



# HHS Public Access

Author manuscript

*Am J Manag Care*. Author manuscript; available in PMC 2018 July 01.

Published in final edited form as:

*Am J Manag Care*. 2017 July ; 23(7): 435–442.

## The Association Between Insurance Type and Cost-Related Delay in Care: A Survey

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### Abstract

**Objectives**—Massachusetts has insurance rates similar to those projected under the Affordable Care Act, but many Massachusetts patients are insured through private insurance plans with high out-of-pocket costs. We aimed to explore the relationship between insurance type (private vs public) and delays in care due to cost, stratified by income.

**Study Design**—Cross-sectional study

**Methods**—We conducted a study of English-speaking adults recruited from the waiting rooms of the emergency department or outpatient clinics of a large healthcare system in western Massachusetts. Our primary outcome was the association between insurance type and cost-related delay in care, stratified by income.

**Results**—Of 800 people approached, 619 (77%) completed the survey. Participants were 60.6% male and 40.2% white, 37.2% Hispanic, and 12.6% black. The majority (61.4%) of those surveyed had public insurance; 34.1% had private insurance and 4.5% were uninsured. Overall, 13.3% reported delays in seeking care related to cost. The impact of insurance on delay of care differed significantly by income tertile ( $P = .02$ ): In the middle-income group (\$12,500 to <\$25,000 per person annually), privately insured respondents were more likely to delay care due to cost when compared with publicly insured subjects (15.6% vs 8.1%; odds ratio [OR], 4.4; **95%** confidence interval [CI], 1.9–10.2, unadjusted; OR, 2.2; 95% CI, 0.9–5.8, adjusted).

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**Author Disclosures:** The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

**Authorship Information:** Concept and design (SAR, MBR, TL); acquisition of data (SAR, BJ, MAM, JM); analysis and interpretation of data (SAR, JF, MBR, SLG, TL); drafting of the manuscript (SAR, TL); critical revision of the manuscript for important intellectual content (SAR, MBR, SLG, TL); statistical analysis (JF); provision of patients or study materials (N/A); obtaining funding (TL); administrative, technical, or logistic support (SAR, JF, TL); and supervision (SLG, MBR, TL).

**Conclusions**—Cost-related delays in care are prevalent despite the presence of an insurance mandate. Middle-income, privately insured patients report more cost-related delays in care compared with publicly insured patients with similar incomes.

Due to the worse health outcomes of the uninsured, the Affordable Care Act (ACA) aimed to expand health insurance coverage through multiple interventions and mandates: expanding Medicaid coverage; incentivizing employers to provide health insurance; and, for those who do not have employer- or government-coverage, implementing an individual mandate for the purchase of private health insurance on a regulated health insurance marketplace.<sup>1,2,3</sup> Decreasing the number of uninsured aimed to improve population health by decreasing financial barriers to health care.

Patients newly insured under the ACA are a heterogeneous group that includes those with employer-sponsored insurance, those with Medicaid, and those who purchased private individual plans from state and federal exchanges.<sup>3</sup> Because of this heterogeneity, there is a risk that some types of health insurance will not allow patients to fully access needed care. This is because the most rapidly expanding insurance types under the ACA are private plans with high levels of cost sharing.<sup>4</sup> Although these plans offer more affordable monthly premiums,<sup>5,6</sup> they are likely to have higher co-pays and deductibles than public insurance<sup>7,8</sup> which may put some patients at risk for reduced access to care due to cost.

Since 2006, Massachusetts has had a mandate requiring individuals to carry health insurance, resulting in less than 5% of the population being uninsured.<sup>9</sup> This creates insurance coverage that is similar to the coverage patterns expected nationally after full implementation of the ACA.<sup>10,11</sup> We hypothesized that people in Massachusetts with private insurance would be more likely to experience cost-related delays in care than participants with public insurance, and that this association would be related to household income and co-pays. To test this hypothesis, we surveyed patients and visitors in a large health system in Massachusetts to explore the relationship between insurance type and delays in healthcare due to cost.

## METHODS

### Study Design and Population

We identified a convenience sample of adults recruited from the waiting rooms of an emergency department (ED) and 2 outpatient primary care clinics in western Massachusetts. The ED serves a diverse population with 110,000 patient visits annually. The outpatient clinics in the study health system serve primarily low-income patients, with 49,000 visits annually. We approached adults who were not visibly in distress in the waiting rooms of both the ED and the clinics. After confirming that they were at least 18 years old and English-speaking, we invited both patients and those accompanying them to participate in this study. The Baystate Medical Center Institutional Review Board approved the study protocol; informed consent was waived since no protected health information was collected other than zip code. Data were collected between February 2014 and May 2014.

## Survey Design

Using previously validated instruments as a guide,<sup>7,12–15</sup> we developed a questionnaire to measure participants' healthcare utilization and their reported impact of cost on utilization of healthcare (eAppendix A). Demographic data consisted of age, sex, race, education, employment status, annual pre-tax household income, zip code, and household size.<sup>16</sup>

Our exposure variable, insurance type, was categorized as uninsured, private insurance, or public insurance. Participants were also asked to specify whether they had an individual or a family health insurance plan. We further asked whether private insurance was self-purchased or employer-sponsored, since self-purchased insurance is more likely to have higher out-of-pocket (OOP) costs.<sup>17,18</sup> Public insurance included Medicare and Medicaid (referred to as "MassHealth" in Massachusetts), as well as a subsidized public-private insurance partnership called "Commonwealth Care." We categorized both Medicare and Medicaid as public insurance because both have much lower premiums and less cost sharing than private insurance (even though they have different patient populations and payment methods).<sup>17,18</sup>

Until January 30, 2015, Commonwealth Care was a state-subsidized plan available to individuals whose income was not low enough to qualify for Medicaid, but for whom private insurance at market rates would be a significant financial burden. Under the ACA, there is no clear comparator to Commonwealth Care, but as Commonwealth Care was highly subsidized by the state, with co-pays comparable to Medicaid's in the lowest-income population, we opted to categorize it under public insurance.<sup>19</sup> This decision was supported by the fact that Commonwealth Care respondents' demographics were more similar to Medicaid/Medicare patient demographics than to the privately insured group.

