



Self-reported healthcare provider utilization across United States Midwestern households

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ABSTRACT

Understanding the relationships between health care provider usage and demographics of patients is necessary for the development of educational materials, outreach information, and programs targeting individuals who may benefit from services. This analysis identified relationships between health care provider usage and individual's demographics. A sample of Midwestern U.S. respondents ($n = 1265$) was obtained through the use of an online survey distributed February 12–26, 2016 and was targeted to be representative of the population of the Midwestern states sampled in terms of sex, age, income, and state of residence. Specific factors identified as significant in contributing to provider usage (in the past five years) differed across the eleven provider types studied. In the most commonly used practitioners (the general or primary physician), relationships between provider usage and age, income, health insurance coverage status, and having children in the household were identified. Furthermore, significant (and positive) correlations were identified between the usage of various practitioners; reporting the use of one type of practitioner studied was correlated positively with reporting the use of another type of health care provider studied in this analysis. This analysis provides insight into the relationships between health care provider usage and demographics of individuals, which can aid in the development of educational materials, outreach programs, and policy development.

1. Introduction

While a long-lived political topic generally, health care has been a dividing issue for the last few presidential terms, coming in as one of the top four priority ballot issues in the 2016, 2012, 2008, and 2004 elections (McCarthy, 2016; Kohut et al., 2012; Kohut, 2007). While political uncertainty may impact health care decisions, multiple other factors, such as provider access, inequity in access, physician shortages in various locales also impact the health-related decisions and associated outcomes for individuals. A preliminary step in understanding provider usage, in order to help inform policy reform and/or education initiatives, is to understand the demographic characteristics of those who do and do not visit different types of health care providers (and how often).

People of all demographics utilize different health care systems (emergency or otherwise) at some point. The National Center for Health Statistics (NCHS) (2017) found that in 2015, 48% of U.S. households had been to a health care provider (doctor's office, emergency

department, home visit) between 1 and 3 times in the last 12 months. The limiting factors amongst many utilization studies is the use of specific samples (usually those with a specific illness or race) and/or limit the number or type of health care providers investigated. Understanding provider use beyond specifics to general demographics can broaden the understanding of health care provider utilization. This analysis evaluates health care provider utilization via a sample of Midwestern residents (targeted to be representative in terms of sex, age, income, and state of residence) to identify potential relationships between resident demographics and health service provider utilization.

2. Methods

2.1. Survey instrument

Data was collected using a survey designed in Qualtrics and hosted at Purdue University.

Using rates from the U.S. Census Bureau (USCB) 2014 American

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Community Survey 1-Year Estimates (USCB, 2014), quotas were established for the demographics of sex, age, annual pretax household income, and state of residence. The quotas were targeted to be representative of the Midwest¹ with the inclusion of Kentucky and Tennessee.² A sample of Midwestern respondents was obtained using a large opt-in panel maintained by Lightspeed GMI. The survey was active February 12, 2016–February 26, 2016 and a total of 7277 respondents clicked on the survey link they received from Lightspeed GMI. Those not completing the survey did so in most cases due to being screened out of the survey by the quotas in place to ensure some degree of representativeness in terms of sex, income, age, and state of residence. In addition to those screened out respondents not completing the survey were excluded from analysis. A final sample of 1265 respondents was used in this analysis.

Respondent's usage of health care providers and services was the focus of this analysis. Additionally, a number of other demographic and household composition questions were asked. Respondents were asked to *Please indicate when you last visited one of these health care providers or utilized one of the following services* and were provided with the following list of providers and services: dentist, primary physician, nutritionist, cardiologist, physical therapist, optometrist, mental health professional, emergency services, in-home care giver, and urgent care.³ Respondents were asked to select one of the following options to indicate their frequency of visitation or use amongst options provided: "Within the last month," "Within the last year," "Within the last five years," and "More than five years ago/Never." For further analysis, responses were aggregated to result in categories of whether or not a respondent had visited each provider type in the past five years. Pairwise correlations amongst usage of various medical professionals were estimated and analyzed.

