

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

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**D**ue 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-provided coverage, implementing an individual mandate for the purchase of private health insurance on a regulated health insurance marketplace.<sup>1-3</sup> Decreasing the number of uninsured aimed to improve population health by decreasing financial barriers to healthcare.

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 concern is all the more relevant however, given that 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 individuals 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.

## ABSTRACT

**OBJECTIVES:** Massachusetts has insurance rates similar to those projected under the Affordable Care Act, but many of the state's 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 individuals 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 that were 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 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].

**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.

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## TAKEAWAY 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 toward 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.

## 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 the ED and the clinics. After confirming that they were at least 18 years old and English-speaking, we invited 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 given that 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** [eAppendices available at [www.ajmc.com](http://www.ajmc.com)]). 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, as 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 (although 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 with Commonwealth Care, but as Commonwealth Care was highly subsidized by the state, with co-pays comparable with 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 such 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 and 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* value for the LR test of the interaction term was  $\leq 0.2$ , 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 that 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 individuals 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 years; *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**.

**TABLE 1.** Patient Characteristics and Their Association With Type of Insurance

Characteristic	Type of Insurance				<i>P</i> <sup>a</sup>
	All 619 (100%) N (%)	Public 380 (61.4%) n (%)	Private 211 (34.1%) n (%)	Uninsured 28 (4.5%) n (%)	
<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 and 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)	<.001
Missing/refused	9 (1.5)	5 (1.3)	0 (0.0)	0 (0.0)	
<b>Age, years</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)	.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)	.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	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)	<.001
Missing/refused	6 (1.0)	3 (0.8)	3 (1.4)	0 (0.0)	
<b>Education</b>					
<High school	59 (9.5)	51 (13.4)	4 (1.9)	4 (14.3)	
High school	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)	<.001
Missing/refused	12 (1.9)	5 (1.3)	5 (2.4)	2 (7.1)	

(continued)

### 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.

**TABLE 1.** Patient Characteristics and Their Association With Type of Insurance (continued)

Characteristic	All 619 (100%) N (%)	Type of Insurance			P <sup>a</sup>
		Public 380 (61.4%) n (%)	Private 211 (34.1%) n (%)	Uninsured 28 (4.5%) n (%)	
Yearly pre-tax household income					
<\$25,000	260 (42.0)	216 (56.8)	30 (14.2)	14 (50.0)	
\$25,000 to <\$50,000	126 (24.0)	68 (17.9)	55 (26.1)	3 (10.7)	
\$50,000 to <\$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)	<.001
Missing/refused	111 (17.9)	68 (17.9)	34 (16.1)	9 (32.1)	
Yearly pre-tax household income, adjusted for number of individuals in household (tertiles) <sup>b</sup>					
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)	<.001
Unavailable	16 (2.6)	11 (2.9)	4 (1.9)	1 (3.6)	
Survey site					
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)	<.001
Employment					
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)	
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)	<.001
Missing/refused	10 (1.6)	1 (0.3)	9 (4.3)	0 (0.0)	
Other than monthly health insurance premium, money spent for co-pays, deductibles, and prescriptions, in last 12 months					
≤\$500	399 (64.5)	286 (75.3)	96 (45.5)	17 (60.7)	
\$501-\$1000	111 (17.9)	50 (13.2)	57 (27.0)	4 (14.3)	
\$1001-\$3000	69 (11.2)	26 (6.8)	39 (18.5)	4 (14.3)	
\$3001-\$5000	10 (1.6)	0 (0.0)	9 (4.3)	1 (3.6)	
>\$5000	13 (2.1)	6 (1.6)	7 (3.3)	0 (0.0)	<.001
Missing/refused	17(2.8)	12 (3.2)	3 (1.4)	2 (7.1)	
How would you rate your health?					
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)	<.001
Missing/refused	29 (4.7)	17 (4.5)	12 (5.7)	0 (0.0)	

(continued)

## Health Access Issues

The median number of visits to a provider within the past 12 months was 3 (IQR = 2-8). Eight percent reported delays in filling prescriptions, 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% confidence interval [CI], 27.0%-34.3%) reported any delay in care in the 12 months prior to completing the survey (data not shown). Of the 189 who delayed care for any reason, 82 (43%) did so due to cost. Other nonmutually exclusive reasons for delay are shown in [Figure 1](#).

