HAVE WE COME UP SHORT?
A COMPARISON OF THE UNMET HEALTH CARE NEEDS AMONG U.S.-BORN AND FOREIGN-BORN ADULTS

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INTRODUCTION

Between 1990 and 2010, the number of foreign-born U.S. residents almost doubled from 20 million to 40 million, accounting for 13% (up from 8%) of the total U.S. population by the end of the period (Martin and Midgley 2010). Additionally, immigrants and their families have moved into new destination states and cities, requiring more and more communities to address immigration-related issues (Hall et al. 2011; Migration Policy Institute 2011). One such issue is immigrant health, and more specifically, immigrants' access to health care.

Cognizant of the country's demographic and social changes, policymakers and health scholars understand that immigrants' access to health care will likely have broad implications for American society. Safeguarding adult immigrants' health may prevent future increases in health care costs stemming from greater reliance on emergency room care, economic setbacks (e.g., depressed productivity), and worse health for children of immigrants (Almond and Currie 2011; Minnesota Immigrant Health Task Force 2005; Rimal 2003; Rossow and Rise 1994).

Providing health care to immigrants often presents a greater challenge than it does for natives. This difficulty reflects immigrants' extraordinary circumstances: they face common barriers to health care (e.g., undereducated, low income), as well as poor English proficiency, limited knowledge of community resources, and legislative obstacles to health insurance coverage. As a result, immigrants may experience higher levels of unmet medical need than do

their native counterparts. Coming to a better understanding of the magnitude of the inequality between immigrants and natives is important for ensuring that both U.S.-born and foreign-born adults receive adequate health care services.

The present study aims to compare immigrants' and natives' unmet medical need, one of the numerous measures researchers have used to evaluate access to and utilization of health care (Derose et al. 2009; Gold 1998). Borrowed from the family planning literature, unmet need acts like a performance measure of the U.S. health care system. Insofar as unmet medical need influences downstream health events, such as severe morbidity, and, ultimately, mortality, immigrants may be poised to endure deteriorating health and higher health care expenditures (Gadomski, Jenkins, and Nichols 1998; Maciosek et al. 2010). Therefore, this study also seeks to explain inequalities within the immigrant population. By identifying the characteristics associated with immigrants' unmet medical need, the public health field, in addition to officials at all levels of government, can move forward in alleviating immigrant-native inequality in access to health care (Ku and Matani 2001; Siddiqi, Zuberi, and Nguyen 2009).

Drawing on Andersen's behavioral model, as well as more recent extensions of it, the analysis attempts to answer the following questions: (a) How do U.S.-born and foreign-born adults differ with respect to unmet medical need after controlling for demographic risk factors, available resources, and family context? and (b) How important are length of stay, language proficiency, and state-level destination type in explaining the unmet medical need of foreign-born adults after controlling for the same covariates?

While a handful of studies have examined the unmet medical need of immigrants and/or natives (Ayanian et al. 2000; Himmelstein and Woolhandler 1995; Newacheck et al. 2000; Shi and Stevens 2005; Siddiqi et al. 2009; Canada only: Setia et al. 2011; Wu, Penning, and Schimmele 2005), no study comparing immigrants and natives has used two conceptualizations of unmet medical need, one that relates to individuals' perceptions of their health care and the other to their actual health care behavior. This structure facilitates the qualitative comparison of attitudes and behavior. Moreover, this study is one of few that analyzes the relationship between two or more immigrant-specific characteristics and health care patterns (Lebrun 2012). The addition of state-level destination type further distinguishes this study from past attempts at understanding immigrants' access to and utilization of health care.

BACKGROUND

Immigrants and unmet medical need

Because immigrants are more likely to be uninsured and to lack a regular source of care than the U.S. born (Derose et al. 2009; Ku and Matani 2001; Siddiqi et al. 2009), it is also likely that they have greater unmet medical need. Yet, studies of immigrants' access to and use of health care do not support such a clear interpretation. While immigrants (or non-citizens) have been found to receive less preventive and ambulatory care than natives (Ku and Matani 2001; Lebrun and Dubay 2010; Xu and Borders 2008), the same does not hold for delayed or forgone care (i.e., subjective unmet medical need). Several studies suggest that natives are actually more likely to report forgone care or difficulty in receiving necessary care than immigrants (Ortega et al. 2007; Siddiqi et al. 2009).

Traditionally, scholars of access to health care, whether specific to immigrants or not, have relied on Andersen and colleagues' behavioral model (Andersen 1995). Since its inception in 1968, the model has evolved to incorporate environmental characteristics, such as the nature of the health care system, and feedback loops between population characteristics, health behavior, and health outcomes. However, despite the usefulness of the refined model's complexity (and perhaps because of the limitations of national health surveys), most studies have remained loyal to the initial model, which focuses on the relationship between individual characteristics and the use of health services. Specifically, the initial model separates individual characteristics into three components: predisposing factors, enabling resources, and need. Among predisposing characteristics are demographic traits (e.g., age, gender), social structure, or determinants of an individual's social standing (e.g., education, ethnicity), and health beliefs. These characteristics influence the presence of enabling resources, which are required to obtain health care. Enabling resources may be at the community (e.g., clinic availability) or personal (e.g., health insurance, income) level. Finally, the need component captures "the biological imperative that accounts for some of people's help seeking and consumption of health services" (Andersen 1995:3). How an individual assesses their health status is deemed a proximate determinant of health care use.

Research teams from various disciplines have attempted to modify the initial behavioral model to improve its relevance for immigrants, or minorities in general. In their study of mental health help-seeking among Mariel Cuban and Haitian refugees, Portes, Kyle, and Eaton (1992)

concluded that Andersen's model "is problematic when applied to foreign-born groups precisely because it neglects the causal significance of their contexts of exit and reception" (p. 284-285). Consequently, their extended model features the context of exit (e.g., origin country) and the context of reception (e.g., co-ethnic community, number of kin at arrival) as important distal determinants of help-seeking behavior. For example, the number of kin at arrival may impact a recent immigrant's familiarity with the social welfare system (an enabling resource), which in turn may influence his or her ability to obtain care. Although their proposed model is better suited to refugees than to other types of immigrants, Portes et al. (1992) called attention to immigrant-specific characteristics that Andersen did not address.

More recently, Mejia et al. (2008) developed a conceptual framework for the receipt of oral health care among Hispanics in the U.S. Incorporating both individual- and environmental-level constructs (an example of the latter is provider language or ethnicity as a feature of the health care system), the framework is reminiscent of Andersen's later model. While not exclusive to Hispanic immigrants, Mejia and partners included immigrant-specific characteristics, such as years in the U.S. and acculturation generally, as enabling factors (resources). In addition, they suggested including nativity status (foreign-born versus native-born) as a risk marker, facilitating the comparison of immigrants and natives. "Risk markers" do not appear in the original behavioral model but are identified in this framework as demographic characteristics that influence predisposing factors (like country of birth informs attitudes toward health care) rather than "biological imperatives."

The present study incorporates aspects from all three models discussed above. Unmet medical need is conceived as the outcome of demographic risk factors, including nativity status, (lack of) resources available to respondents (educational attainment, family income, and insurance status), and family context (marital status).[1] For immigrants only, unmet medical need is a function of length of time in the U.S., English language proficiency, and state-level destination type, as well as the forenamed predictors. Length of time in the U.S. and English language proficiency are immigrant-specific resources, while state-level destination type speaks to the context of reception.

[1] Following Mejia et al. (2008), educational attainment is characterized as a resource rather than a predisposing factor.

Although researchers have used length of time in the U.S. and English language proficiency as proxies for acculturation – the complex process whereby groups and individuals undergo change when they come into contact with another culture (Cruz et al. 2008) – in the context of this study, it is more accurate to conceptualize them as measures of an immigrant's familiarity with, and thus ability to navigate, the formal health care system. In addition, being able to speak fluent English facilitates patient-provider communication, which can impact the quality of health care received (Flores et al. 2003). A medical provider who understands the patient's health problems can refer him or her to appropriate specialists and schedule necessary follow-up appointments, thus reducing unmet need.

Consistent with this reasoning, past studies have generally found that length of time in the U.S. and English language proficiency are positively associated with access to and utilization of health care (DuBard and Gizlice 2008; Ku and Matani 2008; Lara et al. 2005; Lebrun 2012; Leclere, Jensen, and Biddlecom 1994; Shi, Lebrun, and Tsai 2009). After adjusting for covariates, including age, sex, marital status, education, household income, etc., Lebrun (2012) concluded that "recent immigration and limited language proficiency independently contribute to reduced potential and realized access to care" (p. 1067).

Over the past two decades, scholars and policy makers have documented immigrants' (Hispanics') dispersion from traditional gateway states and cities to new destinations (Lichter and Johnson 2009; McConnell 2008; Migration Policy Institute 2011; Suro and Singer 2002). The migrant flows have been distinguished, in part, by human capital (i.e., education), leaving the least educated Hispanics overrepresented in established areas (Lichter and Johnson 2009; McConnell 2008). In order to capture one aspect of Portes et al.'s context of reception, the state-level typology presented in this study incorporates both immigration history (traditional versus new) and the education level of immigrant residents (high-/balanced-skill versus low-skill). While immigrant destination typologies are not new (McConnell 2008), they have largely been confined to descriptive studies outside the field of health services. Therefore, the current study explores the untested relationship between state-level destination type and immigrants' access to health care.

