Low Wage Workers and Barriers to Timely Primary Care

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Abstract

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Introduction:

Lower wage workers use less primary care and more acute care, including emergency department (ED)- and hospital-based care. Clinically modifiable barriers to timely primary care services have been associated with increased acute care use. This study aims to determine the association between low-wage work and clinically modifiable barriers to timely primary care.

Methods:

From the 2011 to 2015 National Health Interview Surveys, I examined data from 50,535 respondents who reported working full-time and had an established outpatient provider and no change in health care coverage in the past year. I compared self-reported delays in care due to four barriers across seven groups of self-reported earnings: <$25,000, $25,000-34,999, $35,000-44,999, $55,000-64,999, $65,000-74,999, and >$75,000. The four barriers included phone availability, appointment wait-time, in-clinic wait-time, and limited clinic service hours. I estimated multivariable logistic regression models, controlling for age, sex, education, insurance coverage, underinsurance, family size, and occupation. All models accounted for survey sampling methods and were weighted to the national population.

Results:

I identified no difference in barriers to timely care between lowest (<$25,000) and highest (>$75,000) earnings groups of full-time workers. Compared to individuals earning $75,000 or more, individuals

earning $65,000-74,999 were more likely to report at least one barrier to primary care (OR 1.22; CI 1.02-1.45; p=0.027); however, this association was not observed for each of the four individual barriers. Furthermore, I did not identify significant differences when compared to the lower wage groups.

Conclusion:

Among full-time workers with an established outpatient provider, the propensity to delay care due to phone availability, appointment wait-time, in-clinic wait time, or service hours was not different between the highest and lowest wage earners. These modifiable barriers are unlikely to explain the marked differences in acute care use among low-wage workers identified in prior studies.

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Dedication

To my mother, Nancy Augustine, who has worked full-time (often for lower wage) while giving unwavering and complete commitment, love, and encouragement to me, my brother and sisters, and the entire family. For this, she is deserving of her own degree. And to her, I dedicate this work.

1 Introduction

The expansion of health insurance under the Affordable Care Act (ACA) resulted in nearly 20 million Americans with predominantly low income gaining health insurance and initiating primary care.[1,2] Primary care functions as the first line to prevention and disease management.[3] With adequate access, timely primary care potentially precludes the need for many acute care services,[3] which would improve efficiency of care, potentially mitigate inequities, and save billions in health care spending.[4,5] However, previous research demonstrates that insurance expansion has modest and conflicting effects on the use of acute care services among lower income populations.[6-8] This raises questions about the ability of the current care delivery system to accommodate and provide timely access to primary care for low-income populations. Understanding the barriers to seeking primary care among low-income populations could inform innovation to restructure care delivery to optimize its use.

The conditions of lower wage work may limit access to timely care and contribute to the differences in health service use among low-income populations. First, lower wage workers are more likely to be paid on an hourly basis and subject to lost wages when seeking care during working hours. In 2008, amendments to the American Disabilities Act (ADA) required employers with 15 or more employees to provide 'reasonable' accommodations;[9] however, low wage workers disproportionately work for smaller employers who are not subject to these requirements. According to United States (US) Department of Labor in 2016, 87% of privately employed workers with wages in the top 10% (≥ $45.96 per hour) received paid sick leave, while only 27% of workers in the lowest 10% (≤ $9.54 per hour) received these benefits.[10] Further, lower wage workers are less likely to retain their job when obtaining medical treatment, as observed with breast cancer.[11] Alternatively, lower wage workers with greater fear of losing their job are more likely to defer recommended treatment, as observed with medical rehabilitation.[12] Together, the lost wages for hourly work, lack of accommodation by employers, and fear of job loss potentially increase the opportunity costs of leaving work to seek care. In a primary care system with limited opportunities to obtain primary care outside standard working hours,[13,14] low-wage workers may have few options other than delaying primary care or obtaining more available care in costly settings, such as emergency department (ED) services.

Previous research has identified a robust relationship between lower wages and greater use of more costly alternatives to primary care. A recent analysis demonstrated that lower wage workers used less preventative and primary care and have substantially more ED visits and hospitalizations. Among 42,936 full-time, privately insured workers, those earning less than $30,000 compared to those earning at least $70,001 utilized half the amount of preventive care and were less likely to have any medical or prescription claim. Yet, rates of ED use, all-cause hospitalization, and avoidable hospitalizations were three, two and four times greater among low wage workers in this same study.[15] As a result, this underuse of preventative and primary care and overuse of acute care services suggests that lower wage workers may confront added barriers to timely primary care.

