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Cost Barriers to Asthma Care by Health Insurance Type among Children with Asthma

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Abstract

Introduction—Children with asthma have ongoing health care needs and health insurance is a vital part of their health care access. Health care coverage may be associated with various cost barriers to asthma care. We examined cost barriers to receiving asthma care by health insurance type and coverage continuity among children with asthma using the 2012–2014 Child Asthma Call-back Survey (ACBS).

Methods—The study sample included 3,788 children under age 18 years with current asthma who had responses to the ACBS by adult proxy. Associations between cost barriers to asthma care and treatment were analyzed by demographic, health insurance coverage, and urban residence variables using multivariable logistic regression models.

Results—Among insured children, more blacks reported a cost barrier to seeing a doctor (10.6% [5.9, 18.3]) compared with whites (2.9% [2.1, 4.0]) (p=0.03). Adjusting for demographic factors (sex, age, and race), uninsured and having partial year coverage were associated with cost barrier to seeing a doctor (adjusted prevalence ratio aPR=8.07 [4.78, 13.61] and aPR=6.58 [3.78, 11.45], respectively) and affording medication (aPR=8.35 [5.23, 13.34] and aPR=4.93 [2.96, 8.19], respectively), compared with children who had full year coverage. Public insurance was associated with cost barrier to seeing a doctor (aPR=4.43 [2.57, 7.62]), compared with private insurance.

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Disclosure of Interest

The authors declare that they have no conflict of interest.

Conclusions—Having no health insurance, partial year coverage, and public insurance were associated with cost barriers to asthma care. Improving health insurance coverage may help strengthen access to and reduce cost barriers to asthma care.

Introduction

Asthma is one of the most prevalent chronic conditions among children, the leading cause of child morbidity [1] and missed school days [2]. Approximately 8% (over 6 million) of children had current asthma in the United States in 2016 [3]. Health insurance is a vital part of health care access and addressing health care needs. Health insurance type and coverage continuity may affect health care access and may be associated with cost barriers to asthma care. Children without health insurance have less access to health care services and poorer health outcomes compared with their insured peers [4]. Referral to a specialist is recommended for asthma management, especially for children with poorly controlled asthma or asthma exacerbations [5]. However, uninsured children with asthma are less likely to have access to specialists and more likely to have unmet health care needs than insured children [4].

Racial and socioeconomic disparities are present in the asthma population, with more non-Hispanic black and low income children having asthma compared with non-Hispanic white and higher income children [6]. Blacks also have higher risk of mortality [2], hospitalizations [6,7], and emergency department visits [2,6,8], and worse asthma control [7] compared with whites. Children from lower socioeconomic backgrounds have worse asthma outcomes [9–12], and poorer health care access [13]. Kuehn [14] found that in Massachusetts, 45% of those covered by Commonwealth Care type 2 or 3, which has the higher cost-sharing options reported cost as a barrier to obtaining health care in general and 25% reported cost as a barrier to accessing primary care, compared with 16% and 6% of those privately insured, respectively. Fung et al. [15] determined that lower income families with higher cost-sharing frequently delayed or avoided children's care due to costs. Health care access has been found to differ between urban and rural communities. A literature review of health-seeking behaviors between rural and urban populations found a reluctance to seek health care in rural areas based on cultural and financial constraints [16]. Another study found that uncontrolled asthma among children prevailed in low-income families living in rural environments [17]. Children with asthma in a poor-urban area have been shown to have more frequent hospitalizations or emergency department visits [9] and children with asthma in an urban health care setting were less likely to have specialty care [18].

Most current studies show overall cost barriers in general based on socioeconomic status and demographics rather than disease-specific. With this study, we will contribute to existing literature by examining specific aspects of cost barriers of asthma care including ability to afford medication, a primary care physician visit, and a specialty care physician visit by analyzing a large asthma database for children administered by multiple states representing all regions of the United States. In addition, we assessed whether the cost barriers were associated with payers' type (public versus private insurance) and urban residence and

examined racial differences in ability to afford medical care among those with health insurance.

The objective of this study is to assess cost barriers to medical care and treatment for children with asthma and determine if those cost barriers differ by demographics, health insurance type and coverage continuity, and urban residence variables, by analyzing the Behavioral Risk Factor Surveillance System Child Asthma Call-back Survey (ACBS).

