Published in final edited form as:

Med Care. 2012 March ; 50(3): 233–242. doi:10.1097/MLR.0b013e318241e5c2.

Medical Expenditures among Immigrant and Non-Immigrant Groups in the U.S.: Findings from the Medical Expenditures Panel Survey (2000–2008)

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Abstract

Objective—To examine time trends and differences in medical expenditures between non-citizens, foreign-born, and U.S.-born citizens.

Methods—We used multi-year Medical Expenditures Panel Survey (2000–2008) data on non-institutionalized adults in the U.S. (N=190,965). Source specific and total medical expenditures were analyzed using regression models, bootstrap prediction techniques, and linear and non-linear decomposition methods to evaluate the relationship between immigration status and expenditures, controlling for confounding effects.

Results—We found that the average health expenditures between 2000 and 2008 for non-citizens immigrants (\$1,836) were substantially lower compared to both foreign-born (\$3,737) and U.S.-born citizens (\$4,478). Differences were maintained after controlling for confounding effects. Decomposition techniques showed that the main determinants of these differences were the availability of a usual source of healthcare, insurance, and ethnicity/race.

Conclusion—Lower healthcare expenditures among immigrants result from disparate access to healthcare. The dissipation of demographic advantages among immigrants could prospectively produce higher pressures on the U.S. healthcare system as immigrants age and levels of chronic conditions rise. Barring a shift in policy, the brunt of the effects could be borne by an already overextended public healthcare system.

INTRODUCTION

The current United States foreign-born population numbers approximately 40 million and is projected to double in size by 2050 (1). The economic importance of the foreign-born working-age population will ascend as the native-born population ages (2). Yet legal and cultural determinants of healthcare among the foreign-born remain largely understudied, which has important implications for the current healthcare debate involving immigrants.

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Financial Disclosures: The authors report no conflicts of interest that could inappropriately influence, or be perceived to influence, this work.

For instance, close to two-thirds are non-citizens, divided between legal permanent residents (LPR; 12.5 million), undocumented immigrants (10.75 million), and non-immigrants (i.e., students, temporary workers; 1.83 million) (3, 4), and the majority of the undocumented (62%) are of Mexican-origin (5). The rapid increase in the size of the foreign-born population poses challenges to the healthcare system, calling for the attention of policymakers in planning for healthcare access and cost. In this manuscript, we will address nuances of the U.S. foreign-born populations in relation to healthcare expenditures and use.

Economic cycles, the federal government's failure to reform immigration, and certain states' enactment of restrictive immigration laws feed U.S. anti-immigrant sentiments. Public opinion surveys show a steady increase in opposition to immigration, citing perceptions of economic burden stemming from job loss, housing competition, and education and healthcare costs (6, 7). While public opinion on immigration has waxed and waned throughout U.S. history, the political rhetoric has become more sensational in the absence of reliable and sensible information.

The discourse on immigrant healthcare overlooks legal barriers to healthcare use, particularly publicly-provided services (8–10). These barriers were recently extended and broadened for certain immigrant groups with the 2010 Patient Protection and Affordable Care Act (11).

Knowledge about expenditures and cost of care among immigrants in the U.S. remains limited (12). A few cross-sectional studies showed lower healthcare spending among immigrants relative to U.S.-born citizens (13–15). More recently, Stimpson and colleagues showed descriptively that these spending differences have been maintained over time (16). Studies have also demonstrated that the total, and publicly funded, share of healthcare consumption by immigrants was much lower relative to their population size (13, 14, 17), speculating that immigrants were subsidizing care for non-immigrants (14).

In this study, we examine national trends in healthcare expenditures and consider factors expected to influence expenditures patterns. The three study aims were to: 1) present time-related statistics that capture the relationship between immigration status and spending; 2) examine share total and source specific expenditures relative to population size and address the issue of disproportionate use of health resources by immigrants; and 3) test for factors that could potentially confound the relationship between immigration status and healthcare expenditures. To this end, we examine the average expenditures trends of three immigration groups over 9 years. Our analytic approach is framed after the Behavioral Model using specific factors associated with healthcare access (18, 19). We expect our findings to inform the debate on the healthcare of the rapidly growing and increasingly important immigrant population.