Prior studies indicate that modifiable barriers to primary care result in patients delaying care and seeking care in alternative, more costly settings. Using National Health Interview Survey (NHIS) data, Rust et al. found that individuals who report difficulty accessing primary care (i.e. getting through on the phone, obtaining an appointment soon, limited clinic hour) were more likely to use the ED.[16] Further, Cheung et al. found Medicaid beneficiaries were more likely than privately insured individuals to report these barriers to primary care and more likely to use the ED.[17]

While barriers to primary care and low-wage work have been separately associated with greater use of acute care, no research to date has examined whether low-wage workers are more likely to encounter these barriers to care. Because low-wage workers face greater opportunity costs and possess fewer accommodations by employers to seek primary care services, clinical barriers likely add opportunity cost and impede willingness to obtain primary care. For example, phone availability, wait-times, and service hours may impact the timeliness to care and change (e.g., mediate or moderate) the need for ED services or hospitalization. For these reasons, I hypothesized lower wage workers would be more likely to identify these barriers compared to higher wage workers.

The objective of this study was to identify if low-wage, full-time workers were more likely to perceive barriers to timely primary care. Building off prior studies,[16,17] I examined patient-reported responses from nationally representative survey data ascertaining four barriers to seeking timely care: phone availability, appointment wait-time, in-clinic wait time, and limited service hours. These barriers are considered modifiable and currently emphasized in evolving models of primary care delivery.[18-20] Findings

from this study will help inform the potential mechanism behind persistent differences in health service use by income level. This evidence will be useful to policymakers to inform modifications to primary care delivery to increase primary care access and reduce acute care use among low-income populations.

2 Methods

2.1 Data source

I performed an observational, cross-sectional analysis of NHIS data, collected between 2011 and 2015.[21] The NHIS is a continuous, household face-to-face survey, delivered to a national sample of civilian noninstitutionalized residents in the US. Sampling methods used multistage area probability design to select geographically defined units from each of the 50 states and the District of Columbia. From these primary sampling units, areas and households were selected, oversampling areas and households with higher concentrations of Black, Asian, and Hispanic persons to increase precision of estimates of these populations.[22,23]

The survey was delivered in 3 sequential sections: Household, Family, and Sample Adult. The Household section ascertained demographic and relationship information. The Family section was offered to each member of the household and assessed socioeconomic status, health, activity, health insurance, and healthcare access and use. Finally, one randomly selected adult from each household was invited to complete the Sample Adult section, which ascertained more detailed information on individual health status, health care use, occupational characteristics, and health-related behaviors.

From 2011-2015, an average of 75.8% of households completed the Household section with 16.2% of households insufficiently completing survey and 8.3% unable to contact or locate for survey. Of those who completed the Household section, 99.0% completed the Family section followed by 80.6% completing the Sample Adult section for an unconditional final response rate of 60.6%.[24-27] For this analysis, I used individual responses from the Sample Adult section and merged data from the Family section to derive characteristics about occupation, income, family, health status, insurance, and healthcare utilization.

2.2 Study Sample

I examined the sample of NHIS respondents who were full-time workers, had no change in health insurance coverage over the year prior to survey and reported having an established outpatient care provider. I first identified 172,465 adults age 18+ who responded to the NHIS during the period 2011-2015. I then excluded individuals who did not work at least 30 hours per week[15,28] for at least 9 months of

the last year (N=95,141). The 9-month cutoff aimed to account for seasonal workers (e.g., teachers), who work full-time and may experience work-related difficulties in obtaining care. Given change in health insurance may significantly influence access by altering coverage networks,[1] I excluded individuals who reported a change in health care coverage in the last year (N=7,602). Further, I excluded individuals who did not identify receiving routine or preventative care in an outpatient setting (clinic, health center, doctor's office or hospital outpatient department; N=10,003). This exclusion aligns with prior studies,[16,17] and restricts the study sample to those with a known source for outpatient, primary care. Finally, I excluded individuals with missing outcome or covariate data (N=592). The final study sample included 50,535 individuals weighted to 73,196,900 workers (Figure 1).

2.3 Explanatory Variable of Interest

I examined self-reported earnings before taxes and deductions from all jobs and businesses (including hourly wages, salaries, tips and commissions) in the year prior to survey. Rather than income alone, I aimed to capture conditions of work, which vary by wage and may limit access to timely care. I condensed self-reported earnings into 7 categories: less than $25,000, $25,000-34,999; $35,000-44,999; $45,000-54,999; $55,000-64,999; $65,000-74,999; and $75,000 or more. For perspective, annual earnings of $25,000 amounts to an hourly wage of $12.00/hour for working the conventional 40 hours per week, or $16.00/hour for working 30 hours per week.