Methods

Survey data description

A sample of 3,788 children under age 18 years with current asthma were included in this study. The study sample consists of children who had responses by adult proxy to the Child Asthma Call-back Survey (ACBS), a two-week telephone follow-up survey to the Behavioral Risk Factor Surveillance System (BRFSS), a random-digit-dialed telephone survey. The ACBS started in 2006 and is an in-depth asthma survey administered by the Behavioral Risk Factor Surveillance System (BRFSS) and funded by the National Asthma Control Program (NACP) of the Centers for Disease Control and Prevention (CDC) (https://www.cdc.gov/brfss/acbs/index.htm). Respondents who complete the Random Child Selection and Childhood Asthma Prevalence modules on the BRFSS and who have ever been diagnosed with asthma are eligible to participate in the Child Asthma Call-back Survey. If both the selected child and adult BRFSS respondent have asthma and live in the same household, only one is eligible for the ACBS. If the eligible child is selected, the adult proxy would then be contacted within two weeks by telephone to participate in the ACBS. The ACBS uses a complex sample design. Data from the survey years 2012 to 2014 were combined to achieve sufficient sample size for reliable estimates and sample weights of the data were developed from the combined data. Data were weighted to account for nonresponse bias and unequal probability of sample selection (https://www.cdc.gov/brfss/acbs/combined_years.html). A total of 26 states that have collected data for all three years were included in this data set (Table 1). The median response rate for children (through their adult proxy respondents) was 44.3% (range 33.8–62.8%) in 2012, 45.2% (range 29.0%–63.5%) in 2013, and 43.0% (range 22.9%–53.8%) in 2014.

Associations between cost barriers to asthma care and treatment were analyzed by demographic, health insurance coverage, and urban residence variables. Explanatory factors included sex (male or female), age group (0–4 years, 5–11 years, and 12–17 years), race (white, black, and other), health insurance status (insured and uninsured), health insurance coverage (partial year coverage, full year coverage, and uninsured), health insurance type (private, public, uninsured, and other insurance), and urban residence (urban and rural). The other race category includes American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, other races, and multiple races. Urban residence was established if residence was inside the center city of a Metropolitan Statistical Area (MSA), outside the center city of an MSA but inside the county containing the center city, or inside a suburban county of the MSA. If county of residence was not in an MSA, then residence was considered rural. MSA is composed of one or more counties that contain a city with population of at least 50,000 or an urbanized area and total population 100,000 or more

(75,000 in New England); center city is the largest city in each MSA (U.S. Census Bureau https://www2.census.gov/geo/pdfs/reference/GARM/Ch13GARM.pdf). Private health insurance included health care coverage paid through the child's parent's employer and public insurance included coverage through Medicaid/Medicare or Children's Health Insurance Program (CHIP). If the respondent had health insurance but did not have coverage at any time in the past 12 months, then the respondent was classified as having partial year coverage. Having health insurance for the entire past 12 months was considered full year coverage. The remaining category included no current health insurance.

The cost barrier variables were determined by yes/no responses to the following three questions on the Child ACBS. Responses to the first two questions on cost barriers to seeing a primary care physician or specialist doctor were combined to form a single indicator, cost barrier to seeing a doctor because of small sample size for each:

- "Was there a time in the past 12 months when {child's name} needed to see his/her primary care doctor for asthma but could not because of the cost?" (cost barrier to seeing a primary care physician)
- "Was there a time in the past 12 months when you were referred to a specialist for {his/her} asthma care but could not go because of the cost?" (cost barrier to seeing a specialist doctor)
- "Was there a time in the past 12 months when {he/she} needed medication for his/her asthma but you could not buy it because of the cost?" (cost barrier to affording medication)

Statistical methods

Statistical procedures were conducted using SAS 9.4-callable SUDAAN to account for complex survey design of the ACBS. Associations between cost barriers to seeing a doctor, affording medication, having at least one cost barrier and characteristics were described. Because of a significant association between race and cost barriers, we further calculated percentage of cost barriers by race among insured and uninsured children. However, only the results among the insured were presented in Table 2, as racial subgroup sample sizes among the uninsured were insufficient. Chi-square test was conducted to determine association between two variables and two-sided significance t-test was used to evaluate differences between percent estimates for two groups at the 0.05 level.