The questionnaire also included questions about health and access to healthcare. We collected participants' self-reported number of chronic medical conditions and state of health<sup>20</sup> as well as a variety of previously validated measures of access to care, including number of outpatient visits in the past year,<sup>21</sup> usual source of care,<sup>21,22</sup> prescription adherence,<sup>23</sup> and intentional delays of medical care.<sup>16</sup> For those who responded "yes" to delays of medical care, we asked additional questions about type of medical care that was delayed and the reasons for delaying care.

The primary outcome was delay in care due to cost, defined as voluntary delay or refusal of care by the respondent due to the cost of care involved. That is, we defined respondents as delaying care due to cost if they affirmatively answered the question, "In the past year, have you ever delayed or avoided getting any kind of medical care?" and then selected the reason, "It cost too much money" when asked, "Why did you delay or avoid medical care?"<sup>24</sup>

## Survey Administration

We first pilot-tested the survey with a sample similar to the target audience using cognitive interviewing techniques.<sup>25,26</sup> The goals of pilot testing were to ensure clarity and completeness of the questions and to assess administration and completion time. We then revised the questionnaire based on the feedback we received. No data obtained from the pilot testing were included in the analysis. The survey administration details can be reviewed in eAppendix B\*\*.

## Analysis

We generated descriptive statistics as proportions for categorical factors and medians with interquartile range (IQR) for ordinal variables. We next calculated per-person household income (PPHI) by dividing the median value of self-reported pre-tax household income category by the number of household residents. For respondents with missing PPHI, multiple imputation was used to estimate the value using available education, interview site (ED vs clinic), self-rated health, and self-rated OOP costs as predictors, chosen for their relatively high correlation with income in the complete sample.<sup>27</sup> We then divided PPHI into tertiles. We included uninsured respondents in descriptive analyses as well as in calculations of income tertiles to ensure a representative sample. However, we excluded the uninsured from multivariable models as this group was too small to draw meaningful conclusions.

Because we hypothesized that those with lower incomes would be more sensitive to high co-pays and deductibles than those with higher income, we tested an income-level by insurance category interaction term using the Likelihood Ratio (LR) test. If the *P* for the LR test of the interaction term was less than or equal to 0.2, a stratified approach would be used, and separate estimates for the association between delay of care and insurance type would be presented for each income level. Final model fit was examined using the Hosmer-Lemeshow Goodness-of-Fit test. After multivariable adjustment, we wished to quantify the extent to which OOP costs and outstanding bills “explained” differences in delay of care which remained after multivariable adjustment. To do so, we added each variable to the fully adjusted model, and noted the change in the insurance variable’s  $\beta$  coefficient.<sup>28</sup> We used stata version 13.1 [StataCorp], College Station, Texas) for all analyses.

## RESULTS

### Population

Of 800 people approached, 704 responded to the survey (88%). Of these, we excluded 85 (12%) questionnaires that were missing insurance category information or for which there was no response to the question regarding delayed care. Thus, we had 619 surveys completed of the 800 subjects originally approached, giving us a final response rate of 77%. Compared with those included in the study, the 85 excluded participants (who failed to complete the survey) were generally older (median age = 49.5 vs 39.5; *P* = .02), less educated (median years of education 12 vs 14; *P* = .001), had higher median comorbidity counts (7 vs 2; *P* < .001), and were more likely to be surveyed in a clinic versus the ED (68.2% vs 23.4%; *P* < .001).

### Demographics

Of the 619 participant responses analyzed, 474 participants (77%) were recruited from the ED and 145 (23%) from 2 primary care clinics. Participants’ characteristics appear in Table 1.

### Household Income

Tertiles of the Pre-tax PPHI distribution corresponded to cut points from the 2014 MassHealth Income Standards and Federal Poverty Guidelines<sup>29</sup>: (tertile 1: <\$12,500; tertile

2: \$12,500 to <\$25,000; tertile 3: \$25,000). Household income (HHI) was missing for 111 respondents (17.9%) and we were able to impute HHI for all but 16, who were excluded from the multivariable analysis.

### Health Access Issues

The median number of visits to a provider within the past 12 months was 3 (IQR, 2–8). A total of 8% reported delay in filling prescription and 32% reported outstanding medical bills. One-third of those analyzed reported OOP costs upwards of \$500 annually (32.8%) (Table 1).

Overall, 189 of the 619 subjects (30.5%; 95% CI, 27.0%-34.3%) reported any delay in care in the 12 months prior to completing the survey (data not shown). Out of the 189 who delayed care for any reason, 82 (43%) did so due to cost. Other non–mutually exclusive reasons for delay are shown in Figure 1.