## Health Issues

Forty-three percent 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 costs 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 greater than \$500 per year (Figure 2).

### Delay in Care

Characteristics of respondents who delayed care due to cost are shown in the **Appendix Table**. 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 composed 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 nondelay 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 2**. Table 2 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> because 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 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 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

**TABLE 1.** Patient Characteristics and Their Association With Type of Insurance (continued)

Characteristic	All 619 (100%) N (%)	Type of Insurance			P <sup>a</sup>
		Public 380 (61.4%) n (%)	Private 211 (34.1%) n (%)	Uninsured 28 (4.5%) n (%)	
Number of chronic conditions prescribed medicine for					
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)	<.001
Missing/refused	4 (0.7)	1 (0.3)	3 (1.4)	0 (0.0)	
Number of visits to provider in last 12 months					
0	50 (8.1)	25 (6.6)	13 (6.2)	12 (42.9)	
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)	
5-10	114 (18.4)	82 (21.6)	30 (14.2)	2 (7.1)	
>10	77 (12.2)	59 (15.5)	16 (7.6)	2 (7.1)	<.001
Missing/refused	29 (4.7)	17 (4.5)	12 (5.7)	0 (0.0)	
Outstanding medical bills	202 (32.6)	110 (29.0)	75 (35.6)	17 (60.7)	.002
ED as usual source of care	77 (12.4)	57 (15.0)	11 (5.2)	9 (32.1)	<.001
Delay in filling prescriptions	52 (8.4)	29 (7.6)	16 (7.6)	7 (25.0)	.02

ED indicates emergency department.

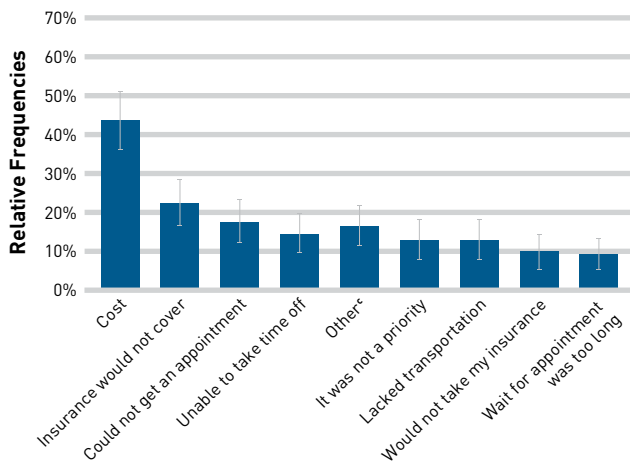
<sup>a</sup>Contrasting public versus private versus uninsured. Fisher exact (categorical) or Kruskal-Wallis equality of populations rank test (ordinal). All  $P$  values are calculated excluding missing responses.

<sup>b</sup>Imputed for 15% of the sample.

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;  $P = .21$ ; 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

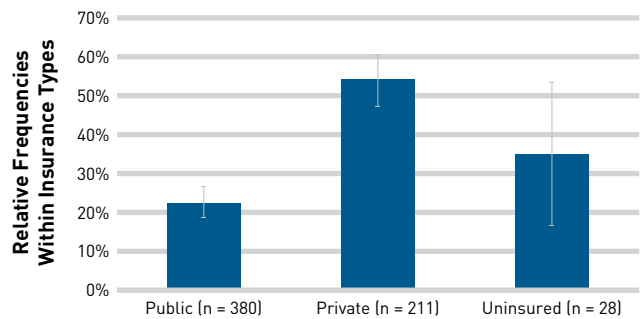
After multivariable adjustment, we wished to quantify the extent to which OOP costs and outstanding bills "explained" differences in delay of care. In the lowest-income tertile, adjustment for OOP costs increased the protective effect of private insurance by 16%, whereas outstanding bills did so by 1%. In the middle-income group, adjustment for OOP costs removed 27% of the risk for delay of care for privately insured subjects, whereas outstanding bills