Associations between cost barrier variables and selected characteristics (i.e., health insurance status, healthcare insurance coverage, health insurance type, and urban residence) were determined using multivariable logistic regression models. Separate regression models were constructed for each cost barrier indicator (e.g. cost barrier to seeing a doctor, affording medication, and at least one cost barrier) as the dependent variable using selected above-mentioned characteristics as independent variables. All models were adjusted for sex, age, and race. Estimates were marked "unreliable" if the calculated Relative Standard Error (RSE) was between 30% and 50% and suppressed in the tables for RSE values higher than 50%. For the remainder of the document, terms such as "higher than," "less than," "more,"

and “associated with” indicate a statistically significant difference, unless otherwise stated and terms such as “similar to” and “not different” indicate no significant differences.

Results

The majority of children with asthma in the study sample were male (weighted, %: 56.2%), 5–11 years (43.9%) or 12–17 years (39.3%), white (66.4%), insured (96.3%), had full year coverage (89.8%), private insurance (57.7%), and lived in an urban area (73.1%) (Table 2).

Cost barrier to affording medication for asthma was 7.4% [95% CI: 5.9, 9.2] and cost barrier to seeing a doctor was 6.9% [4.8, 9.8] (Table 2). More black children experienced a cost barrier to seeing a doctor (13.3% [8.0, 21.2]) as compared with white children (3.6% [2.7, 4.8]) (p=0.008). Uninsured children had higher percentages of all cost barriers compared with children who had full year coverage (Table 2). More children with partial year coverage also experienced cost barriers to affording medication and had at least one cost barrier, compared with full year coverage. About 34.4% [20.0, 52.3] of uninsured children had cost barriers to seeing a doctor compared with 5.7% [3.7, 8.8] (p=0.004) insured and 4.0% [2.8, 5.7] (p=0.002) with full year coverage. Whereas, 39.7% [24.3, 57.4] of uninsured children had cost barriers to affording medication, compared with 6.2% [4.8, 7.9] (p=0.002) insured, including 26.3% [14.7, 42.3] and 4.7% [3.6, 6.2] (p<0.001) with partial and full year coverage, respectively. Percentage of uninsured children who had at least one cost barrier (45.1% [29.0, 62.3]) was higher than those with insurance (10.2% [7.8, 13.3]) (p<0.001), including partial and full year coverage at 46.1% [27.6, 65.8] and 7.6% [5.9, 9.6], respectively (p<0.001) (Table 2).

A higher percentage of children with public insurance (e.g. Medicaid/ CHIP) had a cost barrier to seeing a doctor for asthma care (12.4% [7.0, 20.8]), compared with children who had private insurance (2.1% [1.4, 3.1]) (p<0.001). Cost barrier to affording medication was not different between public and private insurance. More children with public insurance had at least one cost barrier (15.4% [9.8, 23.4]) compared with children with private insurance (6.3% [4.7, 8.4]) at p<0.001. Cost barriers did not differ by urban residence (Table 2).

Among insured children, more blacks had a cost barrier to seeing a doctor (10.6% [5.9, 18.3]) and at least one cost barrier (15.6% [10.3, 23.0]) compared with whites (2.9% [2.1, 4.0] and 6.8% [5.3, 8.7], respectively) (p=0.03 and p=0.01) (Table 3).

Adjusting for demographic factors (sex, age, and race), uninsured and partial year coverage were associated with cost barrier to seeing a doctor (adjusted prevalence ratio (aPR)=8.07 [95% CI: 4.78, 13.61] and aPR=6.58 [3.78, 11.45], respectively) and affording medication (aPR=8.35 [5.23, 13.34] and aPR=4.93 [2.96, 8.19], respectively), compared with children who had full year coverage (Table 4). Uninsured and partial year coverage were also associated with having at least one cost barrier, compared with children who had full year coverage (Table 4). Public insurance was associated with cost barrier to seeing a doctor (aPR=4.43 [2.57, 7.62]) and having at least one cost barrier (aPR=1.97 [1.26, 3.06]), compared with private insurance (Table 4).