From past conceptual work, namely Derose, Escarce, and Lurie (2007), I predict that immigrants in traditional destinations have lower unmet medical need than their counterparts in new destinations because of existing infrastructure (e.g., community clinics, favorable health

insurance policies) that has not yet been initiated in the latter. Derose et al. (2007) discussed new destinations as having fewer well-developed safety nets, culturally competent providers, and immigrant advocacy or community-based organizations. In addition, recent immigrants to new destinations are likely to have fewer immigrant contacts from whom they can learn how to navigate the health care system (Derose et al. 2007). Concerning the human capital dimension, immigrants in high-/balanced-skill states may fair better (have lower unmet need) than immigrants who reside in low-skill states. In part, this may reflect the greater supply of (better quality) medical providers and health care facilities demanded by immigrants with more education and income (citations?). Alternatively, a second argument is based on social networks. Immigrants in high-/balanced-skill states are likely to interact with highly educated co-ethnics, who, following the education gradient, have better health behaviors than their lesser educated counterparts (Braveman, Egerter, and Williams 2011). One study cited that better educated women were more likely to regularly get mammograms and Pap smears, and better educated people were more likely to receive flu shots (Cutler and Lleras-Muney 2010). Therefore, those who use and are knowledgeable about the health care system may influence their neighbors, friends, or family members to utilize health care resources to a greater extent (citations?).

Finally, the need component is left out of the proposed conceptual framework, reserved for future research. I do not discredit the potential importance of need for health care (commonly measured by self-reported health status or the presence/absence of chronic health conditions) in explaining differences in health care utilization (Minkovitz et al. 2002). Among immigrants, the Hispanic (or epidemiologic) health paradox points to the relevance of health status for this population, especially (Jasso et al. 2004). Hispanics, being in better health than U.S.-born residents with similar socioeconomic profiles (and better health than U.S.-born non-Hispanic whites, in some cases [Abraído-Lanza et al. 1999]), may not visit the doctor regularly, because they do not face pressing health concerns (Lucas, Barr-Anderson, and Kington 2003). However, the direction of the relationship between the need for health care and health care utilization/realized access has not been firmly established. It is also likely that an individual's health status may deteriorate (or improve) if he or she is unable (able) to visit a medical provider.

Based on the above discussion, I hypothesize that a) immigrants have greater unmet medical need than natives, and that this inequality is robust to the inclusion of covariates derived from Andersen's behavioral model and its variations; b) more established immigrants and those

that are proficient in English have lower unmet medical need than their counterparts who recently moved to the U.S. and do not speak English well; and c) immigrants who reside in traditional, high-/balanced-skill states have lower unmet medical need than those who inhabit new or low-skill destinations.

Conceptualizing unmet medical need

Researchers who study access to and utilization of health care have fairly recently adopted the term "unmet need" from the fertility and family planning literature (Casterline and Sinding 2000). However, rather than using a derived measure to determine unmet need, as in research on family planning, health services researchers typically rely on a subjective, or perceived, measure of unmet medical need directly asked of survey participants. Allin, Grignon, and Le Grand (2010), studying the utility of subjective unmet need, recounted several approaches to its measurement. Four categories of subjective unmet need were identified: chosen, not-chosen, clinician-validated, and unmet expectations. The first category denotes that an individual perceives a health care need, but consciously decides to forgo the necessary health services (i.e., necessary as recognized by the individual). Although it may be important to determine why individuals deliberately avoid these services, health care researchers tend to focus on involuntary unmet need. Thus, the second category indicates that an individual perceives a health care need, but has been unable to acquire the necessary health services. Absent from national health surveys, clinician-validated unmet need indicates that a person has obtained health services for a perceived need, but an external clinician would deem the quality of care inadequate. Finally, the fourth category, unmet expectations, signifies that a person has obtained care for a perceived need that is insufficient by his or her judgment. Of course, this category may overlap with the others if the individual: (1) chooses not to seek additional care; (2) is unable to obtain additional care; or (3) judges the quality of his or her care similarly to that of a hypothetical clinician.

The most common category, not-chosen unmet need, has been operationalized in past studies as a dichotomous variable based on variations of the question, "During the past 12 months, was there ever a time when you felt that you needed health care but did not receive it?"

(Newacheck et al. 2000; Shi and Stevens 2005; Siddiqi et al. 2009; Wu et al. 2005). [2] This operationalization has been upheld as a succinct and valid indicator of unmet need as perceived by individuals. However, an inevitable weakness of it is that survey researchers must depend on the respondent to understand that a need existed (or still does exist) and be willing to report the unmet need (Newacheck et al. 2000). Although strategies have been developed to improve operationalizing subjective unmet need (e.g., Van Cleave and Davis [2008] derived a measure using the family planning approach), limited recall and social desirability bias threaten reliability and validity of the measure when adequate information to implement such strategies is unavailable in the data.[3]

Consequently, objective measures of unmet medical need provide the opportunity to skirt problems associated with subjective unmet need. At least three techniques, all of which rely on the expertise of clinicians, have been identified to determine objective unmet need (Newacheck et al. 2000). The first technique uses established guidelines from bodies of medical professionals, which delineate the frequency of specific health care services, including routine check-ups, Pap smears, etc. (American Academy of Pediatrics/Bright Futures 2008; U.S. Preventive Services Task Force 2010). In the context of pediatric health research, objective unmet need is inferred if a child has visited a health care provider fewer times than recommended, or at incorrect intervals, or has not received all immunizations standard for a child of similar age. A comparable method is used for adults but different services are emphasized, i.e., objective unmet need is present if an adult did not have, for example, a blood pressure screening in the recommended time range. Second, researchers may recruit physician panels to generate a list of conditions that always warrant medical intervention and appropriate treatments for given conditions. Objective unmet need is deduced if an individual has a severe condition and has not visited a medical provider or if he or she has not received appropriate treatment for any condition. This technique mirrors how researchers have measured quality of health care (Mangione-Smith et al. 2007), such that objective unmet need, here, is equivalent to poor quality

[2] This question may pick up on chosen unmet need, but in the current study, the subjective unmet need question specifically asks if the respondent was *unable* to obtain needed medical care.
[3] The derived measure of Van Cleave and Davis (2008) may still be plagued by limited recall, if not social desirability bias, since the respondent was asked to recall whether his or her child needed medical care in the past year.

care. Third, researchers may recruit physicians to physically examine individuals for signs of unmet need. Secondary data analysis prevents this technique from becoming widely used.[4]

Consistent with the first technique, numerous studies have called attention to the importance of general preventive care (i.e., routine check-ups) for children (Cohen and Christakis 2006; Hakim and Bye 2001; Hakim and Ronsaville 2002; Ronsaville and Hakim 2000), while for adults, few have done so; studies of adult preventive care often focus on a specific preventive service (Bustamante et al. 2010; Corbie-Smith et al. 2002; Sambamoorthi and McAlpine 2003) or health consultation that may or not provide preventive care (Lebrun 2012; Lebrun and Dubay 2010). The present study improves upon past research by employing a measure of routine check-ups for adults, which does not specify the services received.

METHODS

Data source

Data came from Panels 12 (2007-2008) and 13 (2008-2009) of the Medical Expenditure Panel Survey (MEPS), Household Component. The survey has been conducted by the Agency for Healthcare Research and Quality (AHRQ) since 1996 and collects health services data on a nationally representative sample of the U.S. noninstitutionalized population.[5] The sampling frame includes households that participated in the previous year's National Health Interview Survey (NHIS). Computer-assisted personal interviewing (CAPI) was used for data collection which proceeded according to an overlapping panel design: unique panels of households were interviewed five times in a two-year period, and a new panel was added each year (AHRQ n.d.). In order to account for the longitudinal nature of the survey, as well as the complex sampling procedures (including stratification, clustering, and oversampling), all statistical analyses have been weighted by the appropriate panel's longitudinal survey weight, stratum, and cluster variables.

[4] Note that the second and third techniques resemble subjective, clinician-validated unmet need. Physicians' objectivity is debated.

[5] The author obtained permission from AHRQ to use the restricted version of the survey. The restricted data application is available at: http://meps.ahrq.gov/mepsweb/data_stats/data_center_application.jsp.

The analytic sample was restricted to 19,562 adults ages 18 to 85 who had non-missing data on all study covariates.[6,7] Panels 12 and 13 contributed 8,035 and 11,527 participants, respectively. Approximately a quarter of the sample (4,868 respondents) was foreign born.

