HEALTH POLICY/BRIEF RESEARCH REPORT

National Study of Barriers to Timely Primary Care and Emergency Department Utilization Among Medicaid Beneficiaries

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Study objective: We compare the association between barriers to timely primary care and emergency department (ED) utilization among adults with Medicaid versus private insurance.

Methods: We analyzed 230,258 adult participants of the 1999 to 2009 National Health Interview Survey. We evaluated the association between 5 specific barriers to timely primary care (unable to get through on telephone, unable to obtain appointment soon enough, long wait in the physician's office, limited clinic hours, lack of transportation) and ED utilization ($\geq$1 ED visit during the past year) for Medicaid and private insurance beneficiaries. Multivariable logistic regression models adjusted for demographics, socioeconomic status, health conditions, outpatient care utilization, and survey year.

Results: Overall, 16.3% of Medicaid and 8.9% of private insurance beneficiaries had greater than or equal to 1 barrier to timely primary care. Compared with individuals with private insurance, Medicaid beneficiaries had higher ED utilization overall (39.6% versus 17.7%), particularly among those with barriers (51.3% versus 24.6% for 1 barrier and 61.2% versus 28.9% for $\geq$2 barriers). After adjusting for covariates, Medicaid beneficiaries were more likely to have barriers (adjusted odds ratio [OR] 1.41; 95% confidence interval [CI] 1.30 to 1.52) and higher ED utilization (adjusted OR 1.48; 95% CI 1.41 to 1.56). ED utilization was even higher among Medicaid beneficiaries with 1 barrier (adjusted OR 1.66; 95% CI 1.44 to 1.92) or greater than or equal to 2 barriers (adjusted OR 2.01; 95% CI 1.72 to 2.35) compared with that for individuals with private insurance and barriers.

Conclusion: Compared with individuals with private insurance, Medicaid beneficiaries were affected by more barriers to timely primary care and had higher associated ED utilization. Expansion of Medicaid eligibility alone may not be sufficient to improve health care access. [Ann Emerg Med. 2012;xx:xxx.]

Please see page XX for the Editor's Capsule Summary of this article.

INTRODUCTION
Background

The Patient Protection and Affordable Care Act seeks to increase health insurance coverage by expanding Medicaid eligibility.[1] As a result, insurance coverage with Medicaid is expected to increase by 16 million persons during the next decade and may increase overall health care and emergency department (ED) utilization.[2] Although Medicaid expansion will decrease financial barriers to care, other barriers persist, including limited availability of primary care physicians, clinics not being open at convenient times, and transportation issues. Furthermore, the prevalence of barriers to timely primary care for all Americans has increased during the past decade, and these barriers were associated with increasing ED utilization.[3]

Importance

The ED is an important bellwether for access to care, the most common venue for acute care, and the most frequent source of inpatient admissions.[4] Accordingly, barriers to primary care and associated ED utilization are important indicators of health care system performance. Given the limited number and availability of primary care providers, there may be increasing barriers to timely primary care and associated ED visits for current and newly enrolled Medicaid with health insurance expansion through the Patient Protection and Affordable Care Act. Previous studies in single states have evaluated the association between barriers to primary care and ED utilization, specifically for Medicaid beneficiaries.[5,6] However, to our knowledge the role of barriers to timely primary care in the higher observed ED utilization rates for

Editor's Capsule Summary

What is already known on this topic
Although Medicaid has increased access to health care for low-income individuals, it is often difficult for beneficiaries to promptly obtain routine care.

What question this study addressed
To examine the effect of nonfinancial barriers to timely primary care on emergency department (ED) utilization between Medicaid beneficiaries and those privately insured.

What this study adds to our knowledge
Barriers to care were associated with increased ED utilization among both insurance groups. However, the same number of barriers was associated with higher odds of ED utilization among the Medicaid beneficiaries compared with those privately insured.

How this is relevant to clinical practice
Expanding Medicaid coverage to more low-income individuals may increase ED utilization unless nonfinancial barriers to primary care are reduced.

Medicaid beneficiaries has not been evaluated on a national level.

Goals of This Investigation

The primary objective was to describe barriers to timely primary care among Medicaid beneficiaries compared with that for individuals with private insurance and to characterize how these barriers are associated with ED utilization. We hypothesized that Medicaid beneficiaries will have more barriers to care and higher associated ED utilization.

MATERIALS AND METHODS
Study Design

Each year, the National Center for Health Statistics conducts the National Health Interview Survey, a cross-sectional household interview survey representative of the noninstitutionalized US civilian population. We received a waiver from our institutional review board to analyze the National Health Interview Survey data from 1999 to 2009.