METHODS

Data Collection and Analysis

We used the Medical Expenditures Panel Survey (MEPS) full-year consolidated data files. To identify respondents' immigration status, we used files created by the Agency for Healthcare Research Quality (AHRQ) staff linking the MEPS to data from the National Health Interview Survey (NHIS). We combined 9 years of MEPS data (2000–2008) appended to an AHRQ staff-generated common variance structure file allowing us to generate survey design adjusted standard errors. Additionally, sampling weights that correct for non-response bias were used to make inferences about the population of interest. The MEPS collects detailed information on respondents' demographic and socioeconomic

characteristics, in addition to healthcare access, behavior, and expenditures information. Response rates ranged from a high of 66.3% in 2001 to a low of 56.9% in 2007.

Main Outcome

We examined yearly total and source specific (i.e., out-of-pocket, private and public) self-reported healthcare expenditures. The MEPS expenditures are based on direct payments for care made during a specific year, excluding over-the-counter drug payments and payments not linked to specific medical events. All expenditures were GDP adjusted to reflect 2008 U.S. dollars.

Main predictor

We were mainly interested in immigration status as a primary *predisposing* factor in explaining healthcare expenditures. Immigration status was measured using a three-category indicator. U.S.-born individuals were grouped into one category, and foreign-born respondents were divided into two groups, foreign-born (naturalized) citizens and non-citizens.

Covariates

In line with the Behavioral Model, several covariates reflecting individual level “determinants” of healthcare utilization (18) were included to account for possible confounding effects and to investigate their contribution to the differences in expenditures across the main predictor categories. Our *predisposing* factors included 1) ethnicity/race measured using four categories including Non-Latino Whites, Blacks, Latinos/Hispanics, and an “All other ethnicity/race” group; 2) age in years measured using a 5-category indicator (1=18–34, 2=35–44, 3=45–54, 4=55–64, and 5=65 and older); 3) sex included as a dichotomous covariate (0=Female, 1=Male); and 4) education included as a 4-category indicator (1=less than high school, 2=high school, 3=some college, and 4=college or more). Our *enabling* factors consisted of 1) household income, accounted for using a MEPS staff-generated income-to-poverty ratio measure including 5-categories (<100%, 100%–124%, 125%–199%, 200%–399% and ≥ 400%); 2) insurance status coded using a three-category indicator for private insurance, public insurance (i.e., governmental), and uninsured; and 3) availability of a usual source of care (USC) coded as a dichotomous indicator (0=No, 1=Yes). We controlled for *need* using a 5-point self-rated health status measure (1=Poor, 2=Fair, 3=Good, 4=Very Good, and 5=Excellent). Finally, we accounted for time effects using survey year as a categorical measure with the year 2000 set as the reference (2000 to 2008).

Analytic approach

Statistical analyses were conducted with Stata software (Stata 11.1) using design corrections when available. Stata’s survey procedures adjust for stratification, clustering, and probability weighting and allow correct inferences about the population of interest. Our population of interest was non-institutionalized U.S. household resident adults 18-years and over (N=190,965).

We first examined descriptive statistics and estimated healthcare expenditure rates and means. Chi-squared and Wald adjusted independence and means tests were conducted to determine significant bivariate relationships with immigration status. Additionally, given the legal significance of the 5-year residency threshold for access to publicly funded care among non-citizens, means difference tests were conducted to contrast overall expenditures among non-citizens with less than 5 years of residence in the U.S. relative to those reporting 5 years or more of U.S. residence. We then graphed yearly estimates of total healthcare expenditures

and population and highest decile share of total expenditures relative to size for each immigration group, as well as yearly source specific (i.e., out-of-pocket, private, and public) average proportions of healthcare expenditures. We then fit a two-part model to test the relationship between total expenditures and immigration status, controlling for our behavioral model confounding factors (20, 21). To start, a logistic regression modeled the relationship between a dichotomous indicator distinguishing between spenders and non-spenders and the predictor and covariates of interest. Subsequently, an ordinary least squares regression was fit to test the relationship between the log of expenditures, applied to normalize the distribution and allow correct inferences, among individuals reporting any expenditure in the past year and the predictor and covariates. Bootstrapped predictions (bootstrap $n=500$) combining the model estimated probability of expenditure and a transformation of average predicted values of log expenditures were subsequently generated and used to test for differences in expenditures among the three immigration groups (22). Finally, we used, variance decomposition techniques for non-linear (*Fairlie*) and linear (*Oaxaca-Binder*) effects to investigate the determinants of differences between the groups (23–25).