Study variables

Two dichotomous measures of unmet medical need were analyzed in this study. A respondent was considered to have subjective unmet need if he or she had forgone or delayed needed medical care in the past year. Respondents were told to evaluate "need" based on their health-related perceptions and/or statements made by a medical provider. To determine the presence of objective unmet need, respondents were asked, "About how long has it been since {PERSON} had a routine check-up by a doctor or other health professional?" Routine care was defined as a "visit with a doctor or other health professional for assessing overall health, usually not prompted by a specific illness or complaint. It usually includes a blood pressure check, and *may* include taking a blood sample for analysis and questions about health behaviors such as smoking" (emphasis in original). Objective unmet need was deduced if a respondent had not had a routine care visit within the past year. Because guidelines for adult routine care differ by age, gender, and service (e.g., blood pressure check, Pap smear, etc.), the benchmark of one check-up per year was chosen as an indicator of respondents' regular access to preventive health care services (Lebrun and Dubay 2010; Salganicoff, Ranji, and Wyn 2005).

The independent variables of interest pertain to foreign-born respondents. Nativity status was dichotomously coded to differentiate the native and foreign born. The first set of analyses (full sample) included nativity status to measure the difference between natives and immigrants in unmet medical need. For the second set of analyses (foreign born only), immigrant-specific characteristics were incorporated: length of time in the U.S., English language proficiency, and state-level destination type.[8] Following prior literature (and to test for non-linearity), length of time in the U.S. was collapsed into four categories: less than 5 years, 5 to 9 years, 10 to 14 years,

[6] Past studies on adults' access to health care have omitted the elderly (65 years and over) due to their near-universal Medicare coverage. This study, however, included the full sample of adults, because the substantive results did not differ from those of the limited sample.

[7] 136 cases (less than 1%) were eliminated. Missing data did not exceed 0.5% on any of the three variables containing missingness. As a further check, statistical analyses were performed on the larger sample to ensure that the results presented below are robust to the selection criteria. No substantive differences were revealed.

[8] State destination type appeared in the first set of analyses (full sample), as well.

and 15+ years. English language proficiency was determined by the respondent's language of interview rather than language spoken at home. More than 99% of the non-English language interviews were completed in Spanish. The final immigrant-specific characteristic was state-level destination type. De Jong et al (2009) developed a relevant typology, classifying states by their immigration history and the ratio of high- to low-skill immigrants who reside there.[9] The typology separated destinations into four categories: (1) traditional, high-/balanced-skill; (2) traditional, low-skill; (3) new, high-/balanced-skill; and (4) new, low-skill.

A host of variables were included as controls based on the conceptual framework discussed above. The weighted distributions of these variables appear in Table 1. Demographic risk factors included in the analysis were sex, race, and age. Past literature has provided evidence that women are more likely than men to have a regular medical provider and to visit a provider at least once a year (Salganicoff et al. 2005). Race, despite criticism over its lack of precision (Fullilove 1998), has frequently been used in studies of health care access and utilization (Corbie-Smith et al. 2002; Fiscella et al. 2002; Hong et al. 2007; Sambamoorthi and McAlpine 2003; Weinick et al. 2000). Respondents' racial and ethnic identities were divided into four categories: non-Hispanic white (hereafter, white), non-Hispanic black (hereafter, black), Hispanic, and non-Hispanic Asian (Asian). Age, age squared, and age cubed terms controlled for the non-linear age-dependent trends of health care access/utilization (U.S. Census Bureau 2012).[10] Interactions between age and race, age and sex, and race and sex were used to capture gender and racial/ethnic differences in health care access/utilization across the life course (Corbie-Smith et al. 2002; Cylus et al. 2011; Dunlop et al. 2002; Sambamoorthi and McAlpine 2003). For example, reproductive-aged women may receive preventive services more often than their older counterparts (and men of any age) because of pregnancy-related guidelines. Within the reproductive-aged, there is some evidence that African Americans receive Pap tests more often (and Hispanic women less often) than white women (Sambamoorthi and McAlpine 2003).

Educational attainment, family income, and insurance status were included as indicators of the (lack of) resources available to respondents. All three variables consistently appear in

[9] Skill ratio is equal to the number of foreign born (≥25 years) with a college degree divided by the number of foreign born (≥25 years) with less than a high school degree. If the ratio is less than 1, the destination is low-skill.

[10] A categorical age variable (18-34, 35-64, and 65+) facilitated the interpretation of the continuous age variables.

studies of access to health care, which show that having low levels of education and low income and lacking health insurance are negatively associated with the ability to access care (Adler and Newman 2002; Himmelstein and Woolhandler 1995; Sambamoorthi and McAlpine 2003; Shi and Stevens 2005; Siddiqi et al. 2009; Xu and Borders 2008). Educational attainment was based on respondents' highest degree attained and/or years of education completed by Round 1 of the survey. The sample was divided into four mutually-exclusive categories: (1) Less than high school diploma; (2) High school diploma, no college; (3) Some college or Associate's degree; and (4) Bachelor's degree or higher. Family income was also measured as a categorical variable, characterizing families by the ratio of family income to the federal poverty line (which takes into account family size and age of household head). The variable's five categories were defined as follows: (1) Poor, income ≤ 100% FPL; (2) Near poor, 100% FPL < income ≤ 125% FPL; (3) Low income, 125% FPL < income ≤ 200% FPL; (4) Middle income, 200% FPL < income ≤ 400% FPL; and (5) high income, income > 400% FPL. Finally, insurance status was measured two different ways. The first variable was dichotomized, where 1 represented ever being uninsured in the past year, while the second variable categorized the sample by insurance type; i.e., did respondents have any private, public only, or no insurance over the past year?[11]

Respondents' family context was measured by marital status. Scholars have upheld marital status as a key variable in health research (Koball et al. 2010; Schoenborn 2004; Waite 1995); particularly relevant to the current study, married persons are more likely than the unmarried to participate in positive health behaviors, such as early cancer screenings (Osborne et al. 2005). Because of the palpable increase in cohabitation – from 2009 to 2010, heterosexual cohabitation increased by 13% (Krieder 2010) – the measure of marital status included cohabitation in addition to the standard categories of married, divorced/separated, widowed, and never married.

Analytic strategy

Descriptive statistics were generated to summarize the study variables. Then, multivariate logistic regression was used to assess the association between the independent variables of interest and the two dichotomous measures of unmet medical need. For each outcome measure, two sets of analyses were performed. The first set, using the full sample,

[11] Logistic regression tables show results for the first variable only.

determined whether natives and immigrants differed in their level of unmet need, and whether the difference persisted after controls were added. Limited to the foreign born, the second set of analyses assessed the associations between the immigrant-specific characteristics and unmet need. Using a step-wise design, the analysis was used to test whether the immigrant-specific characteristics added explanatory power while controlling for other model covariates.

All analyses were performed using SAS 9.2 (SAS Institute, Inc., Cary, NC). Strata and cluster variables accounted for the complex sampling design (SURVEY prefix), and longitudinal survey weights were used to accurately represent the U.S. noninstitutionalized population. Rounds 3 and 4 provided data on objective and subjective unmet need, respectively, while Round 1 provided data on the independent variables, both time-invariant and time-varying.[12]

RESULTS

Descriptive statistics

Table 1 presents the weighted descriptives for the total sample and for natives and immigrants separately. About 5% of respondents reported delaying or forgoing needed medical care in the past year (subjective unmet need). Natives and immigrants did not differ considerably, with immigrants slightly less likely to have reported subjective unmet need (4.24% vs. 5.65%). In contrast, more than a third of the sample did not have a routine check-up in the past year (objective unmet need), and the discrepancy between natives and immigrants was more pronounced. Immigrants were 6.5 percentage points more likely to have experienced objective unmet need than their native-born counterparts (43.93% vs. 37.43%).

This finding may reflect immigrants' disadvantaged position within the health care system (DuBard and Gizlice 2008; Ku and Matani 2001) or their reliance on other forms of health promotion, e.g., traditional healing practices (Ma 1999; White et al. 2009; Ransford, Carrillo, and Rivera 2010) or familial or communal social support (Harley and Eskenazi 2006; Hofstetter et al. 2010; Mulvaney-Day, Alegría, and Sribney 2007; Peak and Weeks 2002). The difference in objective unmet need between natives and immigrants may also signal better health among the foreign born, who may perceive less need for (and consequently, seek less) non-routine and routine medical care. This explanation is consistent with the selective migration

[12] Age was measured at Round 3. Family income, marital status, and insurance status were annual variables in reference to the first year of data collection.

perspective that finds those who migrate to be healthier than those who remain in the origin country (Akresh and Frank 2008; Hummer et al. 2007). Importantly, the higher prevalence of objective unmet need versus subjective unmet need among the total sample demonstrates that not having a routine check-up in the past year is not consistently perceived as a problem, i.e., as an unmet health care need.

Compared with natives, immigrants were more likely to be young, male, Hispanic or Asian, without a high school diploma, low income (at/below 200% FPL), uninsured (or publicly insured only) in the past 12 months, and residents of traditional, high-/balanced-skill states. Given the family-oriented nature of U.S. immigration policy – in 2009, two-thirds of legal immigrants were relatives of current U.S. citizens (Martin and Midgley 2010) – it follows that immigrants were much more likely than natives to be married (54.66% vs. 30.73%).