The sample was obtained by using a stratified, multistage probability study design with unequal probabilities of selection. The National Health Interview Survey oversamples certain subgroups of people, including racial/ethnic minorities. The annual response rate of the survey is approximately 90% of the eligible households in the sample. From 1999 to 2009, the survey collected household interview data, including demographic characteristics and data on health, for total of 317,497 adults (aged ≥18 years) who represent 210 million of

the US population. This analysis was limited to adults with private or Medicaid insurance (n=230,258). The interview included a core questionnaire consisting of basic health and demographic items. All included variables, except poverty-income ratio, had less than 3% missing values, and these observations were dropped from multivariable models. The missing values for poverty-income ratio were dummy coded separately in the multivariable models.

Data Collection and Processing

We defined presence of a barrier to timely primary care as 1 or more affirmative responses to the following questions: "There are many reasons people delay getting medical care. Have you delayed getting care for any of the following reasons in the past 12 months?" The barriers were "You couldn't get through on the telephone," "You couldn't get an appointment soon enough," "Once you got there, you have to wait too long to see the physician," "The (clinic/physician's) office wasn't open when you could get there," and "You didn't have transportation." In this study, these barriers were used to predict the primary outcome of ED utilization, as measured by response to the question, "During the past 12 months, how many times have you gone to a hospital ED (this includes ED visits that resulted in a hospital admission)?" The National Health Interview Survey did not measure exact numbers of ED visits for each participant but rather categories of ED visits; thus, we dichotomized the outcome (0 versus ≥1) for the purpose of this analysis.

We considered adults with private health insurance with or without any other types of health insurance as "private" and persons with Medicaid with or without Medicare as "Medicaid." Medicare beneficiaries were included in the sample only if they had Medicaid or private insurance. Because we were primarily interested in Medicaid beneficiaries and how they compared with individuals with private insurance, survey participants with other insurance types were excluded from this analysis. We defined outpatient care utilization as having a defined source of primary care and number of outpatient visits in the past 12 months. Having a defined source of primary care was ascertained through the following questions: "Is there a place that you usually go to when you are sick or need advice about your health?" and "What kind of place do you go to most often, a clinic, physician's office, ED, hospital outpatient department, or some other place?" We considered adults as having a defined source of primary care if they responded with an affirmative response to the initial question and if the usual place for care was a "clinic," "physician's office," or "hospital outpatient department." Additionally, the number of outpatient visits was obtained by the question, "During the past 12 months, have many times have you seen a physician or health care professional about your own health at a physician's office, a clinic, or some other place (not inclusive of visits requiring hospitalization, visits to EDs, home visits, dental visits, and telephone calls)?" Having a defined source of primary care was used in the models predicting barriers to timely primary care

Table 1. Percentage distribution of the demographic characteristics and health care utilization of the National Health Interview Survey sample by insurance status.