Discussion

Access to a doctor for asthma care because of high out-of-pocket costs was disproportionately lower for children who were uninsured, had public health insurance, or partial year coverage compared with insured, private insurance, and full year insurance coverage, respectively. This finding is not unexpected and supported by literature because uninsured children are less likely to have specialist care and medication use compared with insured children [19]. Hasegawa et al. [19] found that patients with no insurance used fewer asthma control medications and were less likely to have asthma specialist care. Children with insurance are more likely to gain a medical home, well-child care, prescription medications, and appropriate care for asthma [4].

Children in this study who had public insurance reported more cost barriers to seeing a doctor including a specialist. Children with public insurance tend to live in poorer households with less expendable income. Brooks et al. [20] established that 30 states charge premiums or enrollment fees and 25 charge cost sharing for children in Medicaid or CHIP, although most states make charges only for children on CHIP since the income requirement for CHIP is higher than for Medicaid recipients. Family health care spending increases with premiums but research on relationship to financial hardship is limited [21].

Even among children who were insured, black children experienced a greater cost barrier to seeing a doctor than white children did. A study of primarily black children with Medicaid showed a decreased likelihood of recent primary care and past subspecialty care [22]. Keet et al. [9] demonstrated that black children with asthma on Medicaid had significantly higher rates of ED visits and hospitalizations compared with white children. Mitchell et al. [7] suggested that black children had greater asthma morbidity compared with whites when visiting a specialist, indicating access barriers to specialists. The racial disparities are likely multifactorial, and additional information is needed to increase understanding of different contributing factors.

We found no difference between type of insurance (public versus private insurance) and cost barrier to affording medication. However, Medicaid expansions have been associated with reductions in reports of patients skipping or taking less medication to save money [23]. It was found by Butz et al. [24] that children who receive specialty care filled more than twice as many controller medication prescriptions in the past 12 months compared with those who had not received specialty care. Children who lack regular controller medication use have been found to have a higher probability of ED encounter or hospitalization [25]. Bellin et al. [26] learned from low-income caregivers of children enrolled in Medicaid that they frequently ended up in the ED for uncontrolled asthma, where they obtained medications they could not fill otherwise.

Our finding that health insurance coverage was associated with cost barriers corresponds to the finding of another study demonstrating an association between unmet health care needs due to cost and gap in insurance coverage among children with asthma [27]. Although information on the length of breaks in healthcare insurance was not available, going without health insurance appeared to have a noticeable impact on affording health care.

We found no difference in cost barriers between urban and rural residence. In contrast, Douthit et al. [16] found significant differences in health care access between rural and urban areas, contributed by financial constraints, and poorer health among those in rural areas. Keet et al. [9] established that poor and urban were independent risk factors for asthma morbidity (e.g. emergency department visits and hospitalizations). In the urban versus rural analysis, cost barriers by health insurance status or socioeconomic status were not examined. These factors may contribute to differing patterns in urban and rural communities.

One limitation of this study is that only 26 states are represented in the dataset. Therefore, the findings cannot be generalized to the entire U.S. population. However, participating states were from all four U.S. Census Regions (Table 1). Another limitation is that the survey questions used in this study did not measure reasons for gap in health insurance and length of time without health care coverage in the past 12 months. Lastly, a limitation is that the median ACBS response rate was 44% among 26 participating states. Although the study data were adjusted for non-response bias, any remaining nonresponse bias should be minimal and random due to BRFSS survey design, weighting, and varying response rates across multiple years and states in the dataset, therefore, lessens the effects on results. However, the study was able to show association between cost barriers and health insurance coverage. This study adds to existing literature by identifying characteristics that are associated with cost barriers to seeing a doctor or affording medication for asthma. Furthermore, this study demonstrates racial disparities in cost barriers to seeing an asthma doctor among those with health insurance. We also show the effects of having a gap in health care coverage on these cost barriers, as well as no difference in cost barriers by urban versus rural residence among children with asthma.

However, additional information on whether cost barriers predict asthma outcomes and related health care use, could improve our understanding of the possible role of financial strains in the exacerbation of asthma symptoms and health care use among children.

Conclusion

Having no health insurance, partial year coverage, and public insurance were associated with cost barriers to asthma care. Improving health insurance coverage may help strengthen access to and reduce cost barriers to asthma care.

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Table 1.

Participating states in 2012–2014 Child Asthma Call-back Survey by U.S. Census regions

U.S. Census regions	Participating states
Northeast	CT, ME, MA, NH, NJ, NY, PA, RI
Midwest	KS, MI, MO, NE, OH, WI
South	LA, MD, MS, OK, TX, WV
West	HI, MT, NM, OR, UT, WA

Table 2.