Treating immigrants as a homogenous group is inaccurate. While more than a third of immigrants had less than a high school diploma, a quarter had a Bachelor's degree or higher. Similarly, more than a quarter had an income greater than 400% FPL despite immigrants being more highly concentrated than natives in the three lowest income categories. As far as length of time in the U.S., a majority (60.34%) of the immigrants in the sample had lived in the U.S. for 15 years or more. 15.23% and 18.78% had lived in the U.S. for 10 to 14 years and 5 to 9 years, respectively. Only 5.64% had moved to the U.S. less than five years prior. Interestingly, although few immigrants were recent movers, 39.56% completed their interview in a non-English language.

Multivariate results[13]

Subjective unmet medical need

Table 2 shows regression results for models examining subjective unmet medical need among the total sample. In the unadjusted model, immigrants had lower odds of reporting subjective unmet need than natives (OR = 0.74, 95% CI: 0.61–0.91). After controlling for the model covariates, immigrants maintained significantly lower odds of reporting subjective unmet need (OR = 0.72, 95% CI: 0.55–0.96). This contradicts the hypothesis that immigrants experience greater unmet need than natives.

[13] All analyses presented in this section included continuous age, age squared, and age cubed variables, as well as sex and race/ethnicity. See the appendix for a discussion of the age effects.

Not surprisingly, having income below the high income category (at or below 400% FPL) was associated with higher odds of experiencing subjective unmet need as was lacking health insurance at some point in the past year. All non-marital family types were associated with greater subjective unmet need. In fact, being divorced/separated (OR = 2.20, 95% CI: 1.77–2.73) had similar odds as having poor/negative (OR =2.22, 95% CI: 1.69–2.94) and near poor (OR = 2.13, 95% CI: 1.47–3.09) incomes.

Pertaining to immigrants only, Table 3 reports regression results for models of the association between length of stay, English language proficiency, and state-level destination type and subjective unmet need. In both unadjusted and adjusted analyses, none of the three variables was significant at the 5% level. Immigrants who had a five to nine years' stay had marginally significantly higher odds of subjective unmet need than more established immigrants, i.e., those who had been in the U.S. for fifteen or more years (full model: OR = 1.55, 95% CI: 0.93–2.57). The hypothesis that all three variables are important in explaining subjective unmet need differences among the foreign born was not supported by the data. However, I am hesitant to discount the results for length of time in the U.S., which imply that those in the country for fifteen or more years are slightly better off than more recent immigrants.[14]

Similar to the total sample, having low income (in this case, at or below 200% FPL) and being divorced/separated or never married were associated with higher odds of subjective unmet need among immigrants. Ever being uninsured in the past year was only marginally significantly related to greater subjective unmet need. More years of education have typically been found to promote health care access/utilization, but in this sample immigrants with a high school diploma had lower odds of subjective unmet need than those with a Bachelor's degree or higher (and those with less than a high school diploma had marginally significantly lower odds).

Objective unmet medical need

For objective unmet medical need, the results differed considerably. In Table 4 (analogous to Table 2), among the total sample, immigrants had higher odds than natives of experiencing objective unmet need (OR = 1.31, 95% CI: 1.15–1.50). Controlling for the model covariates, immigrants no longer had significantly higher odds. Again, this contradicts the

[14] The wide confidence intervals in Table 3 stem from the relatively small number of immigrants who reported subjective unmet medical need.

expectation that immigrants experience greater unmet need than natives. Potentially, immigrants and natives depend on the same resources for visiting a medical provider for a routine check-up.

In terms of these resources (or characteristics), educational attainment was negatively associated with objective unmet need. Respondents with less than a high school diploma or only a high school diploma had significantly higher odds of objective unmet need than those with a Bachelor's degree or higher. In contrast to subjective unmet need, only the near poor and low income (between 100% and 200% FPL) categories (and to a lesser extent, middle income) were associated with higher odds of experiencing objective unmet need. Ever lacking health insurance in the past year was associated with doubled odds of objective unmet need (OR = 2.02, 95% CI: 1.82–2.23), and separate analyses (not shown) demonstrated a mixed relationship between insurance type and objective unmet need. Having public insurance only versus any private insurance corresponded to lower odds of objective unmet need (OR = 0.84, 95% CI: 0.74–0.96) whereas being uninsured for the entire year (rather than at some point) was associated with higher odds of objective unmet need (OR = 2.74, 95% CI: 2.45–3.06). Except for widowed, all non-marital family types were associated with higher odds of objective unmet need; cohabiting, not divorced/separated, had the highest odds.

Exclusive to immigrants, Table 5 reports regression results for models of the association between length of stay, English language proficiency, and state-level destination type and objective unmet need. In the unadjusted model, all categories of length of stay below (in reference to) 15+ years were associated with higher odds of objective unmet need. Respondents who lived in the U.S. for less than five years had more than tripled odds of objective unmet need (OR = 3.30, 95% CI: 2.40–4.54), and as length of stay increased, the odds decreased linearly. Having an English language interview was associated with lower odds of experiencing objective unmet need (OR = 0.66, 95% CI: 0.54–0.80). Additionally, living in a traditional, low-skill state compared to a traditional, high-/balanced-skill state was associated with lower odds of objective unmet need (OR = 0.55, 95% CI: 0.44–0.69). Changing the reference category to traditional, low-skill states (not shown) showed all three destination types to be significantly different from the reference category at the .1% level.[15] After accounting for demographic risk factors, available resources, and family context, living in the U.S. for less than five years (OR =

[15] In comparison to traditional, low-skill states, the odds ratio (and 95% CI) for new, high-/balanced-skill states is 2.53 (1.68 – 3.83) and for new, low-skill states, 1.92 (1.40 – 2.65).

1.55:1.08–2.22) and residing in a traditional, high-/balanced-skill state or new state of either skill type (versus a traditional, low-skill state) was associated with higher odds of objective unmet need.[16] No differences by English language interview were present once controls were added. These results provide some evidence of the expectation that all three immigrant-specific variables are important in explaining differences in objective unmet need among the foreign born. Interestingly, though, while the inverse relationship between length of stay and objective unmet need is as hypothesized, the results for state-level destination type did not match the earlier prediction. For one, immigrants in new destinations of either skill-type did not fare worse (i.e., have greater objective unmet need) than those in traditional, high-/balanced-skill states, but they did fare worse than immigrants in traditional, low-skill states. Immigrants in traditional, low-skill states experienced *less* objective unmet need than their counterparts in traditional, high-/balanced-skill states, weakening the argument that immigrants in states with higher skilled cohorts utilize health care more than immigrants in states with lower skilled cohorts.

Educational attainment was not significantly related to objective unmet need among immigrants. Mirroring the results for the total sample, the near poor and low income categories (between 100% and 200% FPL) were associated with higher odds of objective unmet need. In addition, ever being uninsured in the past year was associated with higher odds, although insurance type (not presented) showed no difference between public only and any private insurance. Lastly, widowed immigrants actually had lower odds of experiencing objective unmet need than married ones, while immigrants who were never married or cohabiting (and to a lesser extent, divorced/separated) had higher odds of objective unmet need. Similar to the total sample, cohabiting had the highest odds.

DISCUSSION

This study sought to answer two major questions. First, how do U.S.-born and foreign-born adults differ with respect to unmet medical need after controlling for demographic risk factors, available resources, and family context? Second, after controlling for the same covariates, how important are length of stay, language proficiency, and state-level destination type in explaining the unmet medical need of foreign-born adults only? I hypothesized that

[16] In comparison to traditional, low-skill states, the odds ratio (and 95% CI) for new, high-/balanced-skill states is 2.18 (1.46 – 3.26) and for new, low-skill states, 2.08 (1.40 – 3.09).

immigrants have greater unmet medical need than natives both before and after controlling for the model covariates. In addition, I hypothesized that more established immigrants, those proficient in English, and those who reside in traditional, high-/balanced-skill states have lower unmet medical need than their counterparts who recently moved to the U.S., do not speak English well, and inhabit new or low-skill destination states.

The results for subjective unmet need, for the total sample and for immigrants only, did not provide support for the original hypotheses. Immigrants reported less subjective unmet need than natives despite experiencing greater (or equal) objective unmet need. This inconsistency may result from less frequent attempts at accessing health care among foreign-born adults (Ortega et al. 2007). At the same time, it may reflect immigrants' unique perspective on formal health care, since most originated from countries with very different health care systems and beliefs about what is necessary for a healthy and happy life (for qualitative treatments, see Fadiman 1998; McCarthy et al. 2004). In terms of the immigrant-only analyses, length of time in the U.S., English language proficiency, and state-level destination type did not significantly impact subjective unmet need (regardless of the presence of covariates). This null finding lends support to the notion that no matter how long immigrants reside in the U.S. or how well they speak English, their views of health and health care are driven by earlier life experiences in their origin countries. At the same time, immigrants' perceived level of unmet need may not change with length of time in country or English language proficiency, because as the foreign born become familiar with (and gain formal access to) the U.S. health care system, their increased need for health care services may be offset by their improved ability to access these services.