RESULTS

Sample descriptive statistics are presented in Table 1. Two-thirds of non-citizens (59.1%) were Latinos, compared to over one-third (36.5%) of foreign-born citizens, and 6% of U.S.-born respondents. Non-citizens had the lowest socioeconomic achievements compared to the other groups, with nearly one-half (45.8%) reporting a high school education or less, and one-in-four (25.1%) having a “poor” or “near poor” income classification. Non-citizens were also most likely to be uninsured (38.7%), and to report not having a USC (45.3%). Average health self-ratings were comparable across the three groups, with foreign-born citizens reporting poor to fair health at a slightly higher rate.

Expenditures Trends

The average expenditures among non-citizens (\$1835.6; SE=75.8) was close to two-fifths of those reported by the U.S.-born (\$4478.1; SE=54.4). Foreign-born citizens spent on average \$3732.2 (SE=161.8) (Table 1). Non-citizens were least likely to report having any expenditures (34.7%), followed by foreign-born citizens (16.1%), and those born in the U.S. (12.1%; $\chi^2=1.75.11$, $P<0.001$) (Table 1). The number of years of U.S. residence among the non-citizens was not statistically instrumental in explaining expenditures (results not shown). Those reporting more than 5 years of residence in the United States showed a relatively higher (\$1917.4; SE=78.0), but statistically non-significant ($P=0.0918$), average of expenditures compared to those reporting being in the U.S. for 5 years or less (\$1576.1; SE=189.0).

Time trends showed an overall increase in expenditures between 2000 and 2008 with a steeper positive incline among the U.S.-born (Figure 1). U.S. and foreign-born citizens' shares of spending were relatively proportionate to their population sizes with the latter group presenting a drop in share to size ratio following 2003. The ratios for non-citizens were disproportionately lower, ranging from a high of 0.50 in 2000 and dropping to 0.40 in 2008 (Figure 1). Strikingly similar share to size trends were uncovered among the highest decile of spenders in each immigration group (Figure 1).

Our examination of source specific expenditures indicated that the average proportion of private insurance funding was smallest among non-citizens and highest among the U.S.-born (Figure 2), remaining stable between 2000 and 2008. The proportion of out-of-pocket expenditures was the highest among non-citizens and remained stable over time. Overall, the difference in out-of-pocket spending between the foreign- and U.S.-born citizens was largely

indistinct with a downward time trend evidenced in both groups. Finally, the proportions of publicly-funded healthcare expenditures showed a decline among non-citizens from a high of 19.3% in 2000 to a low of 14.5% in 2003 followed by a gradual increase to reach 19% in 2008. The rates for U.S.-born respondents presented a continuous increase from 15.2% in 2000 to about 21% in 2008. The differences between non-citizens and U.S. born citizens were not statistically significant. Overall, foreign-born citizens had the highest share of publicly funded expenditures. The average estimated proportions were relatively stable between 2000 and 2005, but exhibited a noticeable increase in the following years reaching a high of 23.2% in 2007.

Two-part model

The estimated two-part model results are presented in Table 2. Both non-citizens (OR=0.75; 95% CI=0.69–0.82) and foreign-born citizens (OR=0.89; 95% CI=0.82–0.97) had a lower likelihood of spending compared to U.S.-born respondents. Among the *predisposing* factors, all three ethnic/racial groups had lower odds of spending compared to Whites. Respondents over the age of 45-years were more likely to spend compared to younger adults, with the odds of spending highest among those 65-years and older (OR=3.52; 95% CI=3.16–3.90). Sex was significantly related to propensity to spend, with male respondents substantially less likely to spend compared to females. Higher education was associated with higher odds of spending, especially among respondents reporting a college degree or more (OR=2.22; 95% CI=2.06–2.38). Among the *enabling* factors, income levels over 200% of the poverty threshold were associated with higher odds of spending, as was being insured, both privately and publicly. The odds of having any expenditure were more pronounced among the publicly insured. Additionally, reporting a usual source of care increased the odds of spending (OR=3.41; 95% CI=3.25–3.57). Finally, lower *need* indicated by better self-rated health was associated with gradually reduced propensity to spend.