Percentage of cost barriers by selected characteristics among children (aged 0–17 years) with current asthma-Behavioral Risk Factor Surveillance System Asthma Call-back Survey, 2012–2014

Characteristics	All survey respondents		Cost barrier seeing a doctor (n= 206)	Cost barrier affording medication (n= 255)	At least one cost barrier (n= 356)
	Unweighted n[a]	Weighted, % (95% CI)	Weighted, % (95% CI)	Weighted, % (95% CI)	Weighted, % (95% CI)
Total	3,788		6.9 (4.8, 9.8)	7.4 (5.9, 9.2)	11.6 (9.1, 14.6)
Sex			p=0.84	p=0.50	p=0.81
Male	2,222	56.2 (52.8, 59.5)	7.1 (4.1, 12.0)	7.9 (5.9, 10.5)	11.9 (8.4, 16.6)
Female	1,556	43.8 (40.5, 47.2)	6.6 (4.3, 10.1)	6.8 (4.8, 9.5)	11.2 (8.2, 15.1)
Age, year range			p=0.52	p=0.88	p=0.62
0–4	399	16.8 (14.1, 20.0)	12.8 (5.0, 29.0)[b]	6.7 (3.9, 11.3)	16.2 (7.8, 30.8)[b]
5–11	1,466	43.9 (40.7, 47.2)	5.6 (3.6, 8.7)	7.2 (5.3, 9.8)	11.0 (8.2, 14.5)
12–17	1,923	39.3 (36.3, 42.3)	5.7 (3.8, 8.6)	7.9 (5.4, 11.4)	10.2 (7.4, 13.9)
Race[c]			p=0.008*	p=0.08	p=0.003*
White	2,765	66.4 (63.0, 69.7)	3.6 (2.7, 4.8)	5.7 (4.3, 7.5)	7.6 (6.1, 9.5)
Black	472	19.6 (17.0, 22.5)	13.3 (8.0, 21.2)	10.4 (6.7, 15.8)	18.7 (12.9, 26.3)
Other	457	14.0 (11.4, 17.0)	14.2 (5.1, 33.7)[b]	9.1 (5.2, 15.5)	19.0 (8.9, 36.0)[b]
Health insurance status			p=0.004*	p=0.002*	p<0.001*
Insured	3,651	96.3 (94.8, 97.4)	5.7 (3.7, 8.8)	6.2 (4.8, 7.9)	10.2 (7.8, 13.3)
Uninsured	130	3.7 (2.6, 5.2)	34.4 (20.0, 52.3)	39.7 (24.3, 57.4)	45.1 (29.0, 62.3)
Health insurance coverage			p=0.002*	p<0.001*	p<0.001*
Partial year coverage	205	6.5 (4.5, 9.3)	29.8 (12.0, 56.8)[b]	26.3 (14.7, 42.3)	46.1 (27.6, 65.8)
Full year coverage	3,441	89.8 (86.9, 92.1)	4.0 (2.8, 5.7)	4.7 (3.6, 6.2)	7.6 (5.9, 9.6)
Uninsured	130	3.7 (2.6, 5.2)	34.4 (20.0, 52.3)	39.7 (24.3, 57.4)	45.1 (29.0, 62.3)
Health insurance type			p<0.001*	p=0.006*	p<0.001*
Private (parent's employer)	2,272	57.7 (54.3, 61.0)	2.1 (1.4, 3.1)	5.3 (3.8, 7.4)	6.3 (4.7, 8.4)
Public (Medicaid/CHIP)	1,083	32.9 (29.7, 36.2)	12.4 (7.0, 20.8)	5.9 (4.1, 8.3)	15.4 (9.8, 23.4)
Uninsured	130	3.7 (2.6, 5.2)	34.4 (20.0, 52.3)	39.7 (24.3, 57.4)	45.1 (29.0, 62.3)
Other insurance	262	5.7 (4.6, 7.2)	4.1 (2.1, 7.7)[b]	14.8 (6.0, 32.1)[b]	17.4 (8.1, 33.3)[b]