**FIGURE 1.** Reasons for Delay in Healthcare in Last 12 Months for Those Who Reported Any Delay in Care (n = 189<sup>a,b</sup>)

\*Error bars indicate 95% confidence intervals.

<sup>b</sup>Categories are not mutually exclusive and percentages will total to >100%.

<sup>c</sup>“Other” includes responses such as: “depression,” “alcoholic,” “scared to know what was happening,” “not enough knowledge on how it worked.”

**FIGURE 2.** Percentage of Respondents Reporting Out-of-Pocket Expenditures >\$500 in the Last 12 Months (n = 619)<sup>a</sup>

\*Error bars indicate 95% confidence intervals.

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 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 to <\$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, deductibles) partially mediated the association between insurance type and delay due to cost.

Our findings may, at first, appear to contradict findings from 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, there are 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 (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 the 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 reported 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: if the ACA remains law, it is 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 an outpatient clinic 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 an ED (which serves a large regional catchment area) and clinics that serve a lower-income clientele (who are primarily publicly insured). We included only individuals 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 with those of the state overall.<sup>36</sup> Because 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, assuming that the ACA remains intact in the future.<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. Another 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 results confirm 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 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 results indicate that policy makers should pay close attention to the regulation of insurance plans. 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

**TABLE 2.** Delay of Care Due to Cost, Private Versus Public Insurance, by Income Stratum

	Unadjusted					
	Lowest (n = 193)		Middle (n = 231)		Upper (n = 138)	
	OR	95% CI	OR	95% CI	OR	95% CI
Public	ref	–	ref	–	ref	–
Private	0.3 <sup>a</sup>	[0.0-2.1]	4.4 <sup>a</sup>	[1.9-10.2]	1.1 <sup>b</sup>	[0.4-3.3]
Adjusted for race, self-rated health, employment						
	Lowest		Middle		Upper	
Public	ref	–	ref	–	ref	–
Private	0.2 <sup>a</sup>	[0.0-1.5]	2.2 <sup>c</sup>	[0.9-5.8]	0.7 <sup>b</sup>	[0.2-2.2]

CI indicates confidence interval; OR, odds ratio; ref, reference.

<sup>a</sup>Large Cohen's d effect size ( $\geq|0.8|$ ).

<sup>b</sup>Small Cohen's d effect size ( $\leq|0.3|$ ).

<sup>c</sup>Medium Cohen's d effect size ( $|0.5|$ ).

care in susceptible sociodemographic groups, specifically middle-income beneficiaries with private insurance.

## CONCLUSIONS

Proposed changes to healthcare law (eg, the repeal of the ACA and replacement with an alternative plan) would likely result in a smaller proportion of the population who can obtain public insurance (because of cuts to Medicaid), and, for those with private insurance, a loss of guaranteed minimum healthcare coverage and fewer limitations on OOP spending. This study is an important addition to the ongoing policy debate, as the results suggest that these changes would result in more cost-related delays in access to care for middle-income populations with private insurance (compared with similar populations with public insurance). Policy makers considering such changes to current law should be aware that higher OOP costs are likely to increase delays in access to healthcare, especially for populations with private insurance. ■