Characteristics	All Respondents, % (95% CI)	
	Medicaid, n=24,986	Private Insurance, n=205,272
Demographics		
Age, y		
18–44	56.6 (55.6–57.8)	49.9 (49.5–50.3)
45–64	25.8 (25.1–26.5)	35.8 (35.5–36.1)
≥65	17.7 (16.9–18.5)	14.3 (14.1–14.6)
Female sex	67.4 (66.5–68.3)	51.7 (51.5–52.0)
Race/ethnicity		
Non-Hispanic white	48.4 (46.1–50.8)	79.7 (79.0–80.3)
Non-Hispanic black	21.8 (20.9–22.7)	7.8 (7.5–8.0)
Hispanic	24.7 (23.7–25.7)	9.1 (8.8–9.5)
Non-Hispanic Asian	3.2 (2.8–3.6)	3.6 (3.5–3.7)
Other	2.6 (2.1–3.1)	1.2 (1.1–1.3)
Census region		
Northeast	21.9 (20.8–23.1)	19.7 (19.2–20.2)
Midwest	20.9 (19.8–22.1)	26.9 (26.2–27.6)
South	33.3 (32.0–34.6)	34.1 (33.5–34.8)
West	23.9 (22.7–25.1)	19.3 (18.8–19.9)
Born in the United States	79.2 (78.3–80.1)	88.9 (88.6–89.1)
Socioeconomic status		
Currently employed	25.6 (24.8–26.4)	72.6 (72.2–72.9)
Poverty income ratio		
<1.0	42.9 (42.1–43.7)	3.5 (3.2–3.7)
1.0–1.9	24.0 (23.2–24.8)	9.1 (8.9–9.3)
2.0–3.9	8.7 (8.3–9.3)	26.3 (26.0–26.6)
≥4.0	2.7 (2.3–3.0)	41.1 (40.6–41.5)
Unknown	21.7 (20.9–22.6)	20.1 (19.7–21.5)
Education		
<High school	43.6 (42.7–44.5)	9.7 (9.4–9.9)
High school graduate	32.7 (31.9–33.5)	27.5 (27.1–27.8)
>High school	23.7 (22.9–24.6)	62.8 (62.4–63.3)
Health conditions		
Health status		
Excellent to very good	33.0 (32.0–33.9)	68.2 (67.9–68.5)
Good	29.6 (28.8–30.4)	23.6 (23.4–23.8)
Fair to poor	37.4 (36.5–38.4)	8.2 (8.0–8.3)
Body mass index, kg/m²		
<20	7.5 (7.1–8.0)	6.0 (5.8–6.1)
20–24.9	29.3 (28.5–30.1)	34.6 (34.3–34.9)
25–29.9	29.7 (28.4–30.5)	36.1 (35.8–36.3)
≥30	33.5 (32.7–34.3)	23.3 (23.1–23.6)
Alcohol use		
Lifetime abstainer	39.9 (39.0–40.9)	20.0 (19.4–20.2)
Former drinker	21.7 (21.1–22.4)	13.3 (13.1–13.5)
Current drinker	38.3 (37.4–39.3)	67.0 (66.5–67.4)
Cigarette use		
Never smoker	51.2 (50.3–52.1)	58.7 (58.4–59.0)
Current, every day	32.6 (31.7–33.4)	18.0 (17.7–18.2)
Former smoker	16.2 (15.6–16.8)	23.3 (23.1–23.6)
Hypertension	31.8 (31.0–32.6)	21.2 (20.9–21.5)
Diabetes	14.3 (13.7–14.8)	6.3 (6.1–6.4)
Coronary artery disease	11.1 (10.6–11.6)	5.3 (5.2–5.5)
Stroke	6.2 (5.8–6.6)	1.9 (1.8–2.0)
Asthma	18.1 (17.5–18.8)	10.2 (10.0–10.4)
Cancer	7.8 (7.4–8.3)	7.3 (7.1–7.4)
Outpatient care utilization		
No defined source of primary care	11.0 (10.4–12.0)	9.9 (9.7–10.1)

Table 1. Continued.

Characteristics	All Respondents, % (95% CI)	
	Medicaid, n=24,986	Private Insurance, n=205,272
Number of outpatient visits in the past 12 months		
None	12.2 (11.6–12.9)	14.9 (14.6–15.2)
1	10.3 (9.8–10.8)	16.51 (16.0–17.1)
2–3	18.9 (18.3–19.7)	28.6 (28.3–28.9)
≥4	58.6 (57.7–59.5)	38.7 (38.4–39.0)
ED utilization		
Number of ED visits in the past 12 months		
None	60.4 (59.5–61.2)	82.3 (82.1–82.5)
1	18.7 (18.0–19.3)	12.5 (12.3–12.6)
2–3	12.8 (12.2–13.4)	4.1 (4.0–4.2)
≥4	8.2 (7.7–8.7)	1.1 (1.0–1.2)

but not in models predicting ED utilization because of the overlap between having no defined source of primary care and having barriers to timely primary care.

Demographic data included age, sex, race, ethnicity, country of birth, and US census region. Socioeconomic data included employment status, poverty income ratio, and education. Health condition was measured by self-report to the question, "Would you say your health in general is excellent, very good, good, fair, or poor?" Specific chronic health conditions (Table 1) were selected according to relatively high prevalence and potential for increased primary care and ED utilization. Survey year was included to account for potential secular changes, such as in Medicaid enrollment and ED crowding, during the study period.

Primary Data Analysis

The primary analysis was descriptive, with 95% confidence intervals (CIs). In evaluation of the association between barriers to timely primary care and ED utilization, multivariable logistic regression models were used to adjust for demographics, socioeconomic status, health conditions, outpatient care utilization, and survey year. We also did a sensitivity analysis of the multivariable models excluding Medicare beneficiaries from both insurance groups (n=41,276 excluded).

We also identified an interaction between insurance type and barriers to timely primary care. Thus, the final models included these interaction terms and presented results on Medicaid versus private insurance by 0, 1, and greater than or equal to 2 barriers, with associated *P* values for the interactions.

Survey commands were used to adjust for the complex survey design and weight the sample to provide estimates for the US population. We used F-adjusted mean residual test to assess goodness of fit of the survey-weighted logistic regression model. We performed statistical analyses with Stata (version 10.1; StataCorp, College Station, TX).

Table 2. Percentage of Medicaid and privately insured National Health Interview Survey respondents who reported barriers to timely primary care, overall and by ED utilization.