2.4 Dependent Variables

I examined responses to 4 questions ascertaining reasons for delaying care, which have been previously associated with increased ED use.[16,17] These barriers to timely care are considered modifiable by reorganization of delivery systems and aligned with current models to improve primary care access, including the Patient-Centered Medical Home.[18-20] The four questions asked whether respondents delayed getting medical care during the past 12 months due to *phone availability* (i.e., couldn't get through on the telephone), *appointment wait time* (i.e., couldn't get an appointment soon enough), *in-clinic wait time* (i.e., waited too long in doctor's office), or *limited service hours* (i.e., clinic or office was not open when you could get there). Primary outcomes were four separate binary measures denoting

whether individuals reported “yes” to each of these four barriers to timely care. I also examined a binary measure denoting whether individuals reported any of these four barriers in a secondary analysis.

2.5 Control Variables

I controlled for several factors potentially confounding the relationship between wages and perceived barriers to primary care. These factors include demographics, family characteristics, occupation, health insurance status and underinsurance, and perceived health status. Demographics included age, sex, race/ethnicity (Non-Hispanic (NH) White, NH Black, Hispanic, NH Other), and educational achievement (less than high school (HS) degree, HS degree or equivalent, some college or associates degree, and 4-year college degree or more). Family characteristics included marital status (married or living with domestic partner) and family size. Occupation was defined according to the major categories of the 2010 Standard Occupation Classification: (1) management, professional, and related; (2) sales and office; (3) natural resources, construction and maintenance; (4) production, transportation and material move; and (5) service.[29] Health insurance was designated as uninsured, privately insured with or without public insurance, insured by military (including Tricare, VA, etc.) with or without public insurance, and publicly insured (including Medicaid, Medicare, other state public coverage, other government coverage). Underinsurance was defined as whether individuals had “medical care delayed due to cost in last 12 months.” I included underinsurance as a control, because the analysis aimed to isolate the direct effects of low-wage work independent of the ability to afford care.[30,31] Finally, I adjusted for patient reported health status as marker of perceived health care need.[32,33] All models controlled geographical region and year fixed effects.

2.6 Statistical Analysis

I estimated means, proportions, model estimations, and variances, which were weighted to adjust for the sampling methods outlined by the NHIS to obtain a representative US population. I divided sample weights by the number of years pooled in this analysis. Since samples from years 2011-2015 were drawn from similar geographic areas, data from different years cannot be considered statistically independent.[22]

Therefore, data from all years were treated as a single cross section, accounting for clustering of original strata in variance estimations.

To test the association of wage of full-time workers and perceived barriers to timely care, I estimated multivariable logistic regression models for each binary outcome measure using $75,000 or more as the reference category. All models adjusted for potential confounders listed above. In addition, all models adjusted for delayed care due to cost, an intermediate variable in my conceptual framework, in order to isolate the direct effects of lower wage work. To give perspective of the total effects of lower wage work and indirect effects of cost-related barriers, I performed supplemental analyses, excluding the covariate of cost-related delay in care. All models demonstrated adequate goodness-of-fit by Pearson's correlation, Pregibon's Link, and Hosmer-Lemeshow tests. Standard error estimates were heteroskedastic robust. A nominal p-value of 0.05 was used to assess statistical significance. I performed all statistical analyses with the STATA version 14.0 (StataCorp, College Station, TX). This study was granted exemption from review by the University of Washington Institutional Review Board.

3 Results

3.1 Characteristics of lower wage full-time workers

Table 1 highlights the characteristics of the 50,535 NHIS respondents, representing over 73 million US full-time workers. Compared to highest wage earners (>$75,000), lower wage workers were more likely to be younger, female, and minority race or ethnicity, and less likely to be married or live with a domestic partner. Lower wage earners were also less likely to have a college degree and hold management positions, and were more likely to be employed in production, transportation and service industries, paid hourly, and not have paid sick leave. In addition, lower wage earners were more likely to be uninsured or publicly insured and report delaying care due to costs. Finally, lower wage earners were less likely to have an outpatient visit, and more likely to use the ED or be hospitalized in the prior year.

3.2 Barriers to primary care

The percentage of all workers who reported delaying care due to any barrier was 9.2% (Table 2). For specific barriers, the percentage of workers who reported delaying care due to phone availability, appointment wait-time, in-clinic wait-time, and limited service hours was 1.9%, 5.4%, 3.4%, and 3.3%, respectively. Barriers to timely care were more common among lower wage earners compared to highest wage earners.

In multivariable analysis, I identified no significant differences in the odds of experiencing any barrier to timely care between the highest and lowest wage earners (Table 3). I also did not identify significant differences in the odds of reporting each four barriers to timely care between the highest and lowest wage earners. Relative to individuals earning $75,000 or more, individuals earning $65,000-74,999 were more likely to report any barrier to care (OR 1.22, $p<0.027$). However, this association was not identified with separate analyses of the four barriers individually.

All statistical models controlled for cost-related barriers to care, which are more common among lower wage workers (Table 1) and one of the strongest predictors of each barrier to primary care (Table 4). Removing this from the statistical model, lowest wage workers demonstrate a small, yet significantly greater likelihood of reporting any barrier to timely primary care relative to the highest wage workers (OR 1.18, $p=0.037$) (Appendix, Supplemental table 1).