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## eAppendix Table

Patient Characteristics and Their Association With Delaying Care Due to Cost

Characteristic	Delayed Medical Care in Past Year Due to Cost			P <sup>a</sup>
	All	No	Yes	
	619 (100.0%)	537 (86.8%)	82 (13.2%)	
	N (%)	n (%)	n (%)	
Age, years				
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)	.73
Missing/refused	4 (0.7)	4 (0.7)	0 (0.0)	
Sex				
Male	375 (60.6)	322 (60.0)	53 (64.6)	
Female	231 (37.3)	203 (37.8)	28 (34.2)	.54
Missing/refused	13 (2.1)	12 (2.2)	1 (1.2)	
Race/ethnicity				
White	249 (40.2)	204 (38.0)	45 (54.9)	
Black	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)	.03
Missing/refused	6 (1.0)	5 (0.9)	1 (1.2)	
Education				
<High school	59 (9.5)	56 (10.4)	3 (3.7)	
High school	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)	.25
Missing/refused	12 (1.9)	9 (1.7)	3 (3.7)	
Yearly pre-tax income				
<\$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)	.59
Missing/refused	111 (17.9)	95 (17.7)	16 (19.5)	
Yearly pre-tax income, adjusted for number of individuals in household (tertiles) <sup>b</sup>				
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)	
3: >\$25,000	146 (23.6)	124 (23.1)	22 (26.8)	.62
Unavailable	16 (2.6)	13 (2.4)	3 (3.7)	
Survey site				
ED	474 (76.6)	399 (74.3)	75 (91.5)	
Clinic	145 (23.4)	138 (25.7)	7 (8.5)	.001
Employment				
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)	.01
Missing/refused	10 (1.6)	9 (1.7)	1 (1.2)	
Other than monthly health insurance premium, money spent for co-pays,				

deductibles, prescriptions, in last 12 months				
<\$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)	<.001
Missing/refused	17(2.8)	15 (2.8)	2 (2.4)	
How would you rate your health?				
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)	.18
Missing/refused	29 (4.7)	26 (4.8)	3 (3.7)	
Number of chronic conditions prescribed medicine for				
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)	.93
Missing/refused	4 (0.7)	3 (0.6)	1 (1.2)	
Number of visits to provider in last 12 months				
0	50 (8.1)	41 (7.6)	9 (11.0)	
1	83 (13.4)	72 (13.4)	11 (13.4)	
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)	.65
Missing/refused	29 (4.7)	25 (4.7)	4 (4.9)	
Number of hospitalizations in last 12 months				
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)	.39
Missing/refused	29 (4.7)	25 (4.7)	4 (4.9)	
Outstanding bills currently				
No	397 (64.1)	375 (69.8)	22 (26.8)	
Yes	202 (32.6)	143 (26.6)	59 (72.0)	<.001
Missing/refused	20 (3.2)	19 (3.5)	1 (1.2)	
Delay in filling prescriptions	52 (8.4)	18 (3.4)	34 (41.5)	<.001
ED used as usual source of care	77 (12.4)	63 (11.7)	14 (17.1)	.21

ED indicates emergency department.

<sup>a</sup>Contrasting did not delay care versus delayed care. Fisher exact (categorical) or  $\chi^2$  test of trend (ordinal). All *P* values are calculated excluding missing responses.

<sup>b</sup>Imputed for 15% of the sample.

**eAppendix A.** This was administered on an electronic tablet with algorithms to skip questions based on previous answers. The extended version is seen below to include all questions in the survey instrument.

### **Access to Health Care Survey**

Dear Baystate Patient/Visitor,

This survey is part of a research study being conducted by doctors from Tufts University/Baystate Medical Center to assess your access to health care. This survey contains general questions about you, as well as questions about how you use the health care system. Your participation is completely voluntary and completion of this form implies consent. It will take only 10 minutes to complete. We expect to survey 2000 participants. You can skip any questions you do not feel comfortable answering. If at any time you wish to discontinue your participation, you may stop and it will not result in any penalty or loss of benefits to which you are otherwise entitled. Your responses will remain completely anonymous and will be used for research purposes only and will not impact your care in any way. This information can help influence future health care policies regarding health insurance. All information collected will be stored in a secure location at Baystate Medical Center that is not related to your medical record. No experimental procedures will be conducted during this study. Your privacy will be protected by locking all collected surveys and then scanning them onto a secure database for analysis. No one outside of this study will have access to this information.