Pertaining to objective unmet need, the results for the total sample and for immigrants only were partially consistent with what was expected. Although immigrants experienced greater objective unmet need than natives in the absence of covariates, after controlling for demographic risk factors, available resources, and family context, the immigrant-native gap was eliminated. This finding reinforces the importance of insurance, particularly, in addition to educational attainment and income, as a necessary resource to gaining entry to the U.S. health care system, nativity status notwithstanding (Siddiqi et al. 2009). Among immigrants only, length of time in the U.S. and state-level destination type remained significant predictors of objective unmet need when model covariates were included. I interpret this result as a sign of the bidirectional adaptation process between immigrants and their environments. As immigrants

live in the U.S. for longer, they become more familiar with health insurance policies, the locations of community clinics, and how the majority of Americans utilize health care. In addition, more established immigrants are rewarded with curtailed eligibility restrictions for public health insurance. Also indicative of the environmental adaptation process is the significant difference in objective unmet need between immigrants who inhabit traditional, low-skill states and those who inhabit all other destination types. Most crucial is the difference between traditional, low skill states and new states (of either skill level); traditional, low-skill states have likely built the appropriate health care infrastructure to handle the newcomers, while new states, with small but burgeoning immigrant populations, have not prepared for the substantial demographic trend (Derose et al. 2007). Determining what this infrastructure is (and what other environmental characteristics are invaluable to immigrants' health care utilization) is a promising topic for future study. Surprisingly, English language proficiency was not associated with objective unmet need after controlling for the model covariates. It may be the case that insurance status and, to a lesser extent, income, which were associated with accessing routine health care, mediate the relationship between English language proficiency and objective unmet need. Further analyses are required to test this theory.

Finally, Andersen's original model performed relatively well in predicting subjective and objective unmet medical need among immigrants. For both outcomes, however, the influence of educational attainment did not match expectations. Having a high school diploma as opposed to a Bachelor's degree or higher was actually associated with lower odds of subjective unmet need, calling for inquiry into how immigrants' standards of care are impacted by education level (also, how does country of education matter?). College graduates, assuming that they more frequently interact with the health care system, may perceive certain procedures or specialty appointments (e.g., allergist or dermatologist) as necessary while those with less education may not. For objective unmet need, however, educational attainment had no direct impact on unmet need in the presence of covariates. The association between insurance status and objective unmet need trumped all other variables in the model, but insurance status and subjective unmet need had only a marginally significant association. Health insurance is often viewed as a panacea, and it is important for immigrants' receipt of regular doctor check-ups, but the result for subjective unmet need highlights that perceptions of care are determined by more than just having stable health insurance coverage.

There are several limitations to this study. First, the immigrant sample may not have been representative of the actual U.S. immigrant population. More than 99% of the survey's non-English language interviews were completed in Spanish. Therefore, immigrants who spoke neither English nor Spanish (disproportionately recent movers to the U.S.) may have refused to be interviewed. In addition, undocumented immigrants (again, disproportionately recent movers) may have declined to participate in the government-affiliated survey, cautious about their immigrant status being exposed (Ortega et al. 2007). Because MEPS respondents have already completed the NHIS, this limitation may be even more pertinent than for past studies that employed other data sources (i.e., how likely are undocumented immigrants to participate in two surveys?).

Another potential limitation is that the measure of English language proficiency – English versus non-English interview – may not have captured respondents' actual ability. Shi et al. (2009) shrewdly noted that this measure of proficiency may denote "individuals' preferred spoken language and perceived English proficiency, rather than accurately describe their actual comprehension, ability to navigate the health care system, or communication with health care providers" (p. 636). However, by employing language of interview, this study can be more easily compared to past studies of English language proficiency and access to health care. Moreover, sensitivity analyses (not shown) with English versus non-English language spoken at home did not yield dissimilar results, allaying serious concerns over the original measure.

Third, several probable determinants of immigrants' health care access were omitted: citizenship status, country of origin, and the health beliefs of respondents. Illegal immigrant and non-citizen status has been linked to fewer physician visits and lower odds of having a usual source of health care (Ku and Matani 2001; Ortega et al. 2007). Even with the recent U.S. Supreme Court ruling in favor of the constitutionality of the Affordable Care Act, illegal immigrants are restricted from accessing public health insurance and legal immigrants remain subject to the five-year waiting period (Aguilera 2012; National Immigration Law Center 2010). Future research on immigrants' access to and utilization of health care would benefit from the inclusion of citizenship status in national health surveys. Excluding country of origin from studies of immigrants' access to health care fails to account for the diversity of immigrant experiences. Over the past century or more, U.S. immigration policies have been country- or region-specific, a fact that has shaped (and been shaped by) how immigrants from different

countries are treated (Carrasquillo, Carrasquillo, and Shea 2000; Martin and Midgley 2006). Unfortunately, as for citizenship status and health beliefs, few national health surveys ask respondents their specific country of origin. Qualitative studies have been conducted to better understand the relationship between health beliefs and access to health care. In one, Latinas' beliefs about the etiology of cervical cancer were found to play a role in the women's decision to obtain Pap smears (McMullin et al. 2005). Since questions of health beliefs often do not appear in health surveys, defining proxies seems an appropriate task.

Despite these limitations, this study contributes to the literature on immigrant-native health inequality and determinants by taking advantage of the longitudinal nature of MEPS, analyzing two conceptualizations of unmet medical need, and incorporating immigrant-specific characteristics to Andersen's initial behavioral model. A limited number of studies have examined the influence of multiple immigrant-specific variables on access to and utilization of health care (Lebrun 2012). State-level destination type, in particular, has received little attention as a determinant of immigrant health and health care access.

As we stand at the cusp of a new health care regime, it is prudent to consider if and where we have come up short in providing the best possible health care to Americans. In particular, given the changing demographic landscape, that involves immigrants moving to the U.S. and to new destinations within the U.S., analyzing immigrant-native inequality in unmet medical need is a useful endeavor. However, more research, including research on the interaction between state-level destination type and Metropolitan Statistical Area (MSA) destination type, would elucidate the findings of this study. Moreover, revisiting this topic in several years will assist policymakers in developing the ideal health care system.

TABLES

Table 1. Sample characteristics of adults 18 years and older (N=19,562).

Variable	Total %	Natives %	Immigrants %
Subjective unmet need	5.42	5.65	4.24
Objective unmet need	38.46	37.43	43.93
Foreign-born (native = ref)	15.79	0.00	100.00
Age[a]	46.21 (0.27)	46.65 (0.30)	43.86 (0.43)
Female (male = ref)	52.08	52.34	50.66
Race/ethnicity			
Non-Hispanic white*	70.37	79.93	19.43
Non-Hispanic black	11.35	12.27	6.45
Hispanic	13.76	6.60	51.94
Asian	4.52	1.20	22.17
Educational attainment			
Less than high school	15.59	12.13	34.04
High school diploma	32.87	34.73	22.95
Some college	25.20	26.58	17.85
Bachelor's degree or higher*	26.33	26.55	25.16
Income (as percentage of poverty line)			
Poor/negative	11.19	10.34	15.69
Near poor	4.21	3.69	6.99
Low income	13.35	12.36	18.60
Middle income	32.22	32.34	31.56
High income*	39.03	41.26	27.15
Ever uninsured (never uninsured = ref)	26.00	22.64	43.94
Insurance type			
Any private*	68.68	72.07	50.57
Public only	15.85	15.53	17.58
Uninsured	15.47	12.39	31.85
Family type			
Married*	55.17	53.86	62.19
Widowed	6.16	6.48	4.46
Divorced/separated	12.13	12.43	10.50
Never married	22.67	23.43	18.60
Cohabiting	3.88	3.80	4.26
Length of time in the U.S.			
Less than 5 years	NA	NA	5.64
5-9 years	NA	NA	18.78
10-14 years	NA	NA	15.23
15+ years*	NA	NA	60.34
English interview (non-English interview = ref)	92.39	98.38	60.44
State destination type			
Traditional, high-/balanced-skill*	34.51	30.73	54.66
Traditional, low-skill	29.67	30.41	25.72
New, high-/balanced-skill	25.23	27.54	12.92
New, low-skill	10.59	11.32	6.69
Unweighted n	19,562	14,694	4,868

Source: Medical Expenditure Panel Survey (MEPS), Panels 12 (2007-2008) and 13 (2008-2009).

Note: * and ref denote reference category. NA=Not applicable.

[a] Mean and standard deviation are shown for (continuous) age variable.

Table 2. Odds ratios (OR) and 95% confidence intervals (CI) for determinants (multivariate) of subjective unmet medical need.

Predictor	Model 1	Model 2
Foreign-born	0.740** (0.605 - 0.905)	0.723* (0.548 - 0.955)
Educational attainment (vs. Bachelor's degree or higher)		
Less than high school		0.826 (0.611 - 1.117)
High school diploma		0.830 (0.653 - 1.054)
Some college		0.933 (0.726 - 1.199)
Income as % of poverty line (vs. High income)		
Poor/negative		2.224*** (1.685 - 2.937)
Near poor		2.133*** (1.474 - 3.088)
Low income		1.961*** (1.498 - 2.565)
Middle income		1.477*** (1.186 - 1.839)
Ever uninsured		2.488*** (2.019 - 3.065)
Family type (vs. Married)		
Widowed		1.918** (1.270 - 2.895)
Divorced/separated		2.196*** (1.768 - 2.726)
Never married		1.803*** (1.371 - 2.373)
Cohabiting		1.396† (0.964 - 2.022)
Goodness of fit statistics		
AIC	8,239.86	7,732.74
Likelihood ratio (DF)	10.69 (1)	585.81 (35)
Significance	0.0011	<.0001

† p<.10; * p<.05; ** p<.01; *** p<.001 (two-tailed tests).