### Health Issues

Almost half (43%) had more than 1 chronic medical condition, with 9% reporting upwards of 5 chronic medical conditions for which they receive prescriptions. In terms of self-reported health, 35.4% reported their health to be very good or excellent and 25.7% reported their health to be fair or poor (Table 1).

### Uninsured Versus Insured Participants

The uninsured were similar to the publicly insured in terms of race and income level, but were younger overall (Table 1). The uninsured had higher OOP than those with public insurance but less than those with private insurance (Figure 2).

### Public Versus Private Insurance

As shown in Table 1, demographic characteristics and annual OOP spending varied by insurance type. For example, compared with publicly insured participants, those with private insurance were more likely to be employed (76.8% vs 30.8%;  $P < .001$ ) and to have family insurance plans (64.5% vs 26.6%;  $P < .001$ ). They were also more likely to identify as white (62.6% vs 28.7%), have income greater than \$100,000 per year (11.9% vs 1.6%), have a graduate degree (14.2% vs 4.7%), and to have been surveyed in the ED as opposed to the clinic (89.1% vs 68.9%). Compared with publicly insured participants, those with private insurance were less likely to report 5 or more chronic conditions requiring medication (2.8% vs 12.9%). Respondents with public insurance were significantly less likely than those with private insurance to have OOP expenditures of greater than \$500 per year (Figure 2).

### Delay in Care

Characteristics of respondents who delayed care due to cost are shown in Table 2. Delay in care due to cost was highly correlated with a delay in filling prescriptions (41.5% of those who delayed care avoided filling a prescription, vs 3.4% who did not delay care;  $P < .001$ ); but was not significantly associated with frequent ED use for healthcare (17.1% vs 11.7%;  $P = .21$ ). Delay of care due to cost was significantly associated with white race/ethnicity (whites comprised 54.9% of those who delayed care vs 38.0% of those who did not), being

employed (64.6% in the delay group vs 44.7% in the non-delay group), and having outstanding medical bills (72.0% vs 26.6%). Annual OOP costs less than \$500 were associated with fewer reported delays in care (42.7% vs 67.8%).

### Multivariable Analyses

In the multivariable model examining delay of care by income level and insurance type, we found that the income tertile by insurance type interaction term was statistically significant ( $P = .02$ ), indicating the need for a stratified approach. The association between delay of care and insurance type, by income stratum, is shown in Table 3. Table 3 also includes standardized effect sizes so that the magnitude of the difference between groups can be interpreted without respect to sample size,<sup>30,31</sup> since the stratified approach resulted in small subgroups and multivariable adjustment necessitated exclusion of respondents with missing covariates. In unadjusted models, privately insured subjects in the middle-income group were 4.4 times (95% CI, 1.9–10.2;  $P = .001$ , unadjusted) more likely to delay care when compared with publicly insured subjects. After adjustment, privately insured middle income patients were 2.2 times (95% CI, 0.9–5.8;  $P = .10$ , adjusted) more likely to delay care due to cost when compared with publicly insured subjects (adjusted proportions 15.6% vs 8.1%; Cohen's  $d$ , +0.4, moderate). Although the association was no longer statistically significant after adjustment (95% CI, 0.9–5.8), we refer to the effect size rather than the statistical significance because multivariable adjustment (and exclusion of respondents with missing covariates) may have affected statistical power. Of note, lower-income, privately insured respondents were less likely than publicly insured respondents to delay care due to cost (adjusted proportions 3.1% vs 14.1%; odds ratio 0.2;  $P = 0.21$  Cohen's  $d$ , -0.9, large), although this finding did not achieve statistical significance in adjusted or unadjusted models. We noted only very small differences in delay of care between private and public insurance in the highest income tertile.

### Mediating Factors

After multivariable adjustment, we wished to quantify the extent to which OOP costs and outstanding bills “explained” differences in delay of care. In the lowest income tertile, adjustment for OOP costs increased the protective effect of private insurance by 16%, while outstanding bills did so by 1%. In the middle-income group, adjustment for OOP costs removed 27% of the risk for delay of care for privately insured subjects, while outstanding bills removed 11%. This suggests that some of the observed association between delay of care in privately insured, middle-income respondents is due to higher OOP costs and more outstanding bills as compared with their publicly insured counterparts.

## DISCUSSION

In a large convenience sample in Massachusetts, we found that one-third of patients reported a delay in care in the year prior to the survey. About half of the time, this delay was due to cost. We also found that, after stratifying by income, middle-income tertile (\$12,500–\$25,000 PPHI) participants with private insurance were more likely to report cost-related delays in care compared with participants in the same income group with public insurance. Adjustment for demographic confounders—race, employment status, and self-rated health—



attenuated but did not eliminate the association, as evidenced by a medium effect size even after multivariable adjustment. Annual OOP costs (eg, co-pays and deductibles) partially mediated the association between insurance type and delay due to cost.

Our findings may, at first, appear to contradict a recent study conducted by McCormick et al that found Medicaid was associated with more delays in care compared with private insurance or Commonwealth Care.<sup>7</sup> However, we note several key differences between their study and ours. First, they collected data only from patients in the ED, which might indicate that they were more likely to sample patients without a regular source of care. In contrast, we also sampled visitors in outpatient clinics, thus including those who were not directly using the healthcare system at the time the survey was completed. Second, they did not stratify by income, and, as we have noted, income appears to be an effect modifier in the relationship between insurance type and delays in care. Third, they did not include Medicare patients, meaning that their “Medicaid” group was different from our “public” insurance group. To assess the extent to which this contributed to the difference in our results, we conducted a sensitivity analysis by excluding patients 65 or older [Table 3a in eAppendix C] We found that results did not change appreciably, supporting the original model. Finally, we included Commonwealth Care under the publicly insured group, which makes the studies less comparable. It is notable that both studies show similar overall proportions of participants who delayed care.

