

HEALTH CARE REFORM

Health Insurance Status Change and Emergency Department Use Among US Adults

Adit A. Ginde, MD, MPH; Robert A. Lowe, MD, MPH; Jennifer L. Wiler, MD, MBA

Background: Recent events have increased the instability of health insurance coverage. We compared emergency department (ED) use by newly insured vs continuously insured adults and by newly uninsured vs continuously uninsured adults.

Methods: We analyzed 159 934 adult respondents to the 2004 through 2009 National Health Interview Survey. Health insurance status was categorized as newly insured (currently insured but lacked health insurance at some point during the prior 12 months) vs continuously insured and as newly uninsured (currently uninsured but had health insurance at some point during the prior 12 months) vs continuously uninsured. We analyzed the number of ED visits during the prior 12 months using multivariable Poisson regression.

Results: Overall, 20.7% of insured adults and 20.0% of uninsured adults had at least 1 ED visit. However, 29.5% of newly insured adults compared with 20.2% of continuously insured adults had at least 1 ED visit. Similarly, 25.7% of newly uninsured adults compared

with 18.6% of continuously uninsured adults had at least 1 ED visit. After adjusting for demographics, socioeconomic status, and health status, recent health insurance status change was independently associated with greater ED use for newly insured adults (incidence rate ratio [IRR], 1.32; 95% CI, 1.22-1.42 vs continuously insured adults) and for newly uninsured adults (IRR, 1.39; 95% CI, 1.26-1.54 vs continuously uninsured adults). Among newly insured adults, this association was strongest for Medicaid beneficiaries (IRR, 1.45) but was attenuated for those with private insurance (IRR, 1.24) ($P < .001$ for interaction).

Conclusions: Recent changes in health insurance status for newly insured adults and for newly uninsured adults were associated with greater ED use. As policy and economic forces create disruptions in health insurance status, new surges in ED use should be anticipated.

Arch Intern Med. 2012;172(8):642-647.

Published online March 26, 2012.

doi:10.1001/archinternmed.2012.34

Author Affiliations:
Department of Emergency Medicine, University of Colorado School of Medicine, Aurora (Drs Ginde and Wiler); and Departments of Medical Informatics and Clinical Epidemiology, Emergency Medicine, and Public Health and Preventive Medicine, Oregon Health and Science University, Portland (Dr Lowe).

THE UNITED STATES IS FACING increased instability in health insurance coverage.¹ Government efforts to expand health insurance coverage, including the 2010 Patient Protection and Affordable Care Act,² seek to enhance access to primary care and to reduce potentially preventable emergency department (ED) visits and hospitalizations. However, providing insurance to previously uninsured individuals may effect a paradoxical increase in health care use by creation of a “moral hazard” or by increased use of services that had been previously deferred.^{3,4} In addition, economic recession, with higher rates of unemployment and transient employment, along with entitlement program cutbacks, create a population of newly uninsured individu-

als who have abruptly reduced access to acute and primary care.⁵

This type of health insurance “churning” results in populations of newly insured and newly uninsured individuals, who for different reasons can struggle with access to outpatient care and may turn to EDs for medical services.^{6,7} The ED is an

*For editorial comment
see page 609*

important bellwether for access to care, the most common venue for acute care, and the most frequent source of inpatient admissions⁸; changes in ED use are an important indicator of health care system performance. Prior studies⁹⁻¹³ have demonstrated that ED use was higher among uninsured or underinsured populations

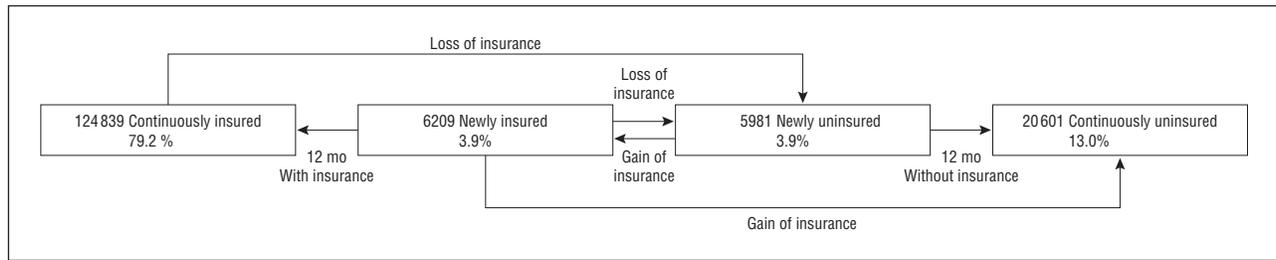


Figure. The relationships and prevalences of 4 primary comparison health insurance status groups among the US population. Percentages are population weighted.