Barriers to Timely Primary Care	All Respondents, % (95% CI)		Proportion with >1 ED Visit (95% CI), %	
	Medicaid, n=24,986	Private, n=205,272	Medicaid, n=9,650	Private, n=36,431
Specific barriers				
Couldn't get through on telephone				
Yes	4.0 (3.7–4.3)	2.2 (2.1–2.3)	61.6 (58.0–65.1)	29.1 (27.4–30.9)
No	96.0 (95.7–96.3)	97.8 (97.7–97.9)	38.8 (37.9–39.6)	17.4 (17.2–17.6)
Couldn't get an appointment soon enough				
Yes	7.2 (6.8–7.7)	5.2 (5.0–5.3)	60.9 (58.2–63.5)	26.6 (25.5–27.6)
No	92.8 (92.4–93.2)	94.8 (94.7–95.0)	38.0 (37.2–38.8)	17.2 (17.0–17.4)
Waiting too long in physician's office				
Yes	7.6 (7.1–8.1)	3.6 (3.5–3.8)	55.1 (52.1–58.0)	26.6 (25.5–27.7)
No	92.4 (92.0–92.8)	96.4 (96.2–96.5)	38.4 (37.6–39.2)	17.3 (17.1–17.5)
Not open when you could go				
Yes	3.8 (3.5–4.1)	2.7 (2.6–2.8)	67.6 (63.4–71.6)	28.5 (27.1–30.0)
No	96.3 (95.9–96.6)	97.3 (97.2–97.4)	38.6 (37.8–39.4)	17.4 (17.2–17.6)
No transportation				
Yes	7.6 (7.1–8.1)	0.6 (0.6–0.6)	59.4 (56.4–62.2)	40.7 (37.6–43.8)
No	92.4 (92.0–92.8)	99.4 (99.3–99.4)	38.1 (37.2–38.9)	17.5 (17.3–30.3)
Total number of barriers				
0	83.7 (83.1–84.4)	91.1 (90.9–91.3)	36.5 (35.6–37.4)	16.8 (16.6–17.0)
1	8.7 (8.2–9.2)	5.3 (5.2–5.5)	51.3 (48.5–51.2)	24.6 (23.7–25.6)
2	3.7 (3.5–4.1)	2.2 (2.1–2.3)	55.9 (51.6–60.0)	26.3 (24.8–27.8)
≥3	3.9 (3.6–4.2)	1.4 (1.3–1.5)	66.3 (62.5–70.0)	33.0 (30.8–35.5)

RESULTS

Table 1 displays demographics, socioeconomic status, health conditions, and outpatient care utilization among adults with Medicaid and private insurance. Compared with adults with private insurance, Medicaid beneficiaries were less likely to report having a usual source of care.

Overall, Medicaid beneficiaries were more than twice as likely to have greater than or equal to 1 ED visit (39.6% versus 17.7% for private insurance). Each of the 5 measured barriers to timely primary care was more common in adults with Medicaid compared with individuals with private insurance (Table 2). The largest absolute differences were observed in "no transportation" (7.6% versus 0.6%), "waited too long in physician's office" (7.6% versus 3.6%), and "couldn't get an appointment soon enough" (7.2% versus 5.2%). Compared with adults with private insurance, Medicaid beneficiaries were twice as likely to have greater than or equal to 1 barrier (16.3% versus 8.9%). The multivariable model suggested an independent association between insurance type and barriers to timely primary care, with Medicaid beneficiaries more likely to have barriers than those with private insurance (Table 3).

For both Medicaid and private insurance beneficiaries, there was an increasing unadjusted association between higher number of barriers and increased ED utilization (Table 2). After adjusting for insurance type and other covariates, barriers to timely primary care were strongly associated with ED utilization (Table 3). Additionally, Medicaid beneficiaries with 1 or greater than or equal to 2 barriers had increasingly higher ED

utilization compared with individuals with private insurance with the same number of barriers. Exclusion of Medicare beneficiaries from the Medicaid and private insurance groups did not materially change these results (Table E1, available online at http://www.annemergmed.com).

In separate multivariable models adjusting for the covariates (data not shown in the tables), the following barriers were independently associated with ED visit: "couldn't get through on telephone" (adjusted odds ratio [OR] 1.56; 95% CI 1.44 to 1.70); "couldn't get an appointment soon enough" (adjusted OR 1.41; 95% CI 1.33 to 1.49); "waiting too long in physician's office" (adjusted OR 1.39; 95% CI 1.30 to 1.47), "clinic not open when you could go" (adjusted OR 1.57; 95% CI 1.46 to 1.69); and "not having transportation" (adjusted OR 1.77; 95% CI 1.61 to 1.94).