Another study, by Bernard et al, surveyed workers who declined employer-sponsored health insurance and found that those with public insurance had similar access to care compared with those with private insurance.<sup>32</sup> Again, the authors did not stratify by income, which could be important since employed workers who declined insurance are likely to be a self-selected group. Notably, a study that did collect income data, by Wisk et al, reported that healthcare-related financial burden in families with children was dependent on income.<sup>33</sup>

A 2015 Gallup survey reported that, in the prior year, 31% of Americans delayed seeking healthcare because of cost.<sup>34</sup> In contrast, we found that 13% of our sample delayed care because of cost in the year prior to the survey. We suspect that there are 2 reasons why we report fewer cost-related delays in care than were identified in the Gallup survey. First, Massachusetts, with insurance rates above 90%, is more reflective of the “post-ACA” rather than “pre-ACA” world. Thus, our study may be an indicator of upcoming trends: it possible that, in the near future, we will see fewer overall delays in care, but an increasing number of middle-income patients with private insurance who are experiencing delays in care.<sup>35</sup> Second, we surveyed subjects who were in a healthcare setting, either in an ED or a health center waiting room. This population may be different than the randomly dialed national sample obtained by the Gallup poll.

## Limitations

There are several limitations to our study. First, we relied on an English-speaking convenience sample in a single geographical area—Western Massachusetts—which may not be representative of the rest of the United States. We attempted to address this limitation by conducting surveys in both the ED (which serves a large regional catchment area), as well as clinics that serve a lower-income clientele (who are primarily publicly insured). We included

only people who were in the process of accessing medical care directly or indirectly (as visitors or companions), which is a population that may differ from the overall population. However, the demographic characteristics of our sample population were comparable to those of the state overall.<sup>36</sup> Since the ACA was based on Massachusetts' 2006 healthcare reforms, local studies such as ours can inform projections about the insurance landscape under the ACA in the rest of the country.<sup>9,35</sup> A second limitation of our study is the fact that insurance information was self-reported, preventing us from collecting details regarding insurance plans and coverage. For example, there were 3 types of Commonwealth Care that had different levels of cost sharing, but most patients were not aware of these differences. We attempted to address this limitation by asking separate questions about OOP costs. We also included Commonwealth Care, Medicare, and Medicaid in a single "public" insurance category. A third limitation is the fact that we collected income information in a categorical fashion and imputed some income data. Although categories were designed to improve response rates and increase respondent comfort with providing delicate information, their categorical nature limited our ability to assign PPHI that corresponded with federal poverty guidelines. Nevertheless, this method of reporting income has been reported to have acceptable accuracy.<sup>37</sup> Finally, given that the majority of patients sampled were in the ED, this can bias the overall population to those with less access to care (those with a usual provider would be less inclined to go to the ED for low-acuity issues). However, given that we not only sampled patients, but also family and friends, we hoped to include a population that was not directly accessing the healthcare system. Future studies should target outpatient clinics in areas with varied demographics to better delineate the effect of insurance type on access to care with income as an effect modifier.

## Implications

In spite of these limitations, our study also has important implications. Our study confirms that patients with health insurance have more access to care than those without insurance. Thus, higher insurance rates achieved under the ACA will likely improve access for patients who were previously uninsured. However, our study also highlights that one-third of patients with health insurance still experience cost-related delays in care. Privately insured patients in our study had higher OOP costs than those without insurance, and we found that many people who were privately insured and living above the poverty line (the "middle income group") frequently experienced recent delays in care due to cost. This may be because this group has the means to purchase private insurance, but may not have sufficient disposable income to cover large, unexpected medical bills.

A potential unintended consequence of an insurance mandate is that employers and patients will increasingly embrace plans with high rates of cost sharing, resulting in large numbers of privately insured patients who are unable to afford recommended care. To reduce the chance that this could happen, our study indicates that policymakers should pay close attention to the regulation of insurance plans under the ACA. In particular, efforts should be made to ensure robust minimum coverage and to maintain or expand current limitations on OOP expenses. Most importantly, our findings suggest that there are great risks to current political efforts aimed at loosening minimum healthcare coverage and reducing limitations on OOP medical expenses. If these efforts succeed and plans with even greater cost sharing are



allowed to flood the market, the result could be widespread increases in cost-related delays in care in susceptible sociodemographic groups.

## CONCLUSIONS

Now that the ACA has been repealed, our findings are even more important. We have confirmed previous studies that those without health insurance have more cost related delays in care than those with health insurance. However, within the insured population, there is a vulnerable group with private insurance but live above the poverty line that experiences significant cost related delays in health care. Future policy should focus on limitations to OOP costs, as this seems to be a major driver of delays in health care.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

**Source of Funding:** Dr Lagu is supported by the National Heart, Lung and Blood Institute of the National Institutes of Health under Award Number K01HL114745.