Characteristics	All survey respondents		Cost barrier seeing a doctor (n= 206)	Cost barrier affording medication (n= 255)	At least one cost barrier (n= 356)
	Unweighted n[a]	Weighted, % (95% CI)	Weighted, % (95% CI)	Weighted, % (95% CI)	Weighted, % (95% CI)
Urban residence			p=0.91	p=0.30	p=0.48
Urban	1,781	73.1 (70.2, 75.8)	6.3 (4.3, 9.1)	5.8 (4.3, 7.8)	9.8 (7.4, 12.8)
Rural	1,068	26.9 (24.2, 29.8)	6.1 (3.5, 10.2)	7.7 (5.1, 11.4)	11.6 (8.0, 16.4)

Abbreviation: CI, Confidence Interval

*p–value statistically significant at the <0.05 level for the chi-square test of association between cost barriers and selected variables

[a]Unweighted numbers for subcategories might not sum to total due to missing value responses

[b]Relative standard error of the estimate is between 30% and 50%; estimate is unstable

[c]Other race category includes American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, other races, and multiple races

Table 3.

Percentage of cost barriers by race among children (aged 0–17 years) with current asthma who have health insurance-Behavioral Risk Factor Surveillance System Asthma Call-back Survey, 2012–2014

Characteristics	Children (aged 0–17 years) with health insurance		
	Cost barrier seeing a doctor	Cost barrier affording medication	At least one cost barrier
	Weighted, % (95% CI)	Weighted, % (95% CI)	Weighted, % (95% CI)
Total	5.9 (3.8, 9.0)	5.9 (4.7, 7.4)	10.0 (7.6, 13.1)
Race[a]	p=0.03 *	p=0.27	p=0.01 *
White	2.9 (2.1, 4.0)	5.1 (3.8, 6.9)	6.8 (5.3, 8.7)
Black	10.6 (5.9, 18.3)	7.8 (5.1, 11.8)	15.6 (10.3, 23.0)
Other	N/A	7.1 (3.7, 13.2)[b]	17.3 (7.2, 36.2)[b]

Abbreviation: CI, Confidence Interval

* p–value statistically significant at the <0.05 level for the chi-square test of association between cost barriers and selected variables

[a] Other race category includes American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific Islander, other races, and multiple races

[b] Relative standard error of the estimate is between 30% and 50%; estimate is unstable

N/A Relative standard error of the estimate ≥ 50%, data suppressed

Table 4.

Adjusted prevalence ratios of cost barriers by health insurance and urban residence variables among children (aged 0–17 years) with current asthma-Behavioral Risk Factor Surveillance System Asthma Call-back Survey, 2012–2014[a]

Characteristics	Cost barrier seeing a doctor Adjusted PR (95% CI)	Cost barrier affording medication Adjusted PR (95% CI)	At least one cost barrier Adjusted PR (95% CI)
Health insurance status			
Insured	1.00	1.00	1.00
Uninsured	**5.47 (2.82, 10.61)**	**6.61 (4.20, 10.40)**	**4.35 (2.70, 6.99)**
Health insurance coverage			
Partial year coverage	**6.58 (3.78, 11.45)**	**4.93 (2.96, 8.19)**	**5.32 (3.52, 8.05)**
Full year coverage	1.00	1.00	1.00
Uninsured	**8.07 (4.78, 13.61)**	**8.35 (5.23, 13.34)**	**5.77 (3.83, 8.69)**
Health insurance type			
Private (parent's employer)	1.00	1.00	1.00
Public (Medicaid/CHIP)	**4.43 (2.57, 7.62)**	0.95 (0.58, 1.54)	**1.97 (1.26, 3.06)**
Uninsured	**13.40 (7.14, 25.16)**	**6.74 (4.08, 11.14)**	**6.15 (3.84, 9.83)**
Other insurance	1.60 (0.68, 3.77)	1.58 (0.67, 3.73)	1.58 (0.76, 3.29)
Urban residence			
Urban	1.00	1.00	1.00
Rural	1.08 (0.58, 2.01)	1.37 (0.84, 2.24)	1.27 (0.82, 1.96)

Abbreviations: CI, confidence interval; PR, prevalence ratio

[a]Prevalence rate ratios for each cost barrier indicator, adjusted for sex, age, and race

Note: numbers in bold are statistically significantly associated with the reference category for each independent variable, determined by if the null value 1 is not within the 95% CI of PRs