facing barriers to outpatient care, including financial and geographic ones, and limited access to primary care services. In addition, newly insured individuals may no longer face a financial disincentive to seek care. If barriers reduce access to traditional sources of primary care, these individuals may be more likely to use ED services than when they were uninsured. Recent legislation and economic recession are likely to increase health insurance instability. To our knowledge, the potential effect of such changes in health insurance status on the use of EDs, many of which are already crowded, has not been previously studied.

The objective of this study was to compare ED use patterns among newly insured vs continuously insured adults and among newly uninsured vs continuously uninsured adults. Based on findings of prior investigations that suggest a change in overall health care use with gain⁴ or loss⁵ of insurance, we hypothesized that changes in health insurance status (recent gain or loss of coverage) would be associated with increased ED use.

METHODS

STUDY DESIGN

The National Center for Health Statistics conducts the National Health Interview Survey (NHIS), a cross-sectional household interview survey of a sample of respondents that approximates the noninstitutionalized US civilian population. The NHIS has been conducted annually since 1957, with the most recently available data being from 2009. We received a waiver from our institutional review board to analyze publicly available NHIS data from 2004 through 2009.

DATA COLLECTION

Details of NHIS survey methods are described elsewhere.^{14,15} Briefly, the sample is obtained using a stratified multistage probability study design with oversampling of certain subgroups, including racial/ethnic minorities and older adults. The NHIS uses a 2-stage sampling strategy covering geographic primary sampling units, with a primary sampling unit defined as a county, a small group of contiguous counties, or a metropolitan statistical area. For each primary sampling unit, second-stage units are used, composed of area and permit segments expected to contain 8 to 16 addresses.

From 2004 through 2009, the NHIS collected household interview data, including demographics, health status, and health care use, for 159 934 adults (≥18 years), who represent an annualized US population of 222 million. The annual response

rate of the NHIS is approximately 90% of the eligible households in the sample. Strategies for sampling, methods for data collection, and survey questions were similar throughout the selected NHIS years to maintain consistency and to facilitate comparisons.

VARIABLES

The primary predictor variables were health insurance type and recent changes in health insurance status. We considered adults who reported private insurance with or without any other health insurance type as having private insurance and those reporting Medicaid with or without Medicare as having Medicaid. We considered adults who reported having only Medicare coverage, without private insurance or Medicaid, as having Medicare only. We considered adults who did not report private, Medicaid, or Medicare coverage but reported another health insurance type (eg, other public or military) as having other insurance. We considered adults who reported no current health insurance coverage as being uninsured.

We categorized adults with some current form of health insurance as newly insured if they reported a lack of health insurance coverage at some point during the prior 12 months. Conversely, continuously insured adults had health insurance without disruption during the prior 12 months. We categorized adults without current insurance as newly uninsured if they reported having some form of health insurance coverage during the prior 12 months. Conversely, continuously uninsured adults did not have health insurance at any point during the prior 12 months. In a secondary analysis, we also evaluated the “dose response” for intervals up to 3 years since last having insurance. The relationships and population prevalences of these 4 primary comparison groups are shown in the **Figure**. We compared these groups to measure the association with the primary outcome of ED use, assessed by the question, “During the past 12 months, how many times have you gone to a hospital emergency room about your own health (this includes emergency room visits that resulted in a hospital admission)?” Possible answers were none, 1, 2 to 3, 4 to 5, 6 to 7, 8 to 9, 10 to 12, 13 to 15, or 16 or more; refused to answer; or “don’t know.”

The primary associations were adjusted by potential confounding variables, including demographics (age, sex, race/ethnicity, and US Census region), socioeconomic status (poverty income ratio and education), and health status, as listed in **Table 1**. The poverty income ratio is the ratio of the observed family income category to the family’s appropriate poverty threshold set by the US Census Bureau. Self-reported health status was measured by the question, “Would you say your health in general is excellent, very good, good, fair, or poor?” We also included body mass index, alcohol use, cigarette use, and chronic health conditions (hypertension, diabetes mellitus, coronary artery disease, stroke, asthma, and cancer), selected based on their high prevalence and potential for increased ED use.