LIMITATIONS

By using data from an existing national survey, we were limited to questions already in the survey and could not alter or add other questions. The study results might have been stronger if we had had a question that directly addressed the causal relationship between the barriers to timely primary care and ED utilization. Additionally, the National Health Interview Survey was based on self-reported data, so barriers and ED utilization could not be confirmed and are subject to recall bias. The measurement of barriers to timely primary care was linked to the respondents' usual source of care but does have some degree of imprecision in reference to "primary" care. Although we

Table 3. Adjusted ORs of reporting 1 or more barriers to timely primary care and 1 or more ED visits within the past 12 months.

Characteristics	≥1 Barrier, Model n=214,169, Adjusted OR (95% CI)*	≥1 ED Visit, Model n=214,089, Adjusted OR (95% CI)[†]
Covariates of primary interest		
Barriers to timely primary care (private insurance)	NA	
None		Referent
1 barrier		1.30 (1.22–1.38)
≥2 barriers		1.48 (1.37–1.59)
Medicaid versus private insurance (no barriers)	1.41 (1.30–1.52)	1.48 (1.41–1.56)
Medicaid and barriers to timely primary care interaction	NA	
Medicaid and 1 barrier (vs private and 1 barrier)		1.66 (1.44–1.92)[†]
Medicaid and ≥2 barriers (vs private and ≥2 barriers)		2.01 (1.72–2.35)[§]
No defined source of primary care	1.28 (1.20–1.36)	NA
Demographics		
Age, y		
18–44	Referent	Referent
45–64	0.87 (0.84–91.1)	0.64 (0.62–0.66)
≥65	0.58 (0.55–0.62)	0.62 (0.59–0.65)
Female sex	1.35 (1.29–1.41)	0.91 (0.89–0.94)
Race/ethnicity		
Non-Hispanic white	Referent	Referent
Non-Hispanic black	0.86 (0.80–0.93)	0.94 (0.90–0.99)
Hispanic	0.86 (0.79–0.93)	1.27 (1.20–1.34)
Non-Hispanic Asian	1.17 (1.05–1.30)	0.76 (0.69–0.85)
Other	1.18 (1.01–1.38)	0.99 (0.86–1.12)
Census region		
Northeast	Referent	Referent
Midwest	1.22 (1.13–1.31)	0.99 (0.95–1.04)
South	1.15 (1.07–1.23)	0.95 (0.91–0.99)
West	1.44 (1.35–1.55)	0.94 (0.90–0.99)
Born in the United States	1.05 (0.99–1.12)	1.15 (1.10–1.21)
Socioeconomic status		
Currently employed	1.07 (1.02–1.13)	0.93 (0.89–0.96)
Poverty income ratio		
<1.0	Referent	Referent
1.0–1.9	0.91 (0.85–0.99)	0.99 (0.93–1.05)
2.0–3.9	0.85 (0.79–0.91)	0.87 (0.82–0.92)
≥4.0	0.85 (0.79–0.92)	0.75 (0.70–0.79)
Unknown	0.69 (0.64–0.75)	0.76 (0.72–0.81)
Education		
<High school	Referent	Referent
High school graduate	0.91 (0.86–0.97)	0.92 (0.88–0.97)
>High school	1.12 (1.05–1.19)	0.86 (0.82–0.91)
Health conditions		
Health status		
Excellent to very good	Referent	Referent
Good	1.39 (1.33–1.45)	1.22 (1.18–1.26)
Fair to poor	1.84 (1.73–1.96)	1.79 (1.71–1.87)
Body mass index, kg/m^2		
<20	Referent	Referent
20–24.9	1.00 (0.92–1.08)	1.06 (0.99–1.12)
25–29.9	1.05 (1.00–1.10)	1.01 (0.98–1.05)
≥30	1.09 (1.04–1.15)	1.06 (1.02–1.10)
Alcohol use		
Lifetime abstainer	Referent	Referent
Former drinker	1.34 (1.24–1.44)	1.05 (1.00–1.10)
Current drinker	1.60 (1.50–1.70)	1.01 (0.97–1.05)
Cigarette use		
Never smoker	Referent	Referent
Current, every day	1.16 (1.11–1.22)	1.34 (1.29–1.39)
Former smoker	1.03 (0.99–1.08)	1.10 (1.06–1.14)

Table 3. Continued.