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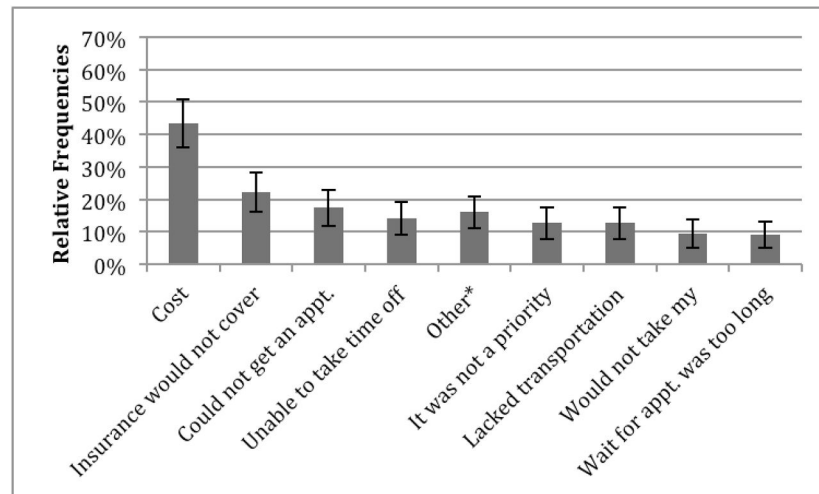
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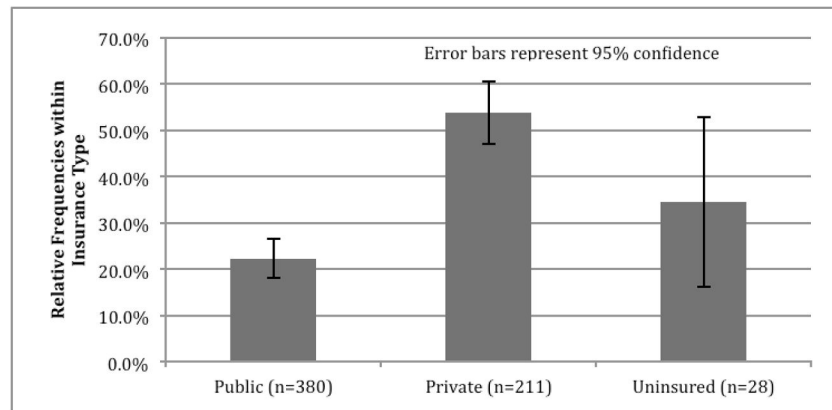
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### Take-Away Points

- We surveyed patients and visitors in a large emergency department and outpatient clinic about type of insurance, out-of-pocket costs, and self-reported cost-related delays in receiving medical treatment. Middle-income respondents with private insurance reported more cost-related delays in care than middle-income respondents with public insurance, although adjustment attenuated these results.
- These findings suggest that national healthcare policies that have pushed middle-income patients towards high-deductible healthcare plans with high out-of-pocket costs may have the unintended consequence of increasing cost-related delays in care for this group.



**Figure 1.**  
Reasons for Delay in Healthcare in Last 12 Months for Those Who Reported Any Delay in Care (n = 189)  
\*“Other” includes responses such as: “depression”, “alcoholic”, “scared to know what was happening”, “not enough knowledge on how it worked”. Categories are not mutually exclusive and percentages will total to >100%



**Figure 2.** Percentage of Respondents Reporting Out-of-Pocket Expenditures Greater Than \$500 in Last 12 Months (n = 619)



**Table 1**

Patient Characteristics and Their Association with Type of Insurance

CHARACTERISTIC	Type of Insurance				P-Value*
	All	Public	Private	Uninsured	
	<b>619 (100%)</b>	<b>380 (61.4%)</b>	<b>211 (34.1%)</b>	<b>28 (4.5%)</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P-Value*</b>
<b>Type of Plan</b>					
Family	237 (38.3)	101 (26.6)	136 (64.5)	0 (0.0)	
Individual	324 (52.3)	255 (67.1)	69 (32.7)	0 (0.0)	
Family & Individual	11 (1.8)	9 (2.4)	2 (1.0)	0 (0.0)	
None	38 (6.1)	10 (2.6)	0 (0.0)	28 (100.0)	<0.001
Missing/Refused	9 (1.5)	5 (1.3)	0 (0.0)	0 (0.0)	
<b>Age</b>					
18–26	134 (21.7)	87 (22.9)	38 (18.0)	9 (32.1)	
27–34	117 (18.9)	76 (20.0)	34 (16.1)	7 (25.0)	
35–44	92 (14.9)	53 (14.0)	35 (16.6)	4 (14.3)	
45–54	133 (21.5)	67 (17.6)	62 (29.4)	4 (14.3)	
55–64	99 (16.0)	56 (14.7)	39 (18.5)	4 (14.3)	
65–74	25 (4.0)	22 (5.8)	3 (1.4)	0 (0.0)	
>75	15 (2.4)	15 (4.0)	0 (0.0)	0 (0.0)	0.11
Missing/Refused	4 (0.7)	4 (1.1)	0 (0.0)	0 (0.0)	
<b>Sex</b>					
Male	375 (60.6)	239 (62.9)	123 (58.3)	13 (46.4)	
Female	231 (37.3)	132 (34.7)	85 (40.3)	14 (50.0)	0.15
Missing/Refused	13 (2.1)	9 (2.4)	3 (1.4)	1 (3.6)	
<b>Race/Ethnicity</b>					
White	249 (40.2)	109 (28.7)	132 (62.6)	8 (28.6)	
Black/AA	78 (12.6)	58 (15.3)	18 (8.5)	2 (7.1)	
Hispanic	230 (37.2)	176 (46.3)	41 (19.4)	13 (46.4)	
Other/Multi	56 (9.1)	34 (9.0)	17 (8.1)	5 (17.9)	<0.001