Modeling the log of positive expenditures revealed that non-citizens and foreign-born citizens spent on average 25.2% and 18.1% less, respectively, compared to respondents born in the U.S. As with the propensity to spend, lower levels of expenditures were associated with the *predisposing* ethnic/racial minority grouping, being male, and lower *need* indicated by higher self-rated health. Expenditures were positively linked to the *predisposing* effects of older age and higher education and the *enabling* effects of insurance (both private and public) availability and reports of having a USC.

The bootstrapped estimate of total expenditures resulting from the two-part model for the overall population was \$4,956.6 (SE=40.7). The bootstrapped estimates for U.S.-born, foreign-born citizens, and non-citizens were \$5,159.5, \$4,224.5 and \$3,900.8, respectively. Bootstrapped significance tests indicated that the differences between the three groups were highly statistically significant ($P<0.001$).

Effects Decomposition

The non-linear decomposition of difference in spending probability shows that 84.3% of the difference (0.22) between non-citizens (0.66) and the U.S.-born (0.88) is explained by model covariates (Figure 3). More specifically, 62.4% of the difference in the probability of reporting any expenditure was explained by three factors: having a USC (26.6%), insurance status (20.1%), and ethnicity/race (15.7%). The probability difference between foreign-born citizens (0.84) and the U.S.-born (0.88) was much reduced (0.04) compared to the difference between non-citizens and the US-born and overwhelmingly explained by ethnicity/race (83.6%). Lastly, 85.1% of the probability difference (0.19) between non-citizens and foreign-born citizens was explained by the model covariates with having a USC (28.6%),

insurance (22.1%), age (11.25%) and education (9.9%) accounting for 72% of this difference.

The linear decomposition of the difference in positive (log) expenditures provides a slightly different portrait (Figure 3). First, model covariates explained about 64% of the difference between non-citizens and the U.S.-born primarily due to age (21.4%), ethnicity/race (17.4%) and insurance (16.2%). Lower health rating slightly inflated (-4.4%) the spending position of the U.S.-born relative to non-citizens, indicating that similar health conditions would have decreased the difference in spending levels between the groups by about 4.4%. Second, 54% of the difference between U.S. and foreign-born citizens was explained by ethnicity/race, with minor contributions from insurance and availability of a USC. However, the difference between the two groups was inflated by several factors, most important of which are health rating (-29.2%) and age (-26.2%) indicating that leveling the differences in health conditions and age between these two groups would decrease the difference in spending by the indicated percentages. Finally, 74.4% of the difference between non-citizens and foreign born citizens was explained by the model covariates. Age (31.4%), insurance (19.2%) and having a USC (10%) were the most influential factors in explaining this difference.

DISCUSSION

We found that immigrants, especially non-citizens, spend disproportionately less on healthcare compared to US-born adults. Second, immigrants' lower spending was sustained over the 9-year study period. The share of overall expenditures relative to population size was distinctly and persistently low among non-citizens. In accordance with previous literature findings, this indicates that immigrants, especially non-citizens do not over-utilize U.S. healthcare resources (13–16). Additionally, out-of-pocket spending consumed the highest share of expenditures among non-citizens, and foreign-born citizens presented a slightly higher share of expenditures funded by public sources compared to the other groups. Given reports of equitable tax contributions relative to population size in the U.S. immigrant population (26–29), our findings signal that group members, and particularly non-citizens, do not overburden publicly funded healthcare services. Third, the lower immigrant expenditures relative to the U.S.-born were chiefly explained by limited access to health insurance and a usual source of healthcare among non-citizens, and ethnic/racial differences among foreign-born citizens. This parallels previous literature, showing that deflated expenditures among non-citizens result from disparate healthcare access factors (30–32) and highlighting the role of racial and ethnic disparities as an explanatory factor of intra-citizen differences (33).

Given evidence indicating that immigrants, especially non-citizens, are at a greater risk of inadequate healthcare access (12, 34, 35), our findings suggest that group members could be delaying or foregoing routine healthcare and preventive services (12) thus deferring negative cumulative health effects (36, 37). Considering that preventive (primary, secondary and tertiary) (38) healthcare (39–42), access to care, including the availability of a usual source of care (43), and continuity of care (44), and adequate treatment (45, 46) have been linked to better health outcomes and lower healthcare costs, we propose that the dissipation of some of the advantageous demographic factors among immigrants, three-fifths of which are under the age of 45-years, and especially non-citizens, where less than 6% are 65-years or older, is prospectively conducive to higher and delayed pressures on the U.S. healthcare system. Indeed, as both the native and immigrant U.S. populations age and the prevalence of chronic conditions increases, the brunt of these effects could be potentially borne by an overextended healthcare system (47–51); largely the public sector and primarily in the form of more costly services including emergency care and hospitalization.