2.2. Logit models

In order to explore potential relationships between medical provider usage and demographics, the ten providers and services were used as dependent variables in logit regression analyses. Logit models have been used in a number of medical and health related studies (Blackwell et al., 2009; Widmar et al., 2017; Lee et al., 2010). For the ten providers included, a binary dependent variable was developed using the question *Please indicate when you last visited one of these health care providers or utilized one of the following services*. Responses indicating having been within the last five years were assigned a value of 1, any other response was assigned a 0. Using this dependent variable, the probability of a respondent having been to the provider or utilized the service within the last five years was estimated. Marginal effects were estimated because the estimated coefficients provide information about the direction of a change in a variable, but not the magnitude of change (Baum, 2006). Summary statistics, correlations, and the logit regressions were performed using STATA (StataCorp, 2015).

Explanatory variables employed in the model represented various demographics of interest. Being male was represented with a 1 (leaving female as 0). Three of the four age categories were used in the model: Age 25 to 44, Age 45 to 64, Age 65 and older, with age 18 to 24 left as

¹ Midwest is defined using the USCB census regions and includes: North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio. (USCB, 2015)

² Kentucky and Tennessee were included due to geographic proximity and to increase the overall scope of the study. Given geographic proximity, sharing of state borders, and shared economic, demographic, and other aspects in the region, the authors elected to err on increasing the size of the region by adding Kentucky and Tennessee to the study area. The targets in terms of sample demographics were updated to reflect the inclusion of these two additional states into the region (in terms of weighting the targeted representativeness for sex, age, education, income, and state of residence).

³ Family Planning Clinic and Crisis Center or Hotline were also included in the list of providers but were dropped from the study due to multicollinearity and low respondent utilization.

the base. Discrete categories of low income and high income were used in the models. Having obtained a college degree of an associates or higher, having indicated some form of employment, and having at least one child in the household were also included in the models.

3. Results

The final sample was comprised of 1265 Midwestern residents and a demographic summary is provided in Table 1. The sample was within 5% of the targeted Midwestern population in terms of sex, age, income level, education level and state of residence. Fifty-eight percent of the sample has obtained at least one college degree of an Associate's level or higher. Of the total sample, 57% reported having at least one part time, seasonal, or full time form of employment (Table 2). Respondents were asked if they had some form of publicly or privately supplied health insurance. Five percent reported being uninsured, 02% reported having some other form of health insurance, 09% reported being a beneficiary of someone else, 05% had Public- Affordable Care, 26% had Public-Medicare, 07% had Public- Medicaid, 09% had private (not related to an employer) and the largest group (37%) had employer provided health insurance. Having at least one child in the household was reported by 28% of respondents.

3.1. Provider usage and demographics

Table 2 provides a summary of responses to the question *Please indicate when you last visited one of these health care providers or utilized one of the following services* for ten providers or services. Mental health providers had been utilized by 20% of the sample within the last five years, while 24% of the sample had seen a cardiologist. Emergency service and urgent care had been visited by 36% and 37% of the sample within the last five years, respectively. A majority of respondents had seen an optometrist (65%) and 86% had seen a dentist. The largest proportion of respondents (92%) had seen a primary physician.

To investigate the relationship between usage of medical providers and services, correlations were estimated for the ten providers and services studied, with results provided in Table 3. Usage of any one provider or utilization of any one service was significantly and positively correlated with visitation to any other provider or utilization of any other service. The strongest correlation, with a coefficient of 0.5455, was between in-home care giver and nutritionist. Usage of an in-home care giver or nutritionist had strong relationships to usage of mental health professionals and cardiologists. Another notable relationship was between utilization of physical therapists and emergency services (a coefficient of 0.4022).

3.2. Logit model results

Ten logit models were estimated, one for each provider or service, in order to understand the relationships between demographics and visitation or utilization of the provider or service within the last five years. All models were significant; logit coefficients and marginal effect coefficients for the top five most used provider types are reported in Table 4.⁴

3.2.1. Top accessed providers: Dentist, primary physician, optometrist

Being male, between the ages of 25 to 44, low income, and not having health insurance significantly decreases the likelihood the respondent would have been to the dentist in the last five years (compared to being female, being 18 to 24, being mid-income, and having health insurance). Not having insurance had the largest marginal contribution, decreasing the likelihood by 24%. Having high income was

⁴ Estimated coefficients and marginal effects for the five lesser visited provider types are available from the authors upon request.

Table 1
Summary of demographics of respondents (*n* = 1265).