CHARACTERISTIC	Type of Insurance				P-Value*
	All	Public	Private	Uninsured	
	<b>619 (100%)</b>	<b>380 (61.4%)</b>	<b>211 (34.1%)</b>	<b>28 (4.5%)</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P-Value*</b>
Missing/Refused	6 (1.0)	3 (0.8)	3 (1.4)	0 (0.0)	
<b>Education</b>					
<HS	59 (9.5)	51 (13.4)	4 (1.9)	4 (14.3)	
HS	225 (36.4)	165 (43.4)	50 (23.7)	10 (35.7)	
Some College	149 (24.1)	83 (21.8)	58 (27.5)	8 (28.6)	
College	126 (20.4)	58 (15.3)	64 (30.3)	4 (14.3)	
Graduate School	48 (7.8)	18 (4.7)	30 (14.2)	0 (0.0)	<0.001
Missing/Refused	12 (1.9)	5 (1.3)	5 (2.4)	2 (7.1)	
<b>Yearly Pre-tax Household Income</b>					
<\$25,000	260 (42.0)	216 (56.8)	30 (14.2)	14 (50.0)	
\$25,000 –<\$50,000	126 (24.0)	68 (17.9)	55 (26.1)	3 (10.7)	
\$50,000 – <\$100,000	91 (14.7)	22 (5.8)	67 (31.8)	2 (7.1)	
>\$100,000	31 (5.0)	6 (1.6)	25 (11.9)	0 (0.0)	<0.001
Missing/Refused	111 (17.9)	68 (17.9)	34 (16.1)	9 (32.1)	
<b>Yearly Pre-tax Household Income, Adjusted for # Persons in Household (Tertiles)**</b>					
1 <\$12,500	216 (34.9)	166 (43.7)	38 (18.0)	12 (42.9)	
2 \$12,500–25,000	241 (38.9)	160 (42.1)	73 (34.6)	8 (28.6)	
3 >\$25,000	146 (23.6)	43 (11.3)	96 (45.5)	7 (25.0)	<0.001
Unavailable	16 (2.6)	11 (2.9)	4 (1.9)	1 (3.6)	
<b>Survey Site</b>					
ED	474 (76.6)	258 (68.9)	188 (89.1)	28 (100.0)	
Clinic	145 (23.4)	122 (32.1)	23 (10.9)	0 (0.0)	<0.001
<b>Employment</b>					
Employed	293 (47.3)	117 (30.8)	162 (76.8)	14 (50.0)	
Unemployed	74 (12.0)	53 (14.0)	11 (5.2)	10 (35.7)	
Retired	55 (8.9)	45 (11.8)	10 (4.7)	0 (0.0)	
Disability Benefits	136 (22.0)	124 (32.6)	9 (4.3)	3 (10.7)	

CHARACTERISTIC	Type of Insurance				P-Value*
	All	Public	Private	Uninsured	
	<b>619 (100%)</b>	<b>380 (61.4%)</b>	<b>211 (34.1%)</b>	<b>28 (4.5%)</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P-Value*</b>
Student	33 (5.3)	25 (6.6)	7 (3.3)	1 (3.6)	
Homemaker	18 (2.9)	15 (4.0)	3 (1.4)	0 (0.0)	<0.001
Missing/Refused	10 (1.6)	1 (0.3)	9 (4.3)	0 (0.0)	
<b>Other than monthly health insurance premium, \$ spent for co-pays, deductibles, prescriptions, in last 12m</b>					
<\$500	399 (64.5)	286 (75.3)	96 (45.5)	17 (60.7)	
\$501–\$1,000	111 (17.9)	50 (13.2)	57 (27.0)	4 (14.3)	
\$1,001–\$3,000	69 (11.2)	26 (6.8)	39 (18.5)	4 (14.3)	
\$3,001–\$5,000	10 (1.6)	0 (0.0)	9 (4.3)	1 (3.6)	
>\$5,000	13 (2.1)	6 (1.6)	7 (3.3)	0 (0.0)	<0.001
Missing/Refused	17(2.8)	12 (3.2)	3 (1.4)	2 (7.1)	
<b>How would you rate your health?</b>					
Excellent	70 (11.3)	41 (10.8)	28 (13.3)	1 (3.6)	
Very Good	149 (24.1)	73 (19.2)	71 (33.7)	5 (17.9)	
Good	212 (34.3)	127 (33.4)	71 (33.7)	14 (50.0)	
Fair	119 (19.2)	91 (24.0)	24 (11.4)	4 (14.3)	
Poor	40 (6.5)	31 (8.2)	5 (2.4)	4 (14.3)	<0.001
Missing/Refused	29 (4.7)	17 (4.5)	12 (5.7)	0 (0.0)	
<b># Chronic Conditions prescribed medicine for</b>					
0	240 (38.8)	127 (33.4)	94 (44.6)	19 (67.9)	
1	109 (17.6)	55 (14.5)	50 (23.7)	4 (14.3)	
2	84 (13.6)	51 (13.4)	31 (14.7)	2 (7.1)	
3	90 (14.5)	68 (17.9)	20 (9.5)	2 (7.1)	
4	36 (5.8)	29 (7.6)	7 (3.3)	0 (0.0)	
5+	56 (9.1)	49 (12.9)	6 (2.8)	1 (3.6)	<0.001
Missing/Refused	4 (0.7)	1 (0.3)	3 (1.4)	0 (0.0)	
<b># Visits to provider in last 12m</b>					
0	50 (8.1)	25 (6.6)	13 (6.2)	12 (42.9)	