Potential strategies to overcome these problems must acknowledge the political reality that financing of programs will be controversial. Short term solutions could use targeted insurance coverage expansion with relatively minimal public financing. Extending the provisions of the Patient Protection and Affordable Care Act, especially the ability to participate in health insurance exchanges and insurance premium tax credits and assistance would help to incorporate currently excluded but administratively accessible immigrant households with at least one individual tax filer. States could take advantage of existing health services assistance programs, expanding them to incorporate less costly procedures and benefit from existing administrative structures. More specifically, redefine services guidelines for Emergency Medicaid coverage to include benefits for preventive care, screening services and disease management offered at Medicaid accepting care providers. Cost offsets can be accrued by the states through studied focused consumption taxes targeting unhealthy behavior (52).

Over the long term, the aim should be for universal insurance coverage, including all non-citizens. Expanded coverage can be attained by mandating insurance coverage for all individuals, especially employer provided, relaxing the rules on access to insurance exchanges, and increasing need based public coverage.

Given that insurance only partially explained the differences between immigrant groups, short term proposals should also focus on reducing non-financial barriers to care. These include enhancing services that allow effective communication with immigrant patients, increasing awareness about the types of available programs and services to poor uninsured immigrants, and emphasizing the confidentiality of information and the minimal risk of immigration status being reported to state and federal authorities.

Over the long term, encouraging both providers and consumers to adopt a USC, and potentially a medical home would increase awareness about the need for more stability and centrality in healthcare. Doing so enhances positive health behaviors, increases preventive care, and helps reduce administrative inefficiencies, yielding positive returns for the health system. Finally, reduce ethnic/racial disparities in healthcare access and care outcomes through a focused approach on more vulnerable groups, more specifically Mexican-origin immigrants who constitute a majority of the U.S. noncitizen immigrant population.

Several study limitations should be considered in evaluating our findings. First, neither the MEPS nor the NHIS include information on immigrants' documentation status, and therefore our study could not isolate the spending patterns of undocumented immigrants from other non-citizen immigrants who are legally permitted to reside in the U.S. Our discussion is therefore based on extrapolations from published reports on the composition and size of the non-citizen immigrant population. Second, we assume that expenditures measure healthcare access and are related to health outcomes. The relationship between healthcare spending and access and outcomes are possibly neither direct nor linear. Third, the MEPS expenditures have been shown to underestimate U.S. healthcare expenditures as provided by the office of the actuary at the Centers for Medicaid and Medicare Services (53, 54). Our findings should, therefore, be assessed with the knowledge that the MEPS: 1) excludes institutionalized individuals, persons in long-term care facilities, and active-duty personnel, 2) does not capture individual tax subsidies, personal care services spending, medical administrative costs, and hospital subsidies, and 3) underestimates high cost cases due to "underreporting and differential attrition" (p.w351)(50). Additionally, MEPS expenditures measures do not allow for direct estimation of uncompensated care among respondents since they account for uncompensated cost of medical care obtained in public but not private institutions (13). Overall, research on uncompensated care among immigrants remains scarce with the solid data needed to conduct such analyses generally absent (9).

However, available work suggests that these costs are restricted among undocumented workers (14) and independent from state immigrant population size (55). More specific to the MEPS, Mohanty and colleagues' analyses of expenditures data adjusted for "free care at private institutions"^{P.1436} and reached conclusions similar to ours regarding immigrant differences in expenditures (15) and Stimpson and colleagues showed largely similar profiles of uncompensated visits among immigrant groups (16). Given the evidence above, we think that any resulting bias, though possible, is likely to be equally distributed among the considered immigrant groups and, given the comparative focus of this work, should not substantively alter our findings. Fourth, about 2,000 observations are lost annually from linking the MEPS to the NHIS; however, the demographic distribution of the missing observations does not differ markedly from the remaining sample and therefore potential bias should be minimal (16). Finally, as with any household data source, self-reports could be subject to bias and lead to further underreporting of expenditures. However, studies done to validate self-reports have shown overall validity (56).