Variable description	Survey respondents (number of respondents)	Survey respondents (% of respondents)	U.S. Census Bureau, 2014 American Community Survey 1-year estimates (%)
Male	607	48	49
Age			
18–24	96	08	13
25–44	415	33	31
45–64	485	38	36
65 and older	269	21	20
Income			
Low income: \$34,999 or less	407	32	35
Mid income: \$35 K to \$74,999	425	34	33
High income: \$75 k or more	433	35	32
Education			
Did not graduate from high school	18	01	
Graduated from high school, did not attend college	220	17	
Attended college, no degree earned	284	22	
Attended college, associate's or trade degree earned	179	14	
Attended college, bachelor's degree earned	357	28	
Graduate or advanced degree	194	15	
Other	13	01	
State of residence			
Illinois	202	16	16
Indiana	104	08	08
Iowa	53	04	04
Kansas	47	04	04
Kentucky	70	06	06
Michigan	164	13	13
Minnesota	91	07	07
Missouri	96	08	08
Nebraska	32	03	02
North Dakota	13	01	01
Ohio	172	14	15
South Dakota	14	01	01
Tennessee	108	09	08
Wisconsin	99	08	08

Source: population percentages obtained from: U.S. Census Bureau; American Community Survey, 2014 American Community Survey 1-Year Estimates, Table S1901; generated by S. R. Dominick; using American FactFinder; < <http://factfinder2.census.gov> >; (21 September 2015).

The data for this analysis was collected via an online survey conducted by Purdue University taking place from February 12th – 26th 2016.

significant and positive, which suggests the likelihood a respondent would have been to the dentist within the last five years increases if they are in the high-income bracket. Likelihood of having been to the dentist in the past five years also increases if the respondent had obtained a college degree or if the respondent had at least one child living in their household.

The likelihood a respondent has been to a primary physician decreases if they are male, while being 65 years of age and older increased the likelihood. Similarly, having a high income and having at least one child in the household increased the likelihood a primary physician was visited in the past five years. Not having health insurance decreased the likelihood of having been to a primary physician and also has the largest marginal contribution, decreasing the likelihood by 26%.

Being 45 to 64 years old, being 65 years old and older, having at least one child in the household and having high income were significant and positive estimators predicting the likelihood of having visited an optometrist. Being 65 and older was the largest positive contributor, increasing the likelihood by 24%. The largest, and only, negative contributor was not having health insurance, which decreased the likelihood by 25%.

3.2.2. Emergency and urgent services

Being low income increased the likelihood of utilization of emergency services. Not having insurance and being 45 to 64 years old both decreased the likelihood of use of emergency services by the largest margins, 16% and 14%, respectively. Being male and having at least one child increased the likelihood of having utilized emergency services

in the past five years.

Three variables were significant and negative in the estimation of likelihood to visit urgent care. Being age 45 to 64 and being age 65 and older both decreased the likelihood of utilizing urgent care (by 14% and 19% respectively). Not having insurance decreased the likelihood of having utilized urgent care in the past 5 years by 18%. Having at least one child in the household increased the likelihood of visiting urgent care by 12%.

3.2.3. Other providers

Having at least one child in the household increased the likelihood that a respondent will have been to a nutritionist by 9%. The likelihood of having been to a nutritionist was also increased by having obtained a college degree or having high income. Unlike the first two models, being male increased the likelihood that a respondent would have been to a nutritionist. Both being 45 and older and not having health insurance decrease the likelihood of having visited a nutritionist in the past 5 years. The largest contributor, increasing the likelihood of having been to a cardiologist by 17%, was being 65 and older. Being male, having high income, and having at least one child in the household increased the likelihood that a respondent has been to a cardiologist. Interestingly, having some form of employment decreased the likelihood that a respondent has been to a cardiologist. Unsurprisingly, not having health insurance also decreased the likelihood the respondent had been to a cardiologist in the past 5 years.

Only two variables were significant in explaining physical therapist utilization in the past 5 years. Not having health insurance decreased

Table 2
Additional demographics and provider visits (n = 1265).

	Survey respondents (number of respondents)	Survey respondents (% of respondents)
Health insurance		
A beneficiary of someone else	114	09
Public- Affordable Care	63	05
Public- Medicare	329	26
Public- Medicaid	89	07
Private (not related to an employer)	114	09
Employer provided	468	37
Other	25	02
Has no health insurance	63	05
Other demographics		
Has employment	721	57
Has obtained college degree	734	58
Children in household	354	28
Provider use/visit in past 5 years		
Nutritionist	139	11
In home care	139	11
Mental health	253	20
Cardiologist	304	24
Physical therapy	379	30
Emergency	455	36
Urgent care	468	37
Optometrist	822	65
Dentist	1088	86
Primary	1164	92

The data for this analysis was collected via an online survey conducted by Purdue University taking place from February 12th – 26th 2016.