Characteristics	≥1 Barrier, Model n=214,169, Adjusted OR (95% CI)*	≥1 ED Visit, Model n=214,089, Adjusted OR (95% CI)†
Hypertension	1.06 (1.00–1.11)	0.99 (0.96–1.03)
Diabetes	0.98 (0.92–1.06)	1.03 (0.98–1.08)
Coronary artery disease	1.20 (1.11–1.29)	1.56 (1.48–1.64)
Stroke	1.16 (1.03–1.30)	1.69 (1.57–1.82)
Asthma	1.40 (1.32–1.46)	1.36 (1.30–1.41)
Cancer	1.04 (0.98–1.11)	1.05 (1.00–1.11)
Outpatient care utilization		
Number of outpatient visits in the past 12 months		
None	Referent	Referent
1	1.39 (1.28–1.52)	2.05 (1.90–2.20)
2–3	1.96 (1.82–2.12)	2.82 (2.65–2.99)
≥4	2.77 (2.57–2.98)	5.34 (5.04–5.66)
Survey year		
1999	Referent	Referent
2000	1.36 (1.20–1.42)	1.24 (1.17–1.32)
2001	1.49 (1.38–1.61)	1.17 (1.10–1.25)
2002	1.29 (1.19–1.40)	1.20 (1.13–1.28)
2003	1.14 (1.05–1.23)	1.19 (1.12–1.27)
2004	1.39 (1.28–1.51)	1.25 (1.17–1.34)
2005	1.36 (1.24–1.48)	1.19 (1.12–1.27)
2006	1.31 (1.19–1.46)	1.24 (1.15–1.33)
2007	1.44 (1.32–1.56)	1.21 (1.12–1.30)
2008	1.50 (1.36–1.65)	1.14 (1.06–1.23)
2009	1.62 (1.49–1.77)	1.17 (1.09–1.26)

*Goodness of fit $P=.35$.
†Goodness of fit $P=.98$.
‡P for interaction term $=.12$.
§P for interaction term $<.001$.

DISCUSSION

assumed that the usual source of care would be primary care providers for the majority of respondents, there may be some respondents who were referring to barriers to specialty care in the responses. Although the National Health Interview Survey sampling method was designed to provide representative data for the population, several demographics are underrepresented. The survey did not include homeless population, nursing homes, prisons, and mental health facilities. These individuals also tend to be frequent ED users, and their exclusion may have caused an underestimation of ED utilization and modestly affected the association between barriers and ED utilization.

DISCUSSION

The effect of state programs to expand Medicaid coverage on ED utilization has been mixed. In Massachusetts, there was higher ED utilization, but in Oregon—where adults were randomized to Medicaid enrollment—early results do not show an increase in ED utilization.[7,8] To our knowledge, this is the first national study to characterize the association between barriers to timely primary care and ED utilization in Medicaid compared with private insurance beneficiaries. Consistent with previous data, our results show that Medicaid beneficiaries had higher overall ED utilization, in part reflective of their worse health and higher prevalence of common chronic medical conditions.[2] However, we also found that Medicaid

beneficiaries were more likely to have barriers to primary care than adults with private insurance, and the presence of these barriers was associated with higher ED utilization. Additionally, Medicaid beneficiaries with barriers had disproportionately higher ED utilization compared with adults with private insurance.

The specific barriers "couldn't get an appointment soon enough" and "having to wait too long to see the physician" reflect an inadequate supply and availability of primary care options. Various factors—low reimbursement rates, paperwork burden, low patient compliance, and delayed reimbursement—limit physician willingness to care for Medicaid patients.[9] Another common barrier, "office wasn't open when you could get there," may reflect Medicaid beneficiaries' particular difficulty requesting time away from work or arranging for child care that is necessary for usual business hours appointments. Primary care access by Medicaid beneficiaries was disproportionately affected by limited transportation, reflecting a need for more convenient clinic locations. Although some states have controversially implemented penalties to reduce "unnecessary" ED visits to encourage primary care over ED utilization, existing barriers to primary care access should be addressed to avoid delay in acute care for Medicaid beneficiaries.

As the Patient Protection and Affordable Care Act is implemented, Medicaid enrollment is expected to increase

through expanded eligibility and streamlined enrollment procedures.[2] Traditionally, Medicaid beneficiaries have had difficulty obtaining a source of primary care.[10] We found that even among adults with established primary care providers, additional barriers to care further limit their ability to access primary care. Under the Patient Protection and Affordable Care Act, Medicaid reimbursements will be 100% of Medicare in 2013 and 2014 (compared with current rates of 70%) to incentivize Medicaid acceptance and treatment by primary care physicians.[10] In the past, states have implemented policies to limit ED utilization by increased copayment.[11] For newly enrolled Medicaid beneficiaries, they will have a defined copayment consistent with Medicaid reimbursements—compared with the potential of a relatively substantive ED bill. The increased demand, in the setting of limited number and availability of primary care providers, may also further reduce access to timely primary care among existing Medicaid beneficiaries. After this transition period of higher reimbursements, regression of reimbursement levels may additionally contribute to Medicaid beneficiaries' difficulty in establishing and accessing primary care.