Table 4 presents the associations between all covariates with the four individual barriers to care and the composite any barrier measure. Beyond explanatory variable of interest, the odds of reporting any barrier to care was greater among women (OR 1.48, $p<0.001$), and workers who reported lower self-reported health (poor vs. excellent/very good: OR 2.83, $p<0.001$) and delayed care due to cost (OR 2.15, $p<0.001$). Compared to 2011, I observed lower odds of reporting any barrier to care starting in 2013 (2013: OR 0.79, $p<0.001$; 2014: OR 0.75, $p<0.001$; 2015: OR 0.81, $p<0.001$).

4 Discussion

This study examined the association of perceived barriers to care and earnings among full-time workers with an established outpatient provider from a nationally representative survey. Due to lost wages, fewer accommodations,[9,10] and fear of losing job,[11,12] employees working lower wage jobs encounter opportunity costs to seeking care during traditional working hours when primary care services are typically available.[14] Correspondingly, I hypothesized that lower wage workers would be more likely to report barrier to seeking timely care, especially limited service hours. My empirical findings did not support this hypothesis and showed no statistically significant association between wage and four barriers to timely care.

This study builds upon prior research of these four clinically modifiable barriers. From the NHIS between 1999 and 2009, these barriers were more prevalent among Medicaid recipients compared to privately insured individuals and linked to higher ED use.[17] While these barriers may persist among Medicaid recipients and contribute to the socioeconomic differences of access, my analysis demonstrated that for full-time workers, these barriers were not significantly different between lower and higher wage earners. For perspective, the lowest earnings group (<$25,000 per year) represented minimum wage workers by capturing the federal and highest state and city regulations ($7.25; $11.50; $15.00 per hour, respectively). Correspondingly, this lowest earnings group included majority of Americans with 0, 1, or 2 dependents (212%; 156%; 124% of 2015 federal poverty level, respectively) who were eligible Medicaid expansion.[34] Since 2009, system level changes primary care delivery, specifically the emphasis of Patient-Centered Medical Home certification[19] and the increase in safety-net, community health centers,[35] may have mitigated system-level causes to socioeconomic disparities of clinical barriers to primary care. My analysis showed an improvement in these barriers over time; however, the overall prevalence of barriers to phone availability, appointment wait-time, in-clinic wait-time, and limited services hours remained similar to general population in 2005 (2.3%, 5.2%, 4.7%, and 3.0%, respectively).[16] In this context, this analysis observed that these clinically modifiable barriers did not significantly differ between minimum and higher wage full-time workers.

The absence of an association between lower wage work and barriers to timely care can be potentially explained by a different set of opportunity costs faced by high wage workers. As indicated previously, lower wage workers have less work-related accommodation for seeking care and arguably face greater opportunity costs;[10,11] however, higher wage-workers face greater work-related responsibility and time pressures. Therefore, opportunity costs may similarly be present. Presenteeism, defined as working while sick despite reduced performance and productivity, is more prevalent among workers who are specialized, have limited substitutes and often work under time pressure—common characteristics of higher wage employees.[36-38] Therefore, the propensity to delay care due to wait times, limited service hours, and phone availability may not differ between higher and lower wage worker; however, the reasons underlying these opportunity costs may be distinct.

Irrespective of wage and related conditions of work, full-time workers with an established primary care provider may simply be willing to overcome barriers to timely care. In this study, I analyzed respondents who identified having an outpatient provider for routine and preventative care. Results from discrete choice experiments indicate that patients are willing to wait for thoroughness and continuity with a provider who knows them, especially for serious or long-standing illnesses.[39-41] Therefore, barriers such as in-clinic and appointment wait-times, phone availability, and service hours may not influence when patients receive care.

My findings, in combination with previous research, suggest clinically modifiable barriers to timely primary care do not explain the disparities of acute care use between low- and high-wage workers. Because this analysis identified no difference between low and higher wage full-time workers, these barriers are unlikely mediate or moderate the inverse relationship between lower wage work and ED use. Rather, other factors are likely to influence how low-wage workers perceive access to care and where they ultimately obtain care. For example, when removing the covariate capturing delayed care due to costs from statistical models, the association between wage level and reporting any barrier to timely care becomes statistically significant. This suggest that lower wage workers who are financially limited to seek other available options may be more likely to confront these barriers to timely care.

