and generalized linear modeling (svy: glm).

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