Table 3
Medical provider pairwise correlation coefficients.

	Dentist	Primary physician	Nutritionist	Cardiologist	Physical therapist	Optometrist	Mental health professional	Emergency services	In-home care giver
Primary physician	0.2526 0.0000								
Nutritionist	0.1021 0.0003	0.1362 0.0000							
Cardiologist	0.0806 0.0041	0.1943 0.0000	0.4648 0.0000						
Physical therapist	0.1426 0.0000	0.1966 0.0000	0.3405 0.0000	0.3889 0.0000					
Optometrist	0.1820 0.0000	0.3148 0.0000	0.1342 0.0000	0.2595 0.0000	0.3113 0.0000				
Mental health professional	0.0744 0.0081	0.1507 0.0000	0.4376 0.0000	0.3191 0.0000	0.3488 0.0000	0.2328 0.0000			
Emergency services	0.0731 0.0093	0.1705 0.0000	0.2945 0.0000	0.3639 0.0000	0.4022 0.0000	0.2117 0.0000	0.3841 0.0000		
In-home care giver	0.0878 0.0018	0.0974 0.0005	0.5455 0.0000	0.4473 0.0000	0.3896 0.0000	0.1863 0.0000	0.4871 0.0000	0.3722 0.0000	
Urgent care	0.1095 0.0001	0.1158 0.0000	0.2903 0.0000	0.2620 0.0000	0.3503 0.0000	0.1885 0.0000	0.3467 0.0000	0.3861 0.0000	0.3160 0.0000

P-values provided beneath correlation coefficients.

The data for this analysis was collected via an online survey conducted by Purdue University taking place from February 12th – 26th 2016.

the likelihood that a respondent has been to a physical therapist by 17%. Conversely, having at least one child in the household increased the likelihood by 09%. Unlike models discussed thus far, being 45 to 64 years old and being 65 years old and older are significant, yet negative, in the model estimating the likelihood of having visited a mental health professional. Not having insurance was also significant and negative. Being male increased the likelihood of having visited a mental health professional, as did being low income or having at least one child in the household. Being male, having high income, and having at least one child in the household increased the likelihood of having used an in-home care provider. Not having insurance and being 45 to 64 years

old decreased the likelihood. For this model, no one significant variable largely increased or decreased the likelihood, ranging from 05 to 07% contribution.

4. Discussion

The topic of health care has been a recent recurring headline amongst U.S. news sources and health care concerns have also been a point of discussion amongst health and political organizations. The National Center for Health Statistics (NCHS) (2017) found that in 2015, 48.4% of U.S. households had been to a health care provider (doctor's office, emergency department, home visit) between 1 and 3 times in the last 12 months. The study reported here found that usage of any one provider (or utilization of any one service) was significantly and positively correlated with utilization of other health services/providers. Thus, one may posit that many visits to doctor's offices are taken by patients who are also patients of other doctors or health service providers. One may wish to consider whether there are people not being seen by any type of practitioner – and – further discussion should be had about potential “gateway services” which may aim to bring such people into medical and health care settings. The potential to reach people who are uncovered in terms of medical services into the system is particularly valuable and deserving of further research attention.

The likelihood that a respondent has been to a primary physician was found to decrease for males and older people. Being male also decreased the likelihood the respondent had been to a dentist and the emergency room. Older respondents were also less likely to visit an optometrist. Having a high income increased the likelihood of visiting a dentist, primary physician, and optometrist. However, having a low income increased the probability of using the emergency room. The

reasons behind different types of doctor visits and income should be studied to garner further insights. Unsurprisingly, not having health insurance decreased the likelihood of having been to any of the top 5 providers. Similarly, not having health insurance decreased the likelihood that a respondent has been to a physical therapist by 17%. For some providers, such as physical therapists, it is posited that other factors not studied in this analysis may be related to utilization. Variables of interest for further study include rural/suburban/urban residence, ethnicity, past health diagnoses, family history, addictions (tobacco, drugs, alcohol), access to transportation and access to health-related information. Further work may wish to consider Internet access

Table 4
Logit model coefficients and marginal effects.