If you have any questions or experience a complication or injury that you believe may be related to this study, please contact Dr. Tara Lagu at 794-7688. If you would like to discuss your rights as a research participant, or wish to speak with someone not directly involved in this study, please contact Baystate Medical Center Institutional Review Board at (413) 794-4356.

### **INSTRUCTIONS:**

For the following questions, please fill in the circle that best matches your answer. All questions refer to the last 12 months (last year) unless otherwise stated.

## DEMOGRAPHICS

Where are you taking this survey?

- Emergency Department of Baystate Medical Center
- High Street Health Center
- Mason Square Clinic

How old are you?

- 18-26
- 27-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 or older

Sex

- Male
- Female
- Other : \_\_\_\_\_

Race/Ethnicity (Check all that apply)

- White
- Black/African American
- Hispanic
- Asian
- Native American
- Other : \_\_\_\_\_  
(please fill in your race)

What is your zip code? \_\_\_\_\_

What is the highest level of education you completed?

- Less than high school
- High school
- GED
- Some college
- College degree
- Graduate Degree

## **INCOME**

Are you currently:

- Employed
- Self Employed (including day care, cleaning)
- Unemployed > 1 yr
- Unemployed < 1yr
- Retired
- Disabled
- Student
- Home maker

Yearly household income in dollars (before taxes)

- Less than \$25,000 (\$2000/month)
- \$25,000 -\$49,999 (\$2000-\$4,000/month)
- \$50,000 - \$100,000 (\$4,000-\$8,000/month)
- More than \$100,000 (more than \$8,000/month)
- I prefer not to say
- I'm not sure

Including you, how many people are supported by this income?

- 1
- 2
- 3
- 4
- 5 or more

## **INSURANCE**

What kind of health insurance plan do you have? (Check all that apply.)

- Family
- Individual
- I don't have health insurance

What kind of health insurance do you have? (check all that apply)

- Private Insurance (eg. Health New England, Blue Shield, Tufts)
- Medicare/Medicare Advantage Mass Health/Medicaid/HealthnetCommonwealth Care
- VA
- I don't have health insurance

Where do you get your health insurance policy from?

(Check all that apply)

- Medicare, Medicaid/Mass HealthEmployer (or spouse's employer)
- School
- VA
- My parents
- I buy it myself (through an agent, health insurance exchange, the internet)
- I don't have health insurance

### **OUT OF POCKET COSTS**

How much does your health insurance (family or individual) plan cost you per month?

- \$0-\$50
- \$51-\$150
- \$151 -\$300
- More than \$300
- I don't know

Other than what you pay monthly for health insurance, how much did you spend on health care in the last 12 months out of pocket? (including co-pays, deductibles, prescriptions and anything not covered by insurance)

- Less than \$500
- \$501 to \$1000
- \$1001 to \$3000
- \$3001 to \$5000
- More than \$5000

How much do you (or your family) pay, on average, each MONTH for medicines you need to take regularly (including prescription, over the counter, vitamins)?

- \$0
- More than \$0, but less than \$20
- \$21 to \$40
- \$41 to \$60
- \$61 to 80
- \$81 to 100
- More than \$100

### **ACCESS TO CARE**

If you have a prescription, how often do you skip doses/split pills to extend it?

- Usually
- Sometimes
- Never

In the past year, have you ever delayed or avoided getting any kind of medical care?

Yes

No

What kind of medical care did you delay or avoid? (check all that apply)

seeing a health care provider

filling a prescription

getting a medical test

getting a surgery

seeing a specialist

Why did you delay or avoid medical care?