CONCLUSION

We found that immigrant healthcare costs were disproportionately lower and remained so over 9 years relative to U.S.-born citizens and argued that immigrants do not present an excessive burden on U.S. healthcare. Furthermore, we found enduring immigrant disparities in healthcare expenditures compared to non-immigrants. Our findings suggest that public health may be best served by reconciling healthcare policies with demographic realities. A more effective and equitable health system could potentially be achieved by extending insurance coverage, USC access, and increasing awareness about centralized healthcare.

Acknowledgments

Funding/Support: Drs. González and Tarraf are supported by the National Institutes of Health, National Institute of Mental Health (R01) MH 84994.

Role of Funding Source: This work was supported by the National Institutes of Health, National Institute of Mental Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

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Figure 1.

Trends in average, share^d, and share relative to population size^e total expenditures among adults 18 years and older in the United States by immigrant status. Results are from the Medical Expenditures Panel Survey (2000–2008).

^a Adult (18 Years and Over) U.S. Population

^b Adult (18 Years and Over) U.S. Population

^c Top Decile of Adult Spenders

^d Share of overall expenditures indicates total group healthcare expenditures as a percentage of overall U.S. healthcare expenditures among adults 18 years and over.

^e Share relative to population size indicates ratio of group healthcare expenditures as a percentage of overall expenditures to group size as a percentage of the U.S. adult (18 years and over) population.

Figure 2.

Trends in source specific (i.e. out-of-pocket, private insurance and public insurance) average proportions of total expenditures^a among adults 18 years and older in the United States by immigrant status. Results are from the Medical Expenditures Panel Survey (2000–2008).

^a Indicates ratio of healthcare expenditures paid by source relative to overall healthcare expenditures.

Figure 3. Fairlie and Oaxaca-Binder decomposition of differences in expected probability and log of expenditures between adult (18 years and older) immigrant groups in the United States. Results are from the Medical Expenditures Panel Survey (2000–2008)

† Comparison group

* Reference group

Note 1: “NC” indicates Non-citizens, “FB” indicates Foreign-born citizens and “USB” indicates U.S.-born citizens.

Note 2: “USC” indicates a Usual Source of Care.

Note 3: Bars included in the negative quadrant of the graph represent factors that lower the level of spending among comparison groups. Bars included in the positive quadrant of the graph represent factors that increase the level of spending among the comparison groups. The width of each included bar represents the percentage of between group difference in outcome explained by the factor or, more specifically, the expected change in group outcome difference if both groups had similar factor characteristics. For example, USC is an unfavorable factor for the NC group leading to a lower expected probability of spending among group members compared to the USB group. It accounts for 28.6% of the difference in the estimated probabilities of spending between the USB and NC groups. Stated

differently, having similar USC characteristics would narrow the difference in the estimated probabilities between the USB and NC groups by 28.6%.

Descriptive statistics of adults 18 years and older in the United States by citizenship status. Results are from the Medical Expenditures Panel Survey (2000–2008) data.