	Dentist		Primary		Optometrist		Emergency		Urgent care	
	Coeff. (Std. Err.)	Marg.Eff. (Std. Err.)	Coeff. (Std. Err.)	Marg.Eff. (Std. Err.)	Coeff. (Std. Err.)	Marg.Eff. (Std. Err.)	Coeff. (Std. Err.)	Marg.Eff. (Std. Err.)	Coeff. (Std. Err.)	Marg.Eff. (Std. Err.)
Male	-0.3427* [0.1769]	-0.0323* [0.0168]	-0.4370* [0.2242]	-0.0240* [0.0125]	-0.0689 [0.1264]	-0.0154 [0.0283]	0.3055** [0.1223]	0.0700** [0.0279]	0.0047 [0.1215]	0.0011 [0.0282]
Age 25to44	-0.7813** [0.3689]	-0.0818* [0.0432]	-0.2024 [0.3638]	-0.0113 [0.0210]	-0.1227 [0.2415]	-0.0277 [0.0548]	-0.2060 [0.2400]	-0.0466 [0.0537]	-0.3602 [0.2383]	-0.0820 [0.0531]
Age 45to64	-0.4731 [0.3639]	-0.0463 [0.0374]	0.5353 [0.3728]	0.0276 [0.0186]	0.7525*** [0.2372]	0.1626*** [0.0489]	-0.6383*** [0.2369]	-0.1421*** [0.0508]	-0.6103*** [0.2333]	-0.1381*** [0.0511]
Age 65 and older	-0.2941 [0.3986]	-0.0294 [0.0426]	1.6118*** [0.5468]	0.0622*** [0.0148]	1.2742*** [0.2762]	0.2440*** [0.0431]	-0.4239 [0.2647]	-0.0932* [0.0555]	-0.8832*** [0.2663]	-0.1872*** [0.0501]
Low income	-0.6110** [0.1996]	-0.0626*** [0.0225]	-0.0045 [0.2639]	-0.0002 [0.0143]	-0.1448 [0.1570]	-0.0327 [0.0357]	0.4449*** [0.1568]	0.1038*** [0.0370]	0.1439 [0.1561]	0.0336 [0.0367]
High income	1.1631*** [0.2911]	0.0964*** [0.0198]	0.8160*** [0.3091]	0.0402*** [0.0136]	0.6099*** [0.1566]	0.1317*** [0.0322]	0.1693 [0.1502]	0.0390 [0.0348]	0.1696 [0.1469]	0.0396 [0.0345]
Has obtained college degree	0.3212* [0.1831]	0.0306 [0.0178]	0.3725 [0.2361]	0.0207 [0.0135]	0.0613 [0.1361]	0.0137 [0.0306]	0.0415 [0.1326]	0.0095 [0.0303]	0.0629 [0.1313]	0.0146 [0.0304]
Has employment	0.1760 [0.1978]	0.0166 [0.0189]	-0.3428 [0.2588]	-0.0182 [0.0135]	-0.18719 [0.1480]	-0.0417 [0.0328]	-0.0762915 [0.1444]	-0.0175 [0.0331]	-0.0247 [0.1425]	-0.0057 [0.0331]
Does not have health insurance	-1.5359*** [0.2954]	-0.2376*** [0.0643]	-2.1083*** [0.3105]	-0.2610*** [0.065]	-1.044*** [0.3043]	-0.2531*** [0.0737]	-0.7843** [0.3355]	-0.1567*** [0.0559]	-0.8806** [0.3411]	-0.1762*** [0.0556]
At least one child	0.6763*** [0.2539]	0.0568*** [0.0190]	0.4873* [0.2733]	0.0242* [0.0126]	0.3376** [0.1615]	0.0737** [0.0343]	0.5878*** [0.1547]	0.1383*** [0.0369]	0.5011*** [0.1524]	0.1189*** [0.0366]
Constant	2.2023*** [0.4197]		2.1850*** [0.4525]		0.0397 [0.2697]		-0.6526** [0.2686]		-0.2366 [0.2647]	
Log likelihood	-446.8316				-760.1860		-797.9727		-808.7197	
Prob > chi2	0.0000		0.0000		0.0000		0.0000		0.0000	
Pseudo R2	0.1305		0.1529		0.0741		0.0363		0.0316	

Significance is represented by * $p < .1$, ** $p < .05$, *** $p < .01$. For the marginal effects $\partial y/\partial x$ is for discrete change of dummy variable from 0 to 1. The data for this analysis was collected via online survey conducted by Purdue University taking place from February 12th – 26th of 2016.

as a potential variable of interest given the growth in health information obtained via the Web.