CHARACTERISTIC	Type of Insurance				P-Value*
	All	Public	Private	Uninsured	
	<b>619 (100%)</b>	<b>380 (61.4%)</b>	<b>211 (34.1%)</b>	<b>28 (4.5%)</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>P-Value*</b>
1	83 (13.4)	44 (11.6)	35 (16.6)	4 (14.3)	
2	89 (14.4)	47 (12.4)	39 (18.5)	3 (10.7)	
3	87 (14.1)	49 (12.9)	34 (16.1)	4 (14.3)	
4	90 (14.5)	57 (15.0)	32 (15.2)	1 (3.6)	
5 to 10	114 (18.4)	82 (21.6)	30 (14.2)	2 (7.1)	
More than 10	77 (12.2)	59 (15.5)	16 (7.6)	2 (7.1)	<0.001
Missing/Refused	29 (4.7)	17 (4.5)	12 (5.7)	0 (0.0)	
<b>Outstanding Medical Bills</b>	<b>202 (32.6)</b>	<b>110 (29.0)</b>	<b>75 (35.6)</b>	<b>17 (60.7)</b>	<b>0.002</b>
<b>ED used most often for health care</b>	<b>77 (12.4)</b>	<b>57 (15.0)</b>	<b>11 (5.2)</b>	<b>9 (32.1)</b>	<b>&lt;0.001</b>
<b>Delay in filling prescriptions</b>	<b>52 (8.4)</b>	<b>29 (7.6)</b>	<b>16 (7.6)</b>	<b>7 (25.0)</b>	<b>0.02</b>

\* Contrasting public v. private v. uninsured. Fisher exact (categorical) or Kruskal-Wallis equality of populations rank test (ordinal). All p-values are calculated excluding missing responses.

\* Imputed for 15% of the sample

**Table 2**

Patient Characteristics and Their Association with Delaying Care Due to Cost

CHARACTERISTIC	Delayed Medical Care in Past Year due to Cost			P-Value*
	All 619 (100.0%)	No 537 (86.8%)	Yes 82 (13.2%)	
	n (%)	n (%)	n (%)	
<b>Age</b>				
18–26	134 (21.7)	117 (21.8)	17 (20.7)	
27–34	117 (18.9)	103 (19.2)	14 (17.1)	
35–44	92 (14.9)	79 (14.7)	13 (15.9)	
45–54	133 (21.5)	110 (20.3)	24 (29.3)	
55–64	99 (16.0)	87 (16.2)	12 (14.6)	
65–74	25 (4.0)	23 (4.3)	2 (2.4)	
75+	15 (2.4)	15 (2.8)	0 (0.0)	0.73
Missing/Refused	4 (0.7)	4 (0.7)	0 (0.0)	
<b>Sex</b>				
Male	375 (60.6)	322 (60.0)	53 (64.6)	
Female	231 (37.3)	203 (37.8)	28 (34.2)	0.54
Missing/Refused	13 (2.1)	12 (2.2)	1 (1.2)	
<b>Race/Ethnicity</b>				
White	249 (40.2)	204 (38.0)	45 (54.9)	
Black/AA	78 (12.6)	71 (13.2)	7 (8.5)	
Hispanic	230 (37.2)	208 (38.7)	22 (26.8)	
Other/Multi	56 (9.1)	49 (9.1)	7 (8.5)	0.03
Missing/Refused	6 (1.0)	5 (0.9)	1 (1.2)	
<b>Education</b>				
<HS	59 (9.5)	56 (10.4)	3 (3.7)	
HS	225 (36.4)	201 (37.4)	24 (29.3)	
Some College	149 (24.1)	120 (22.4)	29 (35.4)	
College	126 (20.4)	105 (19.6)	21 (25.6)	
Grad	48 (7.8)	46 (8.6)	2 (2.4)	0.25
Missing/Refused	12 (1.9)	9 (1.7)	3 (3.7)	
<b>Yearly Pre-tax Income</b>				
< \$25,000	260 (42.0)	230 (42.8)	30 (36.6)	
\$25,000 < \$50,000	126 (24.0)	109 (20.3)	17 (20.7)	
\$50,000 < \$100,000	91 (14.7)	73 (13.6)	18 (22.0)	
> \$100,000	31 (5.0)	30 (5.6)	1 (1.2)	0.59
Missing/Refused	111 (17.9)	95 (17.7)	16 (19.5)	
<b>Yearly Pre-tax Income, Adjusted for # Persons in Household (Tertiles)**</b>				
1 <\$12,500	216 (34.9)	188 (35.0)	28 (34.2)	
2 \$12,500–25,000	241 (38.9)	212 (39.5)	29 (35.4)	