Table 1. Characteristics of US Adults With and Without Recent Changes in Health Insurance Status

Characteristic	% (95% CI)			
	Continuously Insured	Newly Insured	Newly Uninsured	Continuously Uninsured
Demographics				
Age, y				
18-44	43.9 (43.4-44.4)	75.2 (73.9-76.4)	77.5 (76.1-78.8)	70.4 (69.5-71.3)
45-64	35.8 (35.3-36.2)	22.5 (21.2-23.7)	22.2 (20.9-23.6)	28.8 (27.9-29.6)
≥65	20.3 (19.9-20.7)	2.4 (2.0-2.8)	0.3 (0.2-0.5)	0.9 (0.7-1.0)
Female sex	53.0 (52.6-53.4)	55.6 (54.0-57.1)	51.3 (49.6-52.9)	43.7 (42.9-44.6)
Race/ethnicity				
Non-Hispanic white	74.5 (74.0-75.1)	68.4 (66.9-69.9)	57.4 (55.7-59.0)	47.4 (46.1-48.7)
Non-Hispanic black	10.9 (10.5-11.3)	13.5 (12.5-14.7)	17.4 (16.3-18.5)	13.3 (12.5-14.1)
Hispanic	9.4 (9.1-9.8)	14.0 (13.0-15.1)	20.4 (19.0-21.8)	34.6 (33.4-35.9)
Non-Hispanic Asian	4.7 (4.5-4.8)	3.5 (3.0-4.1)	4.3 (3.7-4.9)	4.1 (3.7-4.5)
Other	0.5 (0.4-0.6)	0.6 (0.3-1.0)	0.6 (0.4-1.0)	0.7 (0.5-0.9)
US Census region				
Northeast	19.1 (18.5-19.7)	16.4 (15.0-17.9)	13.0 (11.9-14.2)	11.3 (10.4-12.2)
Midwest	25.2 (24.3-26.0)	25.3 (23.4-27.3)	22.0 (20.5-23.5)	18.0 (16.9-19.1)
South	34.8 (34.0-35.7)	35.4 (33.4-37.4)	42.2 (40.3-44.1)	45.1 (43.6-46.5)
West	20.9 (20.3-21.6)	23.0 (21.4-24.6)	22.8 (21.4-24.3)	25.7 (24.4-27.1)
Socioeconomic Status				
Poverty income ratio				
<1.0	7.3 (6.9-7.6)	16.4 (15.2-17.6)	16.6 (15.5-17.7)	21.2 (20.4-21.9)
1.0-1.9	11.5 (11.2-11.8)	21.9 (20.7-23.2)	23.7 (22.3-25.0)	28.0 (27.2-28.8)
2.0-3.9	24.5 (24.1-24.8)	29.2 (27.7-30.8)	29.9 (28.4-31.4)	23.2 (22.4-24.0)
≥4.0	37.7 (37.1-38.3)	20.3 (19.0-21.7)	15.2 (13.9-16.5)	8.0 (7.5-8.6)
Unknown	19.1 (18.6-19.5)	12.2 (11.2-13.3)	14.7 (13.6-15.9)	19.7 (18.9-20.5)
Education				
<High school graduate	13.1 (12.8-13.5)	14.3 (13.3-15.4)	20.0 (18.7-21.5)	33.3 (32.2-34.5)
High school graduate	27.6 (27.2-28.0)	27.3 (26.0-28.7)	33.3 (31.8-34.9)	34.2 (33.3-35.2)
Some college	29.5 (29.2-29.9)	36.6 (35.0-38.3)	32.9 (31.5-34.4)	23.8 (23.0-24.6)
≥Bachelor's degree	29.8 (29.2-30.3)	21.7 (20.4-23.2)	13.8 (12.7-14.9)	8.7 (8.2-9.2)
Health Status				
Health status				
Excellent or very good	61.8 (61.4-62.3)	59.7 (58.2-61.3)	61.8 (60.1-63.3)	56.1 (55.2-57.0)
Good	25.3 (25.0-25.7)	27.4 (25.9-28.9)	27.5 (26.0-29.0)	31.1 (30.2-31.9)
Fair or poor	12.8 (12.6-13.1)	12.9 (12.0-13.9)	10.8 (9.9-11.7)	12.9 (12.3-13.5)
Body mass index ^a				
<20	5.8 (5.7-6.0)	7.1 (6.3-8.0)	7.4 (6.5-8.5)	6.3 (5.8-6.8)
20-24.9	32.7 (32.4-33.1)	33.3 (31.8-34.8)	31.5 (30.1-33.1)	33.7 (32.8-34.6)
25-29.9	35.7 (35.3-36.0)	30.9 (29.3-32.5)	33.0 (31.5-34.6)	34.2 (33.3-35.0)
≥30	25.8 (25.5-26.2)	28.7 (27.3-30.2)	28.0 (26.6-29.5)	25.9 (25.1-26.8)
Alcohol use				
Lifetime abstainer	22.5 (22.0-22.9)	16.8 (15.5-18.1)	23.7 (22.3-25.1)	28.0 (27.1-28.9)
Former drinker	15.2 (14.9-15.6)	12.8 (11.7-13.9)	10.9 (10.0-11.9)	12.6 (12.0-13.2)
Current drinker	62.3 (61.8-62.8)	70.5 (68.9-72.0)	65.4 (63.8-67.0)	59.4 (58.5-60.4)
Cigarette use				
Never smoker	58.9 (58.5-59.4)	50.2 (48.5-51.9)	53.9 (52.1-55.7)	54.5 (53.6-55.5)
Current everyday smoker	23.7 (23.3-24.1)	18.1 (16.8-19.5)	12.6 (11.6-13.7)	12.2 (11.7-12.8)
Former smoker	17.4 (17.1-17.7)	31.8 (30.1-33.4)	33.5 (31.8-35.2)	33.3 (32.3-34.1)
Chronic health condition				
Hypertension	26.4 (26.1-26.8)	16.1 (15.0-17.3)	12.4 (11.5-13.4)	12.5 (11.8-13.1)
Diabetes mellitus	8.8 (8.5-9.0)	5.4 (4.8-6.1)	4.5 (3.9-5.3)	4.5 (4.2-4.9)
Coronary artery disease	7.4 (7.2-7.6)	3.1 (2.6-3.7)	2.7 (2.2-3.2)	2.5 (2.3-2.8)
Stroke	3.0 (2.9-3.1)	1.6 (1.2-2.0)	1.0 (0.7-1.3)	1.0 (0.8-1.1)
Asthma	7.4 (7.2-7.6)	8.9 (8.1-9.9)	7.6 (6.8-8.6)	5.6 (5.2-6.1)
Cancer	8.7 (8.5-9.0)	4.0 (3.5-4.6)	3.0 (2.5-3.5)	2.6 (2.4-2.9)