Table 1

	Non-Citizens		Foreign-born Citizens		U.S.-born Citizens	
	N	%(SE)	N	%(SE)	N	%(SE)
<i>Ethnicity/race^d</i>						
Whites	1832	15.5 ^{b,c} (0.9)	3149	29.2 ^{a,c} (0.9)	100000	79.4 ^{a,b} (0.5)
Blacks	1095	5.9 ^c (0.5)	1144	6.7 ^c (0.5)	25997	12.0 ^{a,b} (0.5)
Hispanic/Latino	17784	59.1 ^{b,c} (1.3)	8690	36.5 ^{a,c} (1.1)	16181	6.0 ^{a,b} (0.4)
All Other	2925	19.5 ^{b,c} (1)	3781	27.6 ^{a,c} (1.1)	4489	2.6 ^{a,b} (0.2)
<i>Age (years)^d</i>						
18–35	10000	43.4 ^{b,c} (0.8)	3091	19.6 ^{a,c} (0.6)	44000	28.9 ^{a,b} (0.3)
35–44	6590	27.7 ^{b,c} (0.6)	3631	21.6 ^{a,c} (0.6)	28000	19.0 ^{a,b} (0.2)
45–54	3787	15.5 ^{b,c} (0.5)	3916	22.5 ^{a,c} (0.6)	29000	19.5 ^{a,b} (0.2)
55–64	1816	7.7 ^{b,c} (0.4)	2931	17.2 ^{a,c} (0.5)	21000	14.6 ^{a,b} (0.2)
65 and older	1327	5.7 ^{b,c} (0.3)	3195	19.1 ^a (0.6)	27000	17.9 ^a (0.3)
<i>Sex^d</i>						
Female	12289	48.8 ^{b,c} (0.5)	9186	52.7 ^a (0.6)	81252	52.3 ^a (0.1)
Male	11347	51.2 ^{b,c} (0.5)	7578	47.3 ^a (0.6)	67581	47.7 ^a (0.1)
<i>Education^d</i>						
< High school	13906	45.8 ^{b,c} (1)	5774	25.0 ^{a,c} (0.7)	34079	17.7 ^{a,b} (0.3)
High school	4214	19.8 ^{b,c} (0.6)	3751	22.4 ^{a,c} (0.6)	49134	32.8 ^{a,b} (0.3)
Some college	1536	8.4 ^{b,c} (0.3)	2015	13.3 ^{a,c} (0.5)	22828	16.0 ^{a,b} (0.2)
College or more	3839	26.0 ^{b,c} (0.8)	5128	39.3 ^{a,c} (0.9)	42429	33.5 ^{a,b} (0.5)
<i>Income Status^d</i>						
<100%	5794	17.9 ^{b,c} (0.6)	2368	10.1 ^a (0.4)	20987	9.7 ^a (0.2)
100%–124%	2338	7.3 ^{b,c} (0.3)	1045	4.5 ^{a,c} (0.3)	7146	3.6 ^{a,b} (0.1)

	Non-Citizens			Foreign-born Citizens			U.S.-born Citizens		
	N	%(SE)	N	%(SE)	N	%(SE)	N	%(SE)	
125%–199%	6052	21.6 ^{b,c} (0.5)	2773	13.4 ^{a,c} (0.4)	21075	12.1 ^{a,b} (0.2)			
200%–399%	6344	31.0(0.7)	5260	31.0(0.7)	45308	31.2(0.3)			
≥ 400%	3108	22.2 ^{b,c} (0.8)	5318	40.9 ^{a,c} (0.9)	54317	43.3 ^{a,b} (0.5)			
Health Insurance ^{d,e}									
Private	8698	47.0 ^{b,c} (1)	10031	67.8 ^{a,c} (0.8)	102872	75.0 ^{a,b} (0.4)			
Public	4308	14.4 ^b (0.6)	3833	18.2 ^{a,c} (0.6)	26839	14.0 ^b (0.3)			
Uninsured	10630	38.7 ^{b,c} (1)	2900	14.0 ^{a,c} (0.6)	19122	11.0 ^{a,b} (0.2)			
Usual Source of Care ^d									
No Usual Source of Care	11109	45.3 ^{b,c} (0.9)	4034	22.9 ^{a,c} (0.6)	30121	19.3 ^{a,b} (0.3)			
Usual Source of Care	12300	54.7 ^{b,c} (0.9)	12515	77.1 ^{a,c} (0.6)	117443	80.7 ^{a,b} (0.3)			
Self-rated Health ^d									
Poor	639	2.5 ^b (0.2)	707	3.6 ^{a,c} (0.2)	5033	2.8 ^b (0.1)			
Fair	3057	11.5 ^b (0.3)	2452	13.3 ^{a,c} (0.4)	18164	11.1 ^b (0.2)			
Good	7632	33.6 ^c (0.6)	5044	32.5 ^c (0.5)	43191	30.3 ^{a,b} (0.2)			
Very Good	6024	31.3 ^{b,c} (0.6)	4504	33.2 ^{a,c} (0.6)	47805	37.3 ^{a,b} (0.3)			
Excellent	4084	21.0 ^{b,c} (0.6)	2366	17.3 ^{a,c} (0.5)	23199	18.5 ^{a,b} (0.2)			
Expenditures ^d									
No	9058	34.7 ^b (0.7)	3118	16.1 ^{a,c} (0.5)	21251	12.1 ^b (0.2)			
Yes	14578	65.3 ^b (0.7)	13646	83.9 ^{a,c} (0.5)	127582	87.9 ^b (0.2)			
Expenditures (in U.S. Dollars)									
Including non-spenders	23636	1835.6 ^{b,c} (75.8)	16764	3737.2 ^{a,c} (161.8)	148833	4478.1 ^{a,b} (54.4)			
Excluding non-spenders	14578	2810.6 ^{b,c} (109.6)	13646	4455.3 ^{a,c} (188.2)	127582	5096.1 ^{a,b} (61.6)			