Source: Medical Expenditure Panel Survey (MEPS), Panels 12 (2007-2008) and 13 (2008-2009).

Note: The unweighted sample size is 19,562. Base AIC is 8,248.55. Model 2 controlled for age, age2, age3, gender, and race, and all age variables*gender, all age variables*race, and race*gender interaction terms. All models were weighted by longitudinal person weight.

Table 3. Odds ratios (OR) and 95% confidence intervals (CI) for determinants of subjective unmet medical need among foreign-born adults.

Predictor	Model 1	Model 2
Length of time in U.S. (vs. 15 or more years)		
Less than 5 years	0.692 (0.283 - 1.692)	0.812 (0.315 - 2.093)
5-9 years	1.420† (0.949 - 2.125)	1.546† (0.929 - 2.574)
10-14 years	1.050 (0.646 - 1.705)	1.177 (0.703 - 1.971)
English language interview	1.040 (0.679 - 1.596)	1.400 (0.840 - 2.334)
State destination type (vs. Traditional, high-/balanced-skill)		
Traditional, low-skill	1.001 (0.581 - 1.724)	1.043 (0.624 - 1.744)
New, high-/balanced-skill	0.551† (0.285 - 1.065)	0.660 (0.346 - 1.259)
New, low-skill	0.819 (0.346 - 1.937)	0.953 (0.419 - 2.170)
Educational attainment (vs. Bachelor's degree or higher)		
Less than high school		0.577† (0.321 - 1.037)
High school diploma		0.475* (0.264 - 0.855)
Some college		1.143 (0.631- 2.069)
Income as % of poverty line (vs. High income)		
Poor/negative		3.685*** (1.912 - 7.101)
Near poor		3.359** (1.430 - 7.891)
Low income		3.295** (1.516 - 7.158)
Middle income		1.782 (0.848 - 3.745)
Ever uninsured		1.440† (0.940-2.206)
Family type (vs. Married)		
Widowed		1.439 (0.575 - 3.604)
Divorced/separated		2.421*** (1.476 - 3.973)
Never married		2.903*** (1.922 - 4.383)
Cohabiting		0.869 (0.432 - 1.746)
Goodness of fit statistics		
AIC	1,712.68	1,644.20
Likelihood ratio (DF)	11.08 (7)	147.55 (41)
Significance	0.1353	<.0001

† p<.10; * p<.05; ** p<.01; *** p<.001 (two-tailed tests).

Source: Medical Expenditure Panel Survey (MEPS), Panels 12 (2007-2008) and 13 (2008-2009).

Note: The unweighted sample size is 4,868. Base AIC is 1,709.75. Model 2 controlled for age, age2, age3, gender, and race, and all age variables*gender, all age variables*race, and race*gender interaction terms. All models were weighted by longitudinal person weight.

Table 4. Odds ratios (OR) and 95% confidence intervals (CI) for determinants (multivariate) of objective unmet medical need.

Predictor	Model 1	Model 2
Foreign-born	1.310*** (1.145 - 1.498)	0.998 (0.850 - 1.171)
Educational attainment (vs. Bachelor's degree or higher)		
Less than high school		1.225* (1.042 - 1.441)
High school diploma		1.205** (1.069 - 1.358)
Some college		1.029 (0.911 - 1.162)
Income as % of poverty line (vs. High income)		
Poor/negative		1.044 (0.901 - 1.209)
Near poor		1.261* (1.016 - 1.565)
Low income		1.272*** (1.106 - 1.462)
Middle income		1.122† (0.997 - 1.263)
Ever uninsured		2.015*** (1.818 - 2.234)
Family type (vs. Married)		
Widowed		1.121 (0.901 - 1.395)
Divorced/separated		1.149* (1.004 - 1.314)
Never married		1.194** (1.065 - 1.338)
Cohabiting		1.359** (1.083 - 1.705)
Goodness of fit statistics		
AIC	26,025.04	22,947.24
Likelihood ratio (DF)	45.90 (1)	3,191.70 (35)
Significance	<.0001	<.0001

† p<.10; * p<.05; ** p<.01; *** p<.001 (two-tailed tests).

Source: Medical Expenditure Panel Survey (MEPS), Panels 12 (2007-2008) and 13 (2008-2009).

Note: The unweighted sample size is 19,562. Base AIC is 26,068.94. Model 2 controlled for age, age2, age3, gender, and race, and all age variables*gender, all age variables*race, and race*gender interaction terms. All models were weighted by longitudinal person weight.

Table 5. Odds ratios (OR) and 95% confidence intervals (CI) for determinants of objective unmet medical need among foreign-born adults.

Predictor	Model 1	Model 2
Length of time in U.S. (vs. 15 or more years)		
Less than 5 years	3.304*** (2.403 - 4.544)	1.546* (1.079 - 2.216)
5-9 years	2.237*** (1.809 - 2.767)	1.224 (0.927 - 1.616)
10-14 years	1.528*** (1.222 - 1.910)	0.895 (0.698 - 1.148)
English interview	0.655*** (0.538 - 0.797)	1.010 (0.772 - 1.321)
State destination type (vs. Traditional, high-/balanced-skill)		
Traditional, low-skill	0.551*** (0.438 - 0.693)	0.585*** (0.457 - 0.749)
New, high-/balanced-skill	1.396 (0.938 - 2.077)	1.277 (0.886 - 1.839)
New, low-skill	1.060 (0.777 - 1.447)	1.215 (0.838 - 1.762)
Educational attainment (vs. Bachelor's degree or higher)		
Less than high school		1.200 (0.914 - 1.576)
High school diploma		0.836 (0.649 - 1.077)
Some college		1.036 (0.792 - 1.355)
Income as % of poverty line (vs. High income)		
Poor/negative		1.306 (0.922 - 1.850)
Near poor		1.722** (1.146 - 2.586)
Low income		1.701*** (1.256 - 2.305)
Middle income		1.217 (0.908 - 1.632)
Ever uninsured		2.673*** (2.173 - 3.287)
Family type (vs. Married)		
Widowed		0.505* (0.294 - 0.867)
Divorced/separated		1.265† (0.963 - 1.662)
Never married		1.412* (1.077 - 1.850)
Cohabiting		1.604* (1.008 - 2.553)
Goodness of fit statistics		
AIC	6,317.62	5,576.89
Likelihood ratio (DF)	375.04 (7)	1,183.77 (41)
Significance	<.0001	<.0001

† p<.10; * p<.05; ** p<.01; *** p<.001 (two-tailed tests).

Source: Medical Expenditure Panel Survey (MEPS), Panels 12 (2007-2008) and 13 (2008-2009).

Note: The unweighted sample size is 4,868. Base AIC is 6,678.66. Model 2 controlled for age, age^2, age^3, gender, and race, and all age variables*gender, all age variables*race, and race*gender interaction terms. All models were weighted by longitudinal person weight.

REFERENCES

Adler, Nancy E. and Katherine Newman. 2002. "Socioeconomic Disparities in Health: Pathways and Policies." *Health Affairs* 21(2):60-76.

Agency for Healthcare Research and Quality. N.d. "MEPS-HC Sample Design and Collection Process." Rockville, MD. Retrieved April 23, 2012 (http://www.meps.ahrq.gov/survey_comp/hc_data_collection.jsp).

Aguilera, Elizabeth. 2012. "Health care law excludes undocumented immigrants." *San Diego Union-Tribune*, June 28.

Akresh, Ilana R. and Reanne Frank. 2008. "Health Selection among New Immigrants." *American Journal of Public Health* 98(11):2058-2064.

Allin, Sara, Michel Grignon, and Julian Le Grand. 2010. "Subjective Unmet Need and Utilization of Health Care Services in Canada: What are the Equity Implications?" *Social Science & Medicine* 70(3):465-472.

Almond, Douglas and Janet Currie. 2011. "Killing Me Softly: The Fetal Origins Hypothesis." *Journal of Economic Perspectives* 25(3):153-172.

American Academy of Pediatrics/Bright Futures. 2008. "Recommendations for Preventive Pediatric Health Care. Elk Grove Village, IL: American Academy of Pediatrics. Retrieved April 13, 2011 (http://www.ataamerica.com/arc1/users/pdfforms/AAP%20Bright%20Futures%20Periodicity%22Sched%20101107.pdf).

Andersen, Ronald M. 1995. "Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?" *Journal of Health and Social Behavior* 36(1):1-10.

Ayanian, John Z., Joel S. Weissman, Eric C. Schneider, Jack A. Ginsburg, and Alan M. Zaslavsky. 2000. "Unmet Health Needs of Uninsured Adults in the United States." *Journal of the American Medical Association* 284(16):2061-2069.

Braveman, Paula, Susan Egerter, and David R. Williams. 2011. "The Social Determinants of Health: Coming of Age." *Annual Review of Public Health* 32:381-398.