^aCalculated as weight in kilograms divided by height in meters squared.

STATISTICAL ANALYSIS

Survey commands were used to adjust for the complex survey design and to weight the sample to provide estimates for the US population. The descriptive analyses included prevalence (95% CI). We used multivariable Poisson regression analysis

to adjust the primary associations for demographics, socioeconomic status, and health status variables, with results presented as adjusted incidence rate ratios. Because data for the primary outcome of ED use had unequal ordinal group sizes, we used midpoint estimates from each category (eg, 4-5 visits was coded as 4.5 visits) to perform the multivariable analyses.

Table 2. Association Between Health Insurance Type and the Likelihood of Being Newly Insured

Health Insurance Type	Newly Insured, % (95% CI) ^a	Adjusted Odds Ratio (95% CI) ^b
Private	4.1 (4.0-4.3)	1 [Reference]
Medicaid	11.9 (11.1-12.7)	2.02 (1.80-2.26)
Medicare only	1.5 (1.3-1.7)	1.08 (0.90-1.30)
Other	8.8 (7.8-9.8)	1.58 (1.37-1.81)

^aDefined as currently insured but lacked health insurance at some point during the prior 12 months.

^bAdjusted for demographics, socioeconomic status, and health status. Boldface denotes $P < .05$.

Subgroup models evaluated the association between recent insurance and ED use by health insurance type, with interaction terms added to assess the statistical significance of the health insurance type \times recent insurance interaction. Two-tailed $P < .05$ was considered statistically significant. We performed statistical analyses using commercially available software (STATA 10.1; StataCorp LP).