Although one factor is the overall shortage of primary care providers, solutions to improve primary care utilization extend beyond the supply and availability of primary care providers. Community health centers have been demonstrated to be effective at reducing ED visits and inpatient hospitalization.[12] The Patient Protection and Affordable Care Act's increased funding of community health centers might be well used to expand hours and improve convenience of locations so that primary care is more accessible. Indeed, patients in primary care clinics with better evening-hour availability may have fewer ED visits.[13]

In summary, expansion of Medicaid eligibility alone may not be sufficient to improve health care access. Barriers to timely primary care, along with associated ED visits, were higher among Medicaid beneficiaries. In addition, Medicaid beneficiaries were particularly susceptible to having barriers even when they did have a source of primary care. Consequently, unless there is improved primary care availability and access, the ED will continue to serve as an increasingly important venue for acute care of Medicaid beneficiaries.

REFERENCES

1. The Patient Protection and Affordable Care Act. Pub L No. 111–148. 124 Stat 119 through 124 Stat 1025.
2. Sommers BD, Epstein AM. Medicaid expansion—the soft underbelly of health care reform? *N Engl J Med.* 2010;363:2085-2087.
3. Cheung PT, Wiler JL, Ginde AA. Changes in barriers in primary care and emergency department utilization. *Arch Intern Med.* 2011;171:1397-1399.
4. Pitts SR, Carrier ER, Rich EC, et al. Where Americans get acute care: increasingly, it's not at their doctor's office. *Health Aff (Millwood).* 2010;29:1620-1629.
5. Lowe RA, Fu R, Ong ET, et al. Community characteristics affecting emergency department use by Medicaid enrollees. *Med Care.* 2009;47:15-22.
6. Billings J, Mijanovich T. Improving the management of care for high-cost Medicaid patients. *Health Aff (Millwood).* 2007;26:1643-1654.
7. Smulowitz PB, Lipton R, Wharam JF, et al. Emergency department utilization after the implementation of Massachusetts health reform. *Ann Emerg Med.* 2011;58:225-234.
8. Finklestein A, Baicker K. The effects of Medicaid coverage—learning from the Oregon experiment. *N Engl J Med.* 2011;365:683-685.
9. Cunningham PJ, May JH. Medicaid patients increasingly concentrated among physicians. Available at: http://hschange.org/CONTENT/866/866.pdf. Accessed December 15, 2011.
10. Cunningham P. State variation in primary care physician supply: implications for health reform Medicaid expansions. Available at: http://www.rwjf.org/coverage/product.jsp?id=72046. Accessed December 15, 2011.
11. Centers for Medicare & Medicaid Services. Deficit Reduction Act of 2005. Available at: http://www.cms.gov/DeficitReductionAct. Accessed December 15, 2011.
12. Rothkopf J, Brookler K, Wadhwa S, et al. Medicaid patients seen at federally qualified health centers use hospital services less than those seen by private providers. *Health Aff (Millwood).* 2011;30:1335-1342.
13. Lowe RA, Localio AR, Schwarz DG, et al. Association between primary care practice characteristics and emergency department use in a Medicaid managed care organization. *Med Care.* 2005;43:792-800.

Table E1. Adjusted ORs of reporting 1 or more barriers to timely primary care and 1 or more ED visits within the past 12 months, excluding Medicare beneficiaries from the Medicaid and private insurance groups.