It cost too much money

Your insurance wouldn't cover it

Had trouble finding someone who accepts my insurance

You couldn't get time off work

You didn't have transportation

You couldn't get an appointment soon enough

Once you got there, you had to wait too long to see the doctor

The (clinic/doctor's) office wasn't open when you got there

Was not a priority

Other : \_\_\_\_\_

(please write your reason to delay care)

## **BILLS**

Do you currently have outstanding medical bills?

Yes

No

Have you ever had outstanding medical bills?

Yes

No

Have you ever been contacted by a collection agency for unpaid medical bills?

Yes

No

## **USUAL SOURCE OF CARE**

Do you have a primary care provider?

Yes

No

Where does your primary care provider work?

- Private Office
- Retail Clinic (Walmart, CVS)
- Military/VA facility
- Community Health Center/Public Clinic
- Teaching Facility

Where do you go most often for health care? (Check all that apply)

- Your doctor
- Free Clinic
- Emergency Room
- Military/VA facility
- Urgent Care
- Retail Clinic (Walmart, CVS)
- No regular source of care

In the last 12 months, how many times did you see a doctor, nurse practitioner, or physician's assistant?

- 0
- 1
- 2
- 3
- 4
- 5 – 10
- 10 or more

In the last 12 months, how many times were you hospitalized?

- 0
- 1
- 2
- 3
- 4
- 5 – 10
- 10 or more

### **SELF REPORTED HEALTH**

How many chronic medical conditions are you prescribed medicine for? For example, high blood pressure, diabetes, asthma, thyroid, high cholesterol, depression, etc)

- 0
- 1
- 2
- 3
- 4
- 5 or more

How would you generally rate your health?

- Excellent
- Fair
- Very Good
- Poor
- Good

In the past year, have you had an annual physical?

- Yes
- No



How often do you worry you won't be able to afford care if you get sick?

- Usually
- Sometimes
- Never

When you feel sick, how long do you wait before making an appointment with a doctor?

- Less than one day
- 1-2 days
- 1-2 weeks
- 5-7 days
- 3-4 days
- More than 2 weeks

## **eAppendix B**

### Survey Administration:

\*\*After the authors agreed on a final version of the questionnaire, 4 data collectors (SAR, JM, BJ, MAM) were trained in a standardized approach for recruiting subjects and administering the questionnaire. All potentially eligible subjects were approached in the waiting rooms of study sites. After confirming eligibility and obtaining verbal informed consent, participants elected to either take the survey themselves via a tablet computer or to have the data collector ask all the questions aloud and enter responses into the tablet computer. This method was adopted in order to encourage participation of all patients with varying levels of literacy and comfort with technology. The survey was administered between 7:30 AM and 9:00 PM on weekdays and weekends to reduce potential bias due to over-representation of a certain time of day or day of the week.

## eAppendix C

Delay of Care Due to Cost, Private vs Public Insurance, by Income Stratum,  
Excluding Respondents Aged 65 and Older

### Unadjusted

	Lowest (n=187)		Middle (n=214)		Upper (n=120)	
	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
<b>Public</b>	<i>Reference</i>	--	<i>Reference</i>	--	<i>Reference</i>	--
<b>Private</b>	0.3 <sup>c</sup>	0.0, 2.0	4.4 <sup>c</sup>	1.9, 10.7	0.9 <sup>a</sup>	0.3, 2.9

### Adjusted for race, self-rated health, employment

	Lowest		Middle		Upper	
<b>Public</b>	<i>Reference</i>	--	<i>Reference</i>	--	<i>Reference</i>	--
<b>Private</b>	0.2 <sup>c</sup>	0.0, 1.5	2.4 <sup>b</sup>	0.9, 6.3	0.5 <sup>b</sup>	0.2, 2.0

a. Small Cohen's d effect size ( $\leq 0.3$ ) b. Medium Cohen's d effect size ( $\geq 0.5$ ) c. Large Cohen's d effect size ( $\geq 0.8$ )

Note: P-value for Likelihood Ratio test of interaction, supporting stratified approach: 0.02