^aSignificantly different than non-citizens

^bSignificantly different than Foreign-born citizens

^cSignificantly different than U.S.-born citizens

^dDesign adjusted χ^2 Test of independence with citizenship status statistically significant ($P<0.001$)

^eIncome to poverty ratio

Table 2

Predictors of Health Expenditures among United States Adults (18-years and older). Results are from a two part model using Medical Expenditures Panel Survey (2000–2008) data.

	Model 1 ^a		Model 2 ^b	
	OR ^c	95 % CI	β ^d	SE
Predisposing				
Citizenship Status				
U.S.-born Citizens	1.00	--	Ref	--
Non-citizens	0.75***	0.69–0.82	−0.29***	0.02
Foreign-born Citizens	0.89***	0.82–0.97	−0.20***	0.02
Ethnicity/race				
Whites	1.00	--	Ref	--
Blacks	0.55***	0.51–0.59	−0.28***	0.02
Hispanic/Latino	0.61***	0.56–0.65	−0.25***	0.02
All Other	0.56***	0.50–0.62	−0.26***	0.03
Age (Years)				
18–34	1.00	--	Ref	--
35–44	1.02	0.96–1.08	0.10***	0.02
45–54	1.33***	1.25–1.42	0.39***	0.02
55–64	1.93***	1.78–2.08	0.78***	0.02
65+	3.52***	3.16–3.9	1.03***	0.02
Sex				
Female	1.00	--	Ref	--
Male	0.39***	0.38–0.41	−0.35***	0.01
Education				
< High school	1.00	--	Ref	--
High school	1.12***	1.06–1.19	0.08***	0.01
Some college	1.51***	1.41–1.62	0.17***	0.02
College or more	2.22***	2.06–2.38	0.29***	0.01
Enabling				
Income Status ^e				
<100%	1.00	--	Ref	--
100%–124%	1.04	0.94–1.15	−0.04	0.02
125%–199%	1.03	0.96–1.10	−0.07***	0.02
200%–399%	1.10***	1.04–1.18	−0.06***	0.02
≥ 400%	1.46***	1.36–1.58	0.03	0.02
Healthcare Insurance				
Uninsured	1.00	--	Ref	--

	Model 1 ^a		Model 2 ^b	
	OR ^c	95 % CI	β^d	SE
Private	2.83***	2.67–3.00	0.72***	0.02
Public	3.10***	2.87–3.35	0.78***	0.02
Usual Source of Care				
No	1.00	--	Ref	--
Yes	3.41***	3.25–3.57	0.48***	0.02
Need				
Self-rated Health				
Poor	1.00	--	Ref	--
Fair	0.47***	0.39–0.57	−0.65***	0.03
Good	0.28***	0.23–0.33	−1.25***	0.03
Very Good	0.21***	0.17–0.25	−1.60***	0.03
Excellent	0.15***	0.12–0.18	−1.89***	0.03
Time				
Year				
2000	1.00	--	Ref	--
2001	1.20***	1.10–1.31	0.18***	0.02
2002	1.22***	1.12–1.34	0.24***	0.03
2003	1.31***	1.20–1.44	0.30***	0.03
2004	1.19***	1.09–1.31	0.35***	0.03
2005	1.23***	1.11–1.35	0.35***	0.03
2006	1.21***	1.10–1.33	0.32***	0.03
2007	1.30***	1.18–1.43	0.33***	0.03
2008	1.24***	1.12–1.36	0.33***	0.03
Constant	--	--	7.80***	0.04

^a Outcome is a dichotomous indicator indicating whether respondents had no vs. any health expenditures.

^b Outcome is natural log of positive expenditures.

^c Odds Ratio.

^d Unstandardized ordinary least squares regression coefficient.

^e Income to poverty ratio.

*** P<0.001

** P<0.05