Alternatively, lower wage workers face additional socioeconomic burdens, which may limit management of disease, worsen disease severity, and produce greater need for acute care.[42] Qualitative

analyses identified that low-income, high utilizers of the ED prefer hospital-based care due to perceived greater accessibility and higher quality.[42] Among lower wage workers, Sherman et al. observed greater ED use overall, but no difference of ED use for less severe conditions considered treatable in primary care setting. This suggests that lower wage workers do not simply prefer the ED, but rather, possess greater disease severity and need for care in this setting.[15] Lower wage workers have greater co-morbidity of chronic physical and psychiatric illnesses and report poorer health status.[15] While greater comorbidity has not fully explained the inverse relationship between wage and utilization,[15] the differences in adherence to the management and resultant severity may offer compelling explanations of the differences of acute care use. For example, lower wage workers are less likely to have consistent prescription refills and less medication dose availability compared to higher wage workers.[15] Further, Berkowitz et al. identified that competing burdens of lower socioeconomic status, including unmet basic needs of affordable housing and food, may contribute to the severity of chronic disease[43] and the use of primary care and ED services.[44] As historically uninsured, low-income populations gain coverage and presumably greater access, disparities in acute care use persist and are evident among low-wage workers.[6,45] In this context, findings from this study suggest that interventions, which singularly target phone availability, appointment wait time, in-clinic wait time and limited service hours, are unlikely to mitigate disparities in acute care use.

5 Limitations

This study has several limitations. First, I examined survey data, which is subject to recall bias and misclassification based upon question design. Notably, questions on barriers to care relied upon recall over a 12-month retrospective period. Further, these questions referenced usual source of care and did not directly address primary care. I restricted the study sample to individuals who reported having a usual source of routine care located at a clinic/health center, doctor's office, or hospital outpatient department to account for this potential misclassification. Finally, despite controlling for several important covariates, potential unmeasured confounding may be present in model estimates.

6 Conclusions

Among full-time workers with an established outpatient provider, lower wage was not associated with perceived barriers to timely care, including phone availability, appointment wait-time, in-clinic wait-time, and limited service hours. More research is needed to clarify if these modifiable barriers influence the differential use of emergency- and hospital-based care among low-wage workers. In addition, research should aim to further elucidate relationship between low-wage work and acute care use in order to inform the redesign of primary care delivery to better address these disparities and reduce costly care.