CHARACTERISTIC	Delayed Medical Care in Past Year due to Cost			P-Value*
	All	No	Yes	
	619 (100.0%)	537 (86.8%)	82 (13.2%)	
	n (%)	n (%)	n (%)	
3 >\$25,000	146 (23.6)	124 (23.1)	22 (26.8)	0.62
Unavailable	16 (2.6)	13 (2.4)	3 (3.7)	
<b>Survey Site</b>				
ED	474 (76.6)	399 (74.3)	75 (91.5)	
Clinic	145 (23.4)	138 (25.7)	7 (8.5)	0.001
<b>Employment</b>				
Employed	293 (47.3)	240 (44.7)	53 (64.6)	
Unemployed	74 (12.0)	67 (12.5)	7 (8.6)	
Retired	55 (8.9)	51 (9.5)	4 (4.9)	
Disability Benefits	136 (22.0)	126 (23.5)	10 (12.4)	
Student	33 (5.3)	27 (5.0)	6 (7.4)	
Homemaker	18 (2.9)	17 (3.2)	1 (1.2)	0.01
Missing/Refused	10 (1.6)	9 (1.7)	1 (1.2)	
<b>Other than monthly health insurance premium, \$ spent for co-pays, deductibles, prescriptions, in last 12m</b>				
< \$500	399 (64.5)	364 (67.8)	35 (42.7)	
\$501–\$1000	111 (17.9)	93 (17.3)	18 (22.0)	
\$1001–\$3000	69 (11.2)	50 (9.3)	19 (23.2)	
\$3001–\$5000	10 (1.6)	5 (0.9)	5 (6.1)	
>\$5000	13 (2.1)	10 (1.9)	3 (3.7)	<0.001
Missing/Refused	17(2.8)	15 (2.8)	2 (2.4)	
<b>How would you rate your health?</b>				
Excellent	70 (11.3)	67 (12.5)	3 (3.7)	
Very Good	149 (24.1)	126 (23.5)	23 (28.1)	
Good	212 (34.3)	184 (34.1)	29 (35.4)	
Fair	119 (19.2)	100 (18.6)	19 (23.2)	
Poor	40 (6.5)	35 (6.5)	5 (6.1)	0.18
Missing/Refused	29 (4.7)	26 (4.8)	3 (3.7)	
<b># Chronic Conditions prescribed medicine for</b>				
0	240 (38.8)	207 (38.6)	33 (40.2)	
1	109 (17.6)	95 (17.7)	14 (17.1)	
2	84 (13.6)	72 (13.4)	12 (14.6)	
3	90 (14.5)	77 (14.3)	13 (15.9)	
4	36 (5.8)	32 (6.0)	4 (4.9)	
5+	56 (9.1)	51 (9.5)	5 (6.1)	0.93
Missing/Refused	4 (0.7)	3 (0.6)	1 (1.2)	
<b># Visits to provider in last 12m</b>				
0	50 (8.1)	41 (7.6)	9 (11.0)	
1	83 (13.4)	72 (13.4)	11 (13.4)	



CHARACTERISTIC	Delayed Medical Care in Past Year due to Cost			P-Value*
	All 619 (100.0%)	No 537 (86.8%)	Yes 82 (13.2%)	
	n (%)	n (%)	n (%)	
2	89 (14.4)	80 (14.9)	9 (11.0)	
3	87 (14.1)	74 (13.8)	13 (15.9)	
4	90 (14.5)	81 (15.1)	9 (11.0)	
5-10	114 (18.4)	94 (17.5)	20 (24.4)	
10+	77 (12.2)	70 (13.0)	7 (8.5)	0.65
Missing/Refused	29 (4.7)	25 (4.7)	4 (4.9)	
<b># Hospitalizations in last 12m</b>				
0	393 (63.5)	346 (64.4)	47 (57.3)	
1	101 (16.3)	84 (15.6)	17 (20.7)	
2	37 (6.0)	33 (6.2)	4 (4.9)	
3	25 (4.0)	19 (3.5)	6 (7.3)	
4	19 (3.1)	17 (3.2)	2 (2.4)	
5-10	13 (2.1)	12 (2.2)	1 (1.2)	
10+	2 (0.3)	1 (0.2)	1 (1.2)	0.39
Missing/Refused	29 (4.7)	25 (4.7)	4 (4.9)	
<b>Outstanding bills currently</b>				
No	397 (64.1)	375 (69.8)	22 (26.8)	
Yes	202 (32.6)	143 (26.6)	59 (72.0)	<0.001
Missing/Refused	20 (3.2)	19 (3.5)	1 (1.2)	
<b>Delay in filling prescriptions</b>	52 (8.4)	18 (3.4)	34 (41.5)	<0.001
<b>ED used most often for health care</b>	77 (12.4)	63 (11.7)	14 (17.1)	0.21

\* Contrasting did not delay care vs. delayed care. Fisher exact (categorical) or  $\chi^2$  test of trend (ordinal). All p-values are calculated excluding missing responses.

\*\* Imputed for 15% of the sample

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**Table 3**

Delay of Care Due to Cost, Private vs. Public Insurance, by Income Stratum

Unadjusted						
	Lowest (n=193)		Middle (n=231)		Upper (n=138)	
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Public</b>	Reference	--	Reference	--	Reference	--
<b>Private</b>	0.3 <sup>c</sup>	(0.0, 2.1)	4.4 <sup>c</sup>	(1.9, 10.2)	1.1 <sup>a</sup>	(0.4, 3.3)

Adjusted for race, self-rated health, employment*						
	Lowest		Middle		Upper	
	Reference	--	Reference	--	Reference	--
<b>Public</b>	Reference	--	Reference	--	Reference	--
<b>Private</b>	0.2 <sup>c</sup>	(0.0, 1.5)	2.2 <sup>b</sup>	(0.9, 5.8)	0.7 <sup>a</sup>	(0.2, 2.2)

<sup>a</sup>Small Cohen's d effect size ( |0.3|)

<sup>b</sup>Medium Cohen's d effect size (0.5)

<sup>c</sup>Large Cohen's d effect size ( |0.8|)