RESULTS

CURRENTLY INSURED vs CURRENTLY UNINSURED ADULTS

Most respondents (83.1%; 95% CI, 82.8%-83.4%) reported having insurance at the time of the survey, while 16.9% (95% CI, 16.6%-17.2%) were uninsured. Overall, 13.1% (95% CI, 12.9%-13.3%) reported 1 ED visit, 5.4% (95% CI, 5.3%-5.6%) reported 2 to 3 ED visits, and 2.0% (95% CI, 1.9%-2.1%) reported at least 4 ED visits during the prior 12 months. The unadjusted proportion with at least 1 ED visit was similar for insured adults (20.7%) and uninsured adults (20.0%). After controlling for covariates, the number of ED visits remained similar for insured adults and uninsured adults (adjusted incidence rate ratio, 1.05; 95% CI, 1.00-1.12).

NEWLY INSURED vs CONTINUOUSLY INSURED ADULTS

Private insurance was the most common health insurance type (representing 80.4% of those with insurance), followed by Medicaid (8.1%), Medicare only (8.1%), and other (3.4%). Of currently insured respondents, 95.3% were continuously insured during the prior 12 months, and 4.7% were newly insured. The characteristics of newly insured adults compared with continuously insured adults are summarized in Table 1. Newly insured adults were more likely to be younger, represent racial/ethnic minority groups, and have lower income and were less likely to have common chronic health conditions. Adults with Medicaid coverage were most likely to be newly insured, although 88.1% of Medicaid enrollees were continuously insured during the prior 12 months (**Table 2**).

Adults with Medicaid coverage had the highest adjusted ED use during the prior 12 months, while those with private insurance had the lowest (**Table 3**, model 1). Even after adjusting for health insurance type and other

Table 3. Emergency Department (ED) Use Among Insured Adults by Health Insurance Type and Duration With Insurance Coverage

Variable ^a	≥ 1 ED Visit, % (95% CI)	Incidence Rate Ratio (95% CI) ^b
Model 1		
Health insurance type ^c		
Private	17.8 (17.5-18.2)	1 [Reference]
Medicaid	39.8 (38.7-40.9)	1.69 (1.59-1.81)
Medicare only	26.8 (25.7-27.8)	1.20 (1.12-1.29)
Other	27.4 (25.8-29.0)	1.46 (1.32-1.62)
Category		
Newly insured	29.5 (28.0-31.0)	1.32 (1.22-1.42)
Continuously insured	20.2 (19.9-20.6)	1 [Reference]
Model 2		
Private insurance		
Newly insured	22.3 (20.7-24.0)	1.24 (1.11-1.38)
Continuously insured	17.6 (17.3-18.0)	1 [Reference]
Model 3		
Medicaid		
Newly insured	52.5 (49.2-55.9)	1.45 (1.27-1.64)
Continuously insured	38.2 (37.0-39.4)	1 [Reference]
Model 4		
Medicare only		
Newly insured	37.1 (28.6-46.4)	1.02 (0.75-1.38)
Continuously insured	26.7 (25.6-27.7)	1 [Reference]
Model 5		
Other insurance		
Newly insured	31.8 (26.5-37.5)	0.88 (0.69-1.13)
Continuously insured	27.0 (25.3-28.7)	1 [Reference]

^aNewly insured is defined as currently insured but lacked health insurance at some point during the prior 12 months. Continuously insured is defined as having health insurance without disruption for at least 12 months.

^bMultivariable Poisson regression analysis of the number of ED visits during the prior 12 months, adjusted for demographics, socioeconomic status, and health status. Boldface denotes $P < .05$.

^c P values for interaction are as follows: Medicaid \times private insurance ($P < .001$), Medicaid \times Medicare only ($P = .04$), and Medicaid \times other insurance ($P < .001$).

covariates, newly insured adults had 31.7% higher ED use than continuously insured adults. In subgroup analyses, this association between duration of insurance coverage and ED use was strongest among Medicaid enrollees (Table 3, model 3) but was attenuated among adults with private insurance and among those with Medicare only (Table 3, models 2 and 4; $P < .001$ and $P = .04$, respectively, for interaction).