7 Tables and Figures

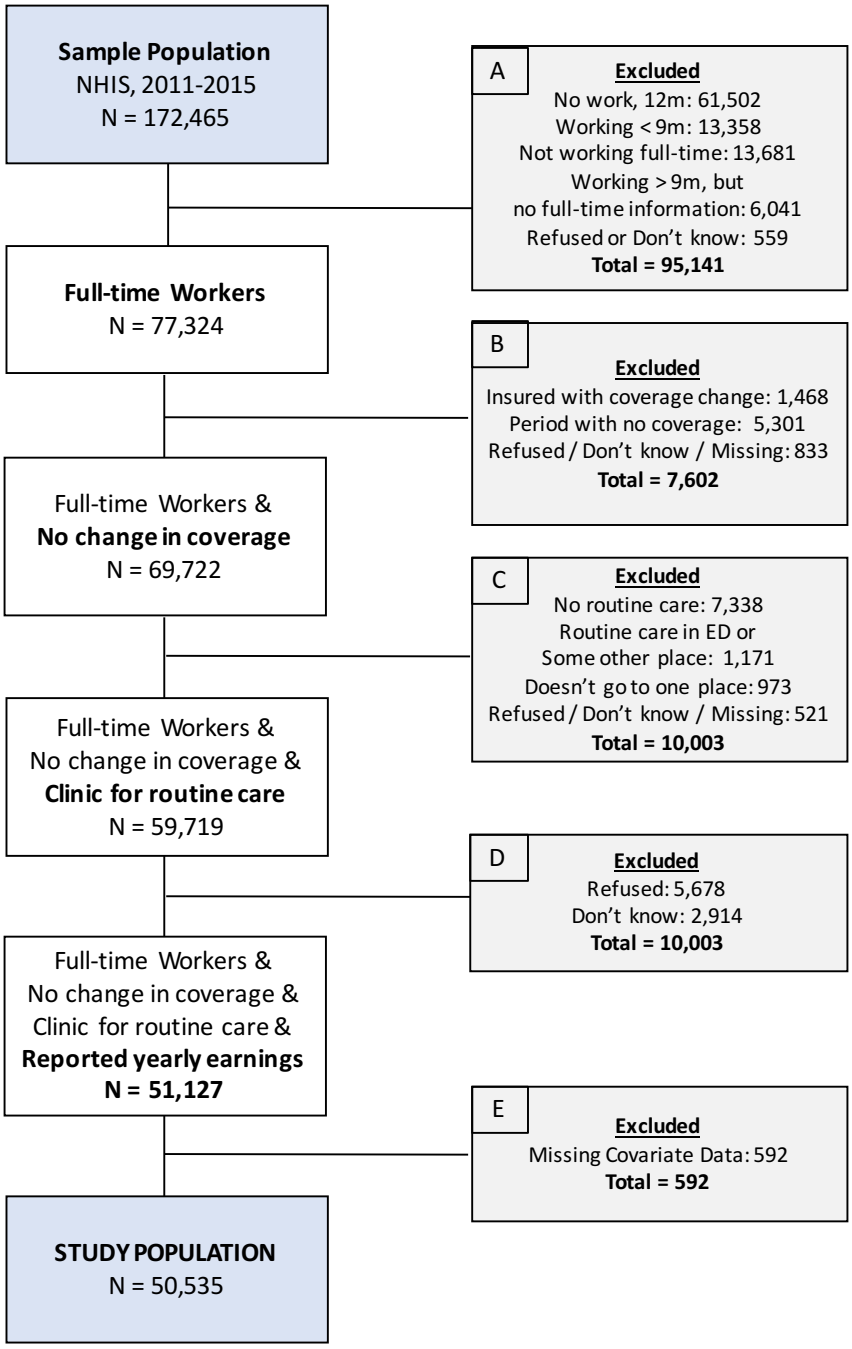

Figure 1: Selection criteria for final study population from National Health Interview Survey 2011-2015. A total of 172,465 individuals responded to the adult sample survey from 2011-2015. Individuals who did not report working at least 30 hours and more than 9 months in past year or had missing information on full-time work were excluded (Box A). Individuals with change in coverage or had coverage and had period of not coverage were excluded (Box B). Individuals who did not identify obtaining routine or preventative care in clinic, outpatient office, or hospital outpatient office were excluded (Box C). Individuals who did not report income, our main exposure, were excluded (Box D). 590 were dropped due to missing covariate data (Box E). The final study sample included 50,535 survey respondents. Abbreviations: National Health Interview Survey (NHIS), months (m).

Table 1: Characteristic of full-time workers by yearly earnings, 2011-2015

	Yearly Earnings						
	<$25,000	**$25,000-34,999**	**$35,000-44,999**	**$45,000-54,999**	**$55,000-64,999**	**$65,000-74,999**	**≥75,000**
Unadjusted N =	9,707	8,072	7,714	6,506	4,619	3,468	10,449
Weighted N =	12,966,180	10,856,241	10,735,111	9,311,747	6,849,837	5,241,730	17,236,055
Age, mean (SD)	40.2 (15.3)	42.0 (13.5)	42.6 (12.4)	44.3 (11.7)	45.1 (11.2)	45.1 (10.9)	47.1 (9.7)
Female (%)	62.2	56.2	51.0	45.3	42.8	41.7	29.8
Race/Ethnicity (%)							
NH White	58.3	64.5	69.2	73.8	74.9	78.0	78.3
NH Black	13.7	13.2	12.2	10.9	10.2	9.1	6.0
Hispanic	22.3	17.2	13.7	10.3	9.0	7.2	6.8
NH Other	5.7	5.2	4.9	5.0	5.9	5.8	8.9
Education (%)							
< High School degree	16.2	9.3	5.7	4.2	3.0	2.0	1.4
High School degree	30.6	29.3	24.1	20.6	16.6	15.1	9.0
Some college	36.7	37.5	36.2	32.8	32.5	27.8	18.9
4-yr college degree +	16.5	23.9	33.9	42.4	47.9	55.1	70.7
Self-reported health status (%)							
Excellent	29.0	28.5	32.0	31.6	34.4	35.4	41.3
Very Good	32.8	35.8	37.1	39.4	38.7	41.8	38.8
Good	29.9	29.6	26.0	24.1	22.9	19.7	17.5
Fair or Poor	8.3	6.1	5.0	5.0	4.0	3.0	2.4
Insurance (%)							
Private	66.1	86.0	92.0	94.2	95.2	96.0	96.5
Military	2.1	2.1	1.6	1.6	1.9	1.6	1.5
Public	13.7	4.1	2.7	1.4	1.5	1.3	1.1
None	18.2	7.8	3.7	2.7	1.5	1.1	0.9
Delayed care due to costs (%)	11.9	9.3	7.0	6.0	4.1	3.9	2.3
Married, living with partner (%)	58.5	65.7	68.8	72.0	74.7	73.1	80.0
Family size, mean (SD)	3.04 (1.72)	2.82 (1.51)	2.81 (1.47)	2.74 (1.37)	2.83 (1.39)	2.76 (1.30)	2.91 (1.30)
Occupation (%)							
Management, prof., etc.	20.4	27.8	37.9	48.2	55.5	61.9	71.3
Sales and office	26.7	29.6	27.0	21.4	17.7	15.1	13.9
Construction &	7.6	7.9	10.1	10.0	10.9	9.4	6.1
Prod., Transport., Mat.	15.3	15.6	13.9	12.8	9.9	8.4	4.5
Service	30.1	19.1	11.0	7.6	6.0	5.2	4.2