Characteristics	≥1 Barrier, Model n=176,068, Adjusted OR (95% CI)*	≥1 ED Visit, Model n=176,047, Adjusted OR (95% CI)[†]
Covariates of primary interest		
Barriers to timely primary care (private insurance)	NA	
None		Referent
1 barrier		1.28 (1.19–1.37)
≥2 barriers		1.49 (1.37–1.61)
Medicaid versus private insurance (no barriers)	1.40 (1.29–1.53)	1.58 (1.48–1.68)
Medicaid and barriers to timely primary care interaction	NA	
Medicaid and 1 barrier (vs private and 1 barrier)		1.81 (1.52–2.16)[†]
Medicaid and ≥2 barriers (vs private and ≥2 barriers)		2.28 (1.90–2.73)[§]
No defined source of primary care	1.27 (1.18–1.35)	NA
Demographics		
Age, y		
18–44	Referent	Referent
45–64	0.87 (0.84–0.91)	0.64 (0.62–0.67)
≥65	0.63 (0.53–0.74)	0.56 (0.49–0.63)
Female sex	1.35 (1.29–1.41)	0.88 (0.86–0.91)
Race/ethnicity		
Non-Hispanic white	Referent	Referent
Non-Hispanic black	0.87 (0.81–0.94)	0.93 (0.88–0.99)
Hispanic	0.87 (0.79–0.95)	1.29 (1.21–1.37)
Non-Hispanic Asian	1.18 (1.05–1.33)	0.77 (0.69–0.87)
Other	1.23 (1.04–1.45)	1.02 (0.88–1.17)
Census region		
Northeast	Referent	Referent
Midwest	1.21 (1.12–1.31)	1.00 (0.96–1.06)
South	1.14 (1.07–1.23)	0.96 (0.92–1.01)
West	1.43 (1.33–1.54)	0.93 (0.89–0.98)
Born in the United States	1.03 (0.96–1.11)	1.16 (1.10–1.22)
Socioeconomic status		
Currently employed	1.08 (1.03–1.14)	0.94 (0.90–0.97)
Poverty income ratio		
<1.0	Referent	Referent
1.0–1.9	0.89 (0.82–0.97)	0.98 (0.91–1.05)
2.0–3.9	0.85 (0.78–0.93)	0.88 (0.83–0.94)
≥4.0	0.86 (0.79–0.93)	0.74 (0.70–0.80)
Unknown	0.69 (0.63–0.76)	0.76 (0.70–0.81)
Education		
<High school	Referent	Referent
High school graduate	0.93 (0.87–0.99)	0.90 (0.85–0.95)
>High school	1.13 (1.06–1.21)	0.82 (0.78–0.87)
Health conditions		
Health status		
Excellent to very good	Referent	Referent
Good	1.38 (1.31–1.44)	1.20 (1.16–1.25)
Fair to poor	1.90 (1.77–2.04)	1.74 (1.64–1.85)
Body mass index, kg/m²		
<20	Referent	Referent
20–24.9	1.00 (0.92–1.09)	1.00 (0.93–1.09)
25–29.9	1.05 (1.00–1.11)	1.03 (0.99–1.07)
≥30	1.11 (1.05–1.16)	1.11 (1.06–1.16)
Alcohol use		
Lifetime abstainer	Referent	Referent
Former drinker	1.31 (1.21–1.42)	1.04 (0.98–1.10)
Current drinker	1.59 (1.48–1.70)	1.04 (0.99–1.09)
Cigarette use		
Never smoker	Referent	Referent
Current, every day	1.16 (1.11–1.22)	1.38 (1.33–1.44)
Former smoker	1.04 (0.99–1.10)	1.10 (1.05–1.14)

Table E1. Continued.

Characteristics	≥1 Barrier, Model n=176,068, Adjusted OR (95% CI)*	≥1 ED Visit, Model n=176,047, Adjusted OR (95% CI)[†]
Hypertension	1.06 (1.00–1.12)	0.97 (0.93–1.02)
Diabetes	0.93 (0.85–1.03)	1.03 (0.98–1.08)
Coronary artery disease	1.22 (1.10–1.36)	1.04 (0.98–1.11)
Stroke	1.28 (1.08–1.52)	1.56 (1.43–1.69)
Asthma	1.42 (1.35–1.50)	1.71 (1.52–1.91)
Cancer	1.02 (0.94–1.11)	1.37 (1.31–1.44)
Outpatient care utilization		
Number of outpatient visits in the past 12 mo		
None	Referent	Referent
1	1.40 (1.28–1.53)	2.10 (1.94–2.26)
2–3	1.99 (1.84–2.15)	2.92 (2.74–3.11)
≥4	2.81 (2.60–3.04)	5.60 (5.27–5.95)
Survey year		
1999	Referent	Referent
2000	1.32 (1.21–1.44)	1.24 (1.16–1.32)
2001	1.49 (1.38–1.62)	1.19 (1.11–1.27)
2002	1.28 (1.17–1.40)	1.21 (1.13–1.29)
2003	1.12 (1.02–1.22)	1.22 (1.14–1.30)
2004	1.38 (1.26–1.51)	1.27 (1.18–1.37)
2005	1.36 (1.23–1.49)	1.20 (1.12–1.29)
2006	1.31 (1.18–1.46)	1.24 (1.15–1.35)
2007	1.43 (1.30–1.57)	1.22 (1.13–1.33)
2008	1.47 (1.32–1.63)	1.16 (1.07–1.26)
2009	1.63 (1.48–1.80)	1.16 (1.07–1.26)

*Goodness of fit P=.37.
[†]Goodness of fit P=.57.
[†]P for interaction term=.12.
[§]P for interaction term <.001.