Past studies have sought to quantify health provider utilization for groups with varying demographics or groups with specific medical diagnoses. Wang et al. (2017) explored medical provider utilization between U.S. and non-U.S. citizens for cancer treatment. Widmer et al. (2015) focused their medical care utilization study on Medicare beneficiaries while Bressler et al. (2015) investigated nutritionist use amongst individuals diagnosed with diabetic macular edema. Cordner (2012) studied health care access amongst homeschooled children. The limiting factors amongst many utilization studies are the specific samples used (usually those with a specific illness or race) and/or limit the number or type of health care providers investigated. Another limiting factor for many studies, including this one, is the use of self-reported data; in particular with respect to health care data, but also across other areas of focus, self-reported data is known to vary in reliability and accuracy. Nonetheless, understanding provider use beyond specifics to general demographics can broaden the understanding of relationships in health care access.

Blackwell et al. (2009) found those with lower income and less education were less likely to have contact with a doctor. Health insurance could logically be a driver of provider visits. According to the National Center for Health Statistics (NCHS) (2017) of those under 65 years old, 54% of insured and 41% of those who were uninsured saw a health care provider 1 to 3 times in the last 12 months in 2015. When analyzing doctor contact alone, Blackwell et al. (2009) found a lack of insurance was strongly related to not having doctor contact, although looking at hospitalization (including emergency services), insurance was insignificant.

Two limitations of the findings presented exist with reference to the verbiage used to describe the primary physician and potential for doctor visits by children. The category with the highest percent of respondents having visited was the primary physician. Admittedly, the survey verbiage of primary physician is vague; it is possible respondents were unclear on what a primary physician is or that they selected this provider for any physician they perceive as their primary health provider. Having at least one child in the household was found to increase the likelihood of visiting all of the top 5 providers in the past five years. The findings surrounding children highlight a potential implication for further study surrounding reporting of health provider usage for individual family members versus multiple household members. While the survey intended to collect usage statistics for adults responding to the survey, the finding surrounding children may reflect some reporting of visits by children as well.

5. Conclusions and implications

Understanding relationships between individual's demographics and utilization of health care providers and practitioners is important for informing health care policy debates. More specifically for the patient and the health and well-being of society, understanding which demographics may be related to the use of various types of health services can aid practitioners and clinicians in education and patient relationship management. Understanding usage of health care providers and clinicians by various demographic groups is necessary to further the development of services and health-focused initiatives.

The positive and significant correlations found in this analysis suggest that visiting any provider type studied was related to visiting other provider types, thus those already visiting practitioners are more likely to visit practitioners. Being male, between the ages of 25 to 44, low income, and not having health insurance significantly decreased the likelihood that a respondent would have been to the dentist in the last five years. Not having insurance had the largest marginal contribution, decreasing the likelihood by 24%. Being male, 65 years of age or older, and not having health insurance decreased the likelihood that a respondent would have visited a primary physician in the past 5 years.

Not having health insurance had the largest marginal contribution, decreasing the likelihood by 26%. Having high income, possessing a college degree, or having a child in the household all increased the likelihood that a respondent had been to the dentist in the past 5 years. Similarly, having a high income and having at least one child in the household increased the likelihood that a primary physician was visited in the past five years.

Given the current healthcare debates and policy formation attempts in progress, further study is clearly necessary to uncover further variables of interest in explaining healthcare provider usage. Further study is necessary to uncover additional aspects of health provider usage, and perhaps associated spending, to more fully inform healthcare debates. It is imperative to recognize that provider use is only one aspect of total health spending; medications, both prescription and over-the-counter may significantly impact total health costs. The findings presented surrounding the relationship between provider usage and insurance status, income, and age may serve as a starting point for informing further work in this area. Further study to investigate the impacts of both income and insurance status is necessary given the findings surrounding emergency provider usage in this analysis. In particular, additional study is necessary for households with lower incomes, varying levels of employment, varying levels of education and health coverage, as well as the presence of children in the household.

Conflict of interest

The authors declare there is no conflict of interest.

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