Table 1: Continued

	Yearly Earnings						
	<$25,000	**$25,000-34,999**	**$35,000-44,999**	**$45,000-54,999**	**$55,000-64,999**	**$65,000-74,999**	**≥$75,000**
Work Conditions (%)							
[#]Paid Hourly	77.1	73.2	60.2	48.7	39.9	34.2	20.9
[#]Paid sick leave	43.1	66.8	76.0	77.4	81.4	81.9	81.6
[#]Work >1 job	9.6	9.2	8.8	9.3	8.0	8.4	8.5
Health care use, 12m (%)							
[#]Any Outpatient visit	82.1	84.3	85.7	87.3	87.2	88.3	88.2
[#]Any ED visit	19.1	15.6	14.0	13.2	12.7	12.8	11.0
[#]Any Hospitalization	6.1	5.2	5.8	5.6	5.7	5.2	4.7

Means and proportions of full-time workers with no change in health coverage and established outpatient care, adjusted for sampling methods of the National Health Interview Survey and weighted to the national population of the United States.
Non-Hispanic (NH); Emergency Department (ED); Production, Transportation, & Material Move (Prod., Transport, Mat.), month (m), year (yr)
[#]Not included as covariate in multivariable analyses

Table 2: Proportion of full-time workers who reported barriers to timely care by yearly earnings

Yearly earnings	Any barrier %	Phone availability %	Appointment wait time %	In-clinic wait time %	Limited service hours %
<$25,000	10.8	2.6	5.9	4.6	4.2
$25,000-34,999	9.9	2.2	5.5	3.9	3.1
$35,000-44,999	8.8	1.7	5.2	3.4	3.2
$45,000-54,999	9.0	1.8	5.7	3.1	3.0
$55,000-64,999	8.5	1.4	5.1	2.7	3.1
$65,000-74,999	10.2	2.3	6.2	3.2	3.6
≥$75,000	8.0	1.6	4.9	2.6	2.8

Proportion of respondents who identified having designated barrier to care; adjusted for National Health Interview Survey sampling methods and weighted to the population of the United States. **Any barrier** includes answering 'yes' to any of the four barriers. All questions prefaced with "Have you delayed getting care for any of the following reasons in the PAST 12 MONTHS?"; **Phone availability**: "You couldn't get through on the telephone"; **Appointment wait time**, "You couldn't get an appointment soon enough" ; **In-clinic wait time**, "Once you get there, you have to wait too long to see the doctor"; **Limited service hours**, "The clinic/doctor's office wasn't open when you could get there".

Table 3: Likelihood of reporting barriers to timely care among full-time workers by yearly earnings.

Yearly earnings	**Any barrier** OR (95% CI)	**Phone unavailability** OR (95% CI)	**Appointment wait time** OR (95% CI)	**In-clinic wait time** OR (95% CI)	**Limited service hours** OR (95% CI)
<$25,000	1.12 (0.95-1.31)	1.34 (0.94-1.89)	1.06 (0.87-1.29)	1.11 (0.87-1.43)	1.18 (0.93-1.51)
$25,000-34,999	1.03 (0.87-1.21)	1.15 (0.83-1.59)	0.99 (0.80-1.22)	1.05 (0.82-1.34)	0.89 (0.68-1.16)
$35,000-44,999	0.96 0.83-1.11)	0.95 (0.69-1.32)	0.96 (0.80-1.15)	1.01 (0.79-1.29)	0.95 (0.75-1.20)
$45,000-54,999	1.00 (0.86-1.16)	0.99 (0.70-1.41)	1.07 (0.88-1.31)	0.99 (0.78-1.26)	0.94 (0.75-1.19)
$55,000-64,999	0.95 (0.80-1.13)	0.77 (0.52-1.14)	0.96 (0.79-1.18)	0.87 (0.67-1.13)	0.97 (0.71-1.31)
$65,000-74,999	1.22* (1.02-1.45)	1.39 (0.99-1.95)	1.20 (0.99-1.46)	1.13 (0.85-1.51)	1.14 (0.86-1.51)
≥$75,000	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*

Multivariable logistic regression controlling for characteristics in Table 1. Odds ratio reporting barrier to timely care compared to income >$75,000 as the referent category. **Any barrier** includes answering 'yes' to any of the four barriers. All questions prefaced with "Have you delayed getting care for any of the following reasons in the PAST 12 MONTHS?"; **Phone availability**: "You couldn't get through on the telephone"; **Appointment wait time**, "You couldn't get an appointment soon enough" ; **In-clinic wait time**, "Once you get there, you have to wait too long to see the doctor"; **Limited service hours**, "The clinic/doctor's office wasn't open when you could get there"; All analysis weighted and adjusted for survey sampling methods; *p<0.05

Table 4: Characteristics associated with reporting barriers to timely care.