Bustamante, Arturo Vargas, Jie Chen, Hector P. Rodriguez, John A. Rizzo, and Alexander N. Ortega. 2010. "Use of Preventive Care Services among Latino Subgroups." *American Journal of Preventive Medicine* 38(6):610-619.

Carrasquillo, Olveen, Angeles I. Carrasquillo, and Steven Shea. 2000. “Health Insurance Coverage of Immigrants Living in the United States: Differences by Citizenship Status and Country of Origin.” *American Journal of Public Health* 90(6):917-923.

Casterline, John B. and Steven W. Sinding. 2000. "Unmet Need for Family Planning in Developing Countries and Implications for Public Policy." *Population and Development Review* 26:691-724.

Cohen, Adam L. and Dimitri A. Christakis. 2006. “Primary Language of Parent is Associated with Disparities in Pediatric Preventive Care.” *Journal of Pediatrics* 148(2):154-157.

Corbie-Smith, Giselle, Elaine W. Flagg, Joyce P. Doyle, and Megan A. O’Brien. 2002. “Influence of Usual Source of Care on Differences by Race/Ethnicity in Receipt of Preventive Services.” *Journal of General Internal Medicine* 17(6):458-464.

Cruz, Theresa H., Stephen W. Marshall, J. Michael Bowling, and Andrés Villaveces. 2008. “The Validity of a Proxy Acculturation Scale among U.S. Hispanics.” *Hispanic Journal of Behavioral Sciences* 30(4):425-446.

Cutler, David M. and Adriana Lleras-Muney. 2010. “Understanding Differences in Health Behaviors by Education.” *Journal of Health Economics* 29(1):1-28.

Cylus, Jonathan, Micah Hartman, Benjamin Washington, Kimberly Andrews, and Aaron Catlin. 2011. “Pronounced Gender and Age Differences Are Evident in Personal Health Care Spending Per Person.” *Health Affairs* 30(1):153-160.

De Jong, Gordon F., Deborah Roempke Graefe, Laura Rosell, Amanda Maull, and Matthew Hall. 2009. “State Immigration Legislation and Policy: Immigrant Reception Climate and Access to Public Benefits and Services.” Poster session presented at the annual meeting of the Association of Public Policy and Management, Washington, DC.

Derose, Kathryn Pitkin, Benjamin W. Bahney, Nicole Lurie, and José J. Escarce. 2009. “Review: Immigrants and Health Care Access, Quality, and Cost.” *Medical Care Research and Review* 66(4):355-408.

Derose, Kathryn Pitkin, José J. Escarce, and Nicole Lurie. 2007. “Immigrants and Health Care: Sources of Vulnerability.” *Health Affairs* 26(5):1258-1268.

DuBard, C. Annette and Ziya Gizlice. 2008. “Language Spoken and Differences in Health Status, Access to Care, and Receipt of Preventive Services among U.S. Hispanics.” *American Journal of Public Health* 98(11):2021-2028.

Dunlop, Dorothy D., Larry M. Manheim, Jing Song, and Rowland W. Chang. 2002. "Gender and Ethnic/Racial Disparities in Health Care Utilization among Older Adults." *Journal of Gerontology* 57B(4):S221-S233.

Fiscella, Kevin, Peter Franks, Mark P. Doescher, and Barry G. Saver. 2002. "Disparities in Health Care by Race, Ethnicity, and Language among the Insured." *Medical Care* 40(1):52-59.

Fadiman, Anne. 1998. *The Spirit Catches You and You Fall Down*. New York: Farrar, Straus and Giroux.

Flores, Glenn, M. Barton Laws, Sandra J. Mayo, Barry Zuckerman, Milagros Abreu, Leonardo Medina, and Eric J. Hardt. 2003. "Errors in Medical Interpretation and Their Potential Clinical Consequences in Pediatric Encounters." *Pediatrics* 111(1):6-14.

Fullilove, Mindy Thompson. 1998. "Comment: Abandoning "Race" as a Variable in Public Health Research – An Idea Whose Time Has Come." *American Journal of Public Health* 88(9):1297-1298.

Gadomski, Anne, Paul Jenkins, and Melissa Nichols. 1998. "Impact of a Medicaid Primary Care Provider and Preventive Care on Pediatric Hospitalization." *Pediatrics* 101(3):e1-e10.

Gold, Marsha. 1998. "Beyond Coverage and Supply: Measuring Access to Healthcare in Today's Market." *Health Services Research* 33(3):625-652.

Hakim, Rosemarie B. and Barry V. Bye. 2001. "Effectiveness of Compliance with Pediatric Preventive Care Guidelines among Medicaid Beneficiaries." *Pediatrics* 108(1):90-97.

Hakim, Rosemarie B. and Donna S. Ronsaville. 2002. "Effect of Compliance with Health Supervision Guidelines among US Infants on Emergency Department Visits." *Archives of Pediatric and Adolescent Medicine* 156:1015-1020.

Hall, Matthew, Audrey Singer, Gordon F. De Jong, and Deborah Roempke Graefe. 2011. "The Geography of Immigrant Skills: Educational Profiles of Metropolitan Areas." State of Metropolitan America #34. Washington, DC: Brookings Institution.

Hartman, Micah, Aaron Catlin, David Lassman, Jonathan Cylus, and Stephen Heffler. 2008. "U.S. Health Spending by Age, Selected Years through 2004." *Health Affairs* 27(1):w1-w12.

Harley, Kim and Brenda Eskenazi. 2006. "Time in the United States, Social Support and Health Behaviors during Pregnancy among Women of Mexican Descent." *Social Science & Medicine* 62(12):3048-3061.

Himmelstein, David U. and Steffie Woolhandler. 1995. "Care Denied: U.S. Residents Who Are Unable to Obtain Needed Medical Services." *American Journal of Public Health* 85(3):341-344.

Hofstetter, C. Richard, John W. Ayers, Veronica L. Irvin, D. Eastern Kang Sim, Suzanne C. Hughes, Frederick Reighard, and Melbourne F. Hovell. 2010. "Does Church Participation Facilitate Tobacco Control? A Report on Korean Immigrants." *Journal of Immigrant and Minority Health* 12(2):187-197.

Hong, Rick, Brigitte Baumann, and Edwin D. Boudreaux. 2007. "The Emergency Department for Routine Healthcare: Race/Ethnicity, Socioeconomic Status, and Perceptual Factors." *Journal of Emergency Medicine* 32(2):149-158.

Hummer, Robert A., Daniel A. Powers, Starling G. Pullum, Ginger L. Grossman, and W. Parker Frisbie. 2007. "Paradox Found (Again): Infant Mortality among the Mexican-Origin Population in the United States." *Demography* 44(3):441-457.

Jasso, Guillermina, Douglas S. Massey, Mark R. Rosenzweig, and James P. Smith. 2004. "Immigrant Health: Selectivity and Acculturation." Pp. 227-266 in *Critical Perspectives on Racial and Ethnic Differences in Late Life*, edited by Norman B. Anderson, Rodolfo A. Bulatao, and Barney Cohen. Washington, DC: National Academies Press.

Koball, Heather L., Emily Moiduddin, Jamila Henderson, Brian Goesling, and Melanie Besculides. 2010. "What Do We Know About the Link Between Marriage and Health?" *Journal of Family Issues* 31(8):1019-1040.

Kreider, Rose M. 2010. "Increase in Opposite-Sex Cohabiting Couples from 2009 to 2010 in the Annual Social and Economic Supplement (ASEC) to the Current Population Survey (CPS)." Housing and Household *Economic* Statistics Division Working Paper. Retrieved May 27, 2012 (http://www.census.gov/population/www/socdemo/Inc-Opp-sex-2009-to-2010.pdf).

Ku, Leighton and Sheetal Matani. 2001. "Left Out: Immigrants' Access to Health Care and Insurance." *Health Affairs* 20(1):247-256.

Lara, Marielena, Cristina Gamboa, M. Iya Kahramanian, Leo S. Morales, and David E. Hayes Bautista. 2005. "Acculturation and Latino Health in the United States: A Review of the Literature and its Sociopolitical Context." *Annual Review of Public Health* 26:367-397.

Lebrun, Lydie A. 2012. "Effects of Length of Stay and Language Proficiency on Health Care Experiences among Immigrants in Canada and the United States." *Social Science & Medicine* 74(7):1062-1072.

Lebrun, Lydie A. and Lisa C. Dubay. 2010. "Access to Primary and Preventive Care among Foreign-Born Adults in Canada and the United States." *Health Services Research* 45(6):1693-1719.

Leclere, Felicia B., Leif Jensen, and Ann E. Biddlecom. 1994. "Health Care Utilization, Family Context, and Adaptation among Immigrants to the United States." *Journal of Health and Social Behavior* 35(4):370-384.

Lichter, Daniel T. and Kenneth M. Johnson. 2009. "Immigrant Gateways and Hispanic Migration to New Destinations." *International Migration Review* 43(3):496-518.

Lucas, Jacqueline W., Daheia J. Barr-Anderson, and Raynard S. Kington. 2003. "Health Status, Health Insurance, and Health Care Utilization Patterns of Immigrant Black Men." *American Journal of Public Health* 93(10):1740-1747.

Ma, Grace X. 1999. "Between Two Worlds: The Use of Traditional and Western Health Services by Chinese Immigrants." *Journal of Community Health* 24(6):421-437.