		Any barrier OR	Phone availability OR	Appointment wait time OR	In-clinic wait time OR	Limited service hours OR
Age		0.99***	1.00	0.99***	1.00	0.98***
Female		1.41***	2.06***	1.40***	1.34***	1.39***
Race/Ethnicity						
	NH White	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
	NH Black	0.94	0.99	0.99	1.46***	0.60***
	Hispanic	1.33***	1.09	1.24**	2.23***	1.02
	NH Other	1.06	0.88	1.10	1.66***	0.65***
Education						
	< High School	0.67***	0.62*	0.56***	0.93	0.60**
	HS graduate	0.69***	0.72*	0.64***	0.93	0.71***
	Some college	0.89*	0.77*	0.85*	1.08	0.96
	4-yr college +	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
Self-reported health						
	Excellent	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
	Very Good	1.32***	1.27*	1.35***	1.27**	1.63***
	Good	1.79***	1.50***	1.95***	1.63***	1.92***
	Fair or Poor	2.83***	2.76***	2.76***	3.00***	3.15***
Health insurance						
	Private	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
	Military	1.65***	1.91**	2.46***	1.16	0.99
	Public	1.04	0.93	1.24	1.27	0.66*
	None	0.82*	0.97	0.69**	1.02	0.95
Delayed care, costs		2.15***	2.47***	2.32***	1.80***	2.19***
Married, living w/ partner		1.09	1.02	1.18*	1.11	0.96
Family size		0.90***	0.94	0.88***	0.91*	1.01
Occupation						
Management, prof., related		*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
Sales and office		0.81***	0.69**	0.79**	0.89	0.71***
Construction & Maintenance		1.01	1.15	0.73*	1.29	1.00
Product., Trans., Mat. move		1.09	0.90	0.97	1.05	1.05
Service		0.98	0.93	0.92	1.17	0.92
Year	2011	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
	2012	0.99	1.06	0.99	0.91	1.08
	2013	0.79***	0.81	0.88	0.77**	0.78*
	2014	0.75***	0.76*	0.82*	0.66***	0.74**
	2015	0.81**	0.91	0.87	0.75**	0.74**
Region	Northeast	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*
	Midwest	1.09	0.78	1.15	0.96	1.17
	South	1.08	0.86	1.05	1.28*	1.07
	West	1.24**	1.04	1.39***	1.14	1.19

All analysis weighted and adjusted for survey sampling methods.
Non-Hispanic (NH); Professional (prof.); Production, Transportation, & Material Move (Prod., Trans., Mat. move), *p<0.05; **p<0.01; ***p<0.001

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9 Appendix

Supplemental Table 1: **Likelihood of reporting barriers to timely care among full-time workers by yearly earnings without adjusting for delayed care due to cost**.

Yearly earnings	**Any barrier** OR (95% CI)	**Phone unavailability** OR (95% CI)	**Appointment wait time** OR (95% CI)	**In-clinic wait time** OR (95% CI)	**Limited service hours** OR (95% CI)
<$25,000	1.18* (1.01-1.37)	1.44* (1.02-2.03)	1.13 (0.93-1.37)	1.16 (0.90-1.49)	1.25 (0.99-1.59)
$25,000-34,999	1.08 (0.92-1.27)	1.22 (0.89-1.68)	1.04 (0.84-1.28)	1.09 (0.85-1.39)	0.93 (0.72-1.21)
$35,000-44,999	0.99 0.83-1.15)	1.00 (0.73-1.38)	1.00 (0.84-1.20)	1.04 (0.81-1.33)	0.99 (0.78-1.25)
$45,000-54,999	1.02 (0.88-1.18)	1.02 (0.72-1.45)	1.10 (0.90-1.33)	1.01 (0.79-1.28)	0.97 (0.77-1.22)
$55,000-64,999	0.97 (0.81-1.15)	0.78 (0.53-1.16)	0.98 (0.80-1.19)	0.88 (0.68-1.14)	0.98 (0.72-1.33)
$65,000-74,999	1.23* (1.03-1.46)	1.41* (1.00-1.98)	1.21 (1.00-1.47)	1.14 (0.86-1.52)	1.15 (0.87-1.53)
≥$75,000	*Referent*	*Referent*	*Referent*	*Referent*	*Referent*

Odds ratio of reporting barrier using multivariable logistic regression. **Any barrier** includes report of any 4 barriers. All questions prefaced with “Have you delayed getting care for any of the following reasons in the PAST 12 MONTHS?”; **Phone availability**: “You couldn't get through on the telephone”; **Appointment wait time**, ”You couldn't get an appointment soon enough” ; **In-clinic wait time**, “Once you get there, you have to wait too long to see the doctor”; **Limited service hours**, “The clinic/doctor's office wasn't open when you could get there”; All analysis weighted and adjusted for survey sampling methods; *p<0.05; **p<0.01; ***p<0.001