Maciosek, Michael, Ashley B. Coffield, Thomas J. Flottemesch, Nichol M. Edwards, and Leif I. Solberg. 2010. "Greater Use of Preventive Services in U.S. Health Care Could Save Lives at Little or No Cost." *Health Affairs* 29(9):1656-1660.

Mangione-Smith, Rita, Alison H. DeCristofaro, Claude M. Setodji, Joan Keesey, David J. Klein, John L. Adams, Mark A. Schuster, and Elizabeth A. McGlynn. 2007. "The Quality of Ambulatory Care Delivered to Children in the United States." *New England Journal of Medicine* 357(15):1515-1523.

Martin, Philip and Elizabeth Midgley. 2006. "Immigration: Shaping and Reshaping America." Population Bulletin 61(4). Washington, DC: Population Reference Bureau.

------. 2010. "Immigration in America 2010." Population Bulletin Update. Washington, D.C.: Population Reference Bureau.

McCarthy, Marianne C., Ester Ruiz, Betty J. Gale, Cheryl Karam, and Nancy Moore. 2004. "The Meaning of Health: Perspectives of Anglo and Latino Older Women." *Health Care for Women International* 25(10):950-969.

McConnell, Eileen Diaz. 2008. "The U.S. Destinations of Contemporary Mexican Immigrants." *International Migration Review* 42(4):767-802.

McMullin, Juliet M, Israel De Alba, Leo R. Chávez, and F. Allen Hubbell. 2005. "Influence of Beliefs about Cervical Cancer Etiology on Pap Smear Use among Latina Immigrants." *Ethnicity & Health* 10(1):3-18.

Mejia, Gloria C., Jay S. Kaufman, Giselle Corbie-Smith, R. Gary Rozier, Daniel J. Caplan, and Chirayath M. Suchindran. 2008. "A Conceptual Framework for Hispanic Oral Health Care." *Journal of Public Health Dentistry* 68(1):1-6.

Migration Policy Institute. 2011. "States with the Largest and Fastest-Growing Immigrant Populations." Washington, DC. Retrieved April 13, 2012 (http://www.migrationinformation.org/datahub/FB_maps/StateRankingsACS_2010_NFN_Growth_1990.pdf).

Minnesota Immigrant Health Task Force. 2005. "Immigrant Health: A Call to Action: Recommendations from the Minnesota Immigrant Health Task Force." Minneapolis, MN. Retrieved June 20, 2012 (http://www.health.state.mn.us/divs/idepc/refugee/topics/immhealthrpt.pdf).

Minkovitz, Cynthia S., Patricia J. O'Campo, Yi-Hua Chen, and Holly A. Grason. 2002. "Associations Between Maternal and Child Health Status and Patterns of Medical Use." *Ambulatory Pediatrics (now Academic Pediatrics)* 2(2):85-92.

Mulvaney-Day, Norah E., Margarita Alegría, and William Sribney. 2007. "Social Cohesion, Social Support, and Health among Latinos in the United States." *Social Science & Medicine* 64(2):477-495.

National Immigration Law Center. 2010. "How Are Immigrants Included in Health Care Reform?" Los Angeles, CA. Retrieved July 21, 2012 (http://www.nilc.org/immigrantshcr.html).

Newacheck, Paul W., Dana C. Hughes, Yun-Yi Hung, Sabrina Wong, and Jeffrey J. Stoddard. 2000. "The Unmet Health Needs of America's Children." *Pediatrics* 105(4):989-997.

Ortega, Alexander N., Hai Fang, Victor H. Perez, John A. Rizzo, Olivia Carter-Pokras, Steven P. Wallace, and Lillian Gelberg. 2007. "Health Care Access, Use of Services, and Experiences among Undocumented Mexicans and Other Latinos." *Archives of Internal Medicine* 167(21):2354-2360.

Osborne, Cynthia, Glenn V. Ostir, Xianglin Du, M. Kristen Peek, and James S. Goodwin. 2005. "The Influence of Marital Status on the Stage of Diagnosis, Treatment, and Survival of Older Women with Breast Cancer." *Breast Cancer Research and Treatment* 93(1):41-47.

Peak, Christopher and John R. Weeks. 2002. "Does Community Context Influence Reproductive Outcomes of Mexican Origin Women in San Diego, California?" *Journal of Immigrant Health* 4(3):125-136.

Portes, Alejandro, David Kyle, and William W. Eaton. 1992. "Mental Illness and Help-seeking Behavior among Mariel Cuban and Haitian Refugees in South Florida." *Journal of Health and Social Behavior* 33(4):283-298.

Ransford, H. Edward, Frank R. Carrillo, and Yessenia Rivera. 2010. "Health Care-Seeking among Latino Immigrants: Blocked Access, Use of Traditional Medicine, and the Role of Religion." *Journal of Health Care for the Poor and Underserved* 21(3):862-878.

Rimal, Rajiv N. 2003. "Intergenerational Transmission of Health: The Role of Intrapersonal, Interpersonal, and Communicative Factors." *Health Education and Behavior* 30(1):10-28.

Ronsaville, Donna S. and Rosemarie B. Hakim. 2000. "Well Child Care in the United States: Racial Differences in Compliance with Guidelines." *American Journal of Public Health* 90(9):1436-1443.

Rossow, Ingeborg and Jostein Rise. 1994. "Concordance of Parental and Adolescent Health Behaviors." *Social Science & Medicine* 38(9):1299-1305.

Salganicoff, Alina, Usha R. Ranji, and Roberta Wyn. 2005. *Women and Health Care: A National Profile – Key Findings from the Kaiser Women's Health Survey*. Menlo Park, CA: Kaiser Family Foundation. Retrieved May 27, 2012 (http://www.kff.org/womenshealth/upload/women-and-health-care-a-national-profile-key-findings-from-the-kaiser-women-s-health-survey.pdf).

Sambamoorthi, Usha and Donna D. McAlpine. 2003. "Racial, Ethnic, Socioeconomic, and Access Disparities in the Use of Preventive Services among Women." *Preventive Medicine* 37(5):475-484.

Schoenborn, Charlotte A. 2004. "Marital Status and Health: United States, 1999-2002." Advance Data from Vital and Health Statistics, no. 351. Hyattsville, MD: National Center for Health Statistics.

Setia, Maninder Singh, Amelie Quesnel-Vallee, Michal Abrahamowicz, Pierre Tousignant, and John Lynch. 2011. "Access to Health-Care in Canadian Immigrants: A Longitudinal Study of the National Population Health Survey." *Health and Social Care in the Community* 19(1):70-79.

Shi, Leiyu, Lydie A. Lebrun, and Jenna Tsai. 2009. "The Influence of English Proficiency on Access to Care." *Ethnicity & Health* 14(6):625-642.

Shi, Leiyu and Gregory D. Stevens. 2005. "Vulnerability and Unmet Health Care Needs." *Journal of General Internal Medicine* 20(2):148-154.

Siddiqi, Arjumand, Daniyal Zuberi, and Quynh C. Nguyen. 2009. "The Role of Health Insurance in Explaining Immigrant Versus Non-immigrant Disparities in Access to Health Care: Comparing the United States to Canada." *Social Science & Medicine* 69(10):1452-1459.

Suro, Robert and Audrey Singer. 2002. "Latino Growth in Metropolitan America: Changing Patterns, New Locations." Washington, DC: Center on Urban & Metropolitan Policy and Pew Hispanic Center.

U.S. Census Bureau. 2012. "Percent Distribution of Number of Visits to Health Care Professionals by Selected Characteristics: 2000 and 2009." Table 166 in *Statistical Abstract of the United States: 2012, 131st edition*. Washington, DC: U.S. Government Printing Office.

U.S. Preventive Services Task Force. 2010. "Recommendations." Rockville, MD. Retrieved June 17, 2012 (http://www.uspreventiveservicestaskforce.org/recommendations.htm).

Van Cleave, Jeanne and Matthew M. Davis. 2008. "Preventive Care Utilization among Children With and Without Special Health Care Needs: Associations with Unmet Need." *Academic Pediatrics* 8(5):305-311.

Waite, Linda J. 1995. "Does Marriage Matter?" *Demography* 32(4):483-507.

Weinick, Robin M., Samuel H. Zuvekas, and Joel W. Cohen. 2000. "Racial and Ethnic Differences in Access to and Use of Health Care Services, 1977 to 1996." *Medical Care Research and Review* 57(S1):36-54.

White, Brett, Lyndee Knox, Monica Zepeda, Dennis Mull, and Felix Nunez. 2009. "Impact of Immigration on Complementary and Alternative Medicine Use in Hispanic Patients." *Journal of the American Board of Family Medicine* 22(3):337-338.

Wu, Zhang, Margaret J. Penning, and Christoph M. Schimmele. 2005. "Immigrant Status and Unmet Health Care Needs." *Canadian Journal of Public Health* 96(5):369-373.

Xu, Ke Tom and Tyrone F. Borders. 2008. "Does Being an Immigrant Make a Difference in Seeking Physician Services?" *Journal of Health Care for the Poor and Underserved* 19(2):380-390.