NEWLY UNINSURED vs CONTINUOUSLY UNINSURED ADULTS

Of adults without current insurance, 23.3% were newly uninsured and 76.7% were continuously uninsured during the prior 12 months. The characteristics of newly uninsured adults compared with continuously uninsured adults are summarized in Table 1. Newly uninsured adults were more likely to be younger, female, and of higher

Table 4. Emergency Department (ED) Use Among Uninsured Adults by Duration Without Insurance Coverage

Duration Without Insurance Coverage	≥1 ED Visit, % (95% CI)	Incidence Rate Ratio (95% CI) ^a
Model 1		
Category		
Newly uninsured, ≤12 mo	25.7 (24.3-27.0)	1.39 (1.26-1.54)
Continuously uninsured, >12 mo	18.6 (17.9-19.3)	1 [Reference]
Model 2		
Detailed		
≤6 mo	27.2 (25.4-29.1)	1.58 (1.31-1.90)
>6 mo to 12 mo	23.5 (21.3-25.8)	1.24 (1.01-1.53)
>12 mo to 3 y	21.4 (20.0-22.8)	1.07 (0.90-1.27)
>3 y	20.7 (19.6-21.8)	1.02 (0.86-1.21)
Never insured	13.1 (12.1-14.3)	1 [Reference]

^aMultivariable Poisson regression analysis of the number of ED visits during the prior 12 months, adjusted for demographics, socioeconomic status, and health status. Boldface denotes $P < .05$.

socioeconomic status and were less likely to represent racial/ethnic minority groups. Common health conditions were similar between the 2 groups except that asthma was more prevalent among the newly uninsured.

Newly uninsured adults had 39.3% higher adjusted ED use than continuously uninsured adults (**Table 4**, model 1). Further stratification by duration without insurance coverage demonstrated a dose-response relationship, with ED use being most likely within 6 months of losing insurance and being least likely among adults who lost insurance more than 3 years ago or who never had insurance (Table 4, model 2).

COMMENT

While the more than 46 million uninsured individuals are increasingly blamed for rising ED visit volumes, the present study is consistent with previous studies^{6,16} finding that uninsured Americans have similar risk-adjusted ED visit use as insured individuals. However, we found that disruptions in health insurance status (recent gain or loss of insurance) were associated with greater ED use. Although in our study only 7.8% of US adults had changes in health insurance status during the prior 12 months, legislative and economic factors are poised to increase the frequency of recent gain or loss of insurance.

In theory, newly insured adults should have new access to primary care services for acute and preventive care needs, resulting in a decreased need for ED services; however, our results indicate increased use of ED services. One possible explanation is that, during the prior uninsured state, individuals may necessarily defer care, leading to a period of increased “catch-up” use of health care services.^{3,4} Also, reducing the financial barrier to care by obtaining health insurance without addressing other barriers to primary care may encourage patients to use the ED when there is a lack of access to other sites of care.¹⁷ As suggested by the Massachusetts experience, the overall number of ED visits has continued to increase with health insurance expansion.¹⁸ Indeed, the overall short-

age of primary care providers to care for the newly insured has further limited access to outpatient care, particularly adults with Medicaid coverage.¹⁹ However, under the 2010 Patient Protection and Affordable Care Act, some adults who may be mandated to purchase new health insurance will be young and in good health. The effect of new insurance coverage on ED use for these adults, who previously elected to forgo coverage, is unknown.

The current economic recession may also affect ED use by contributing to loss of (or transient) employment and instability of associated health insurance coverage. Prior evidence supports the concept that, in addition to possessing health insurance coverage, the consistency of insurance provision is particularly important for improving health outcomes and reducing the need for hospitalization through better access to outpatient services.²⁰ Indeed, prior gaps in health insurance coverage for Medicare beneficiaries have negative effects that seem to last for several years.^{21,22} Our results confirm that currently uninsured adults who had previously possessed health insurance coverage during the prior 12 months also had greater ED use. The newly uninsured, who previously had insurance and better access to primary care, may experience a sudden decrease in access to care and require EDs for medical services.²³ Another potential explanation is that newly uninsured individuals may have new health problems that cause loss of employment and insurance coverage,²⁴ resulting in increased ED use. In describing changes in ED use rates, we make no judgment as to whether these visits are in any way inappropriate.¹⁹ Indeed, increased use of EDs (and subsequent hospitalizations) may be a marker of an improvement in health care utilization.

Adults with Medicaid coverage are particularly vulnerable to transient health insurance coverage. Our results show that adults with Medicaid coverage were twice as likely as those with private insurance to have lacked insurance coverage during the prior 12 months and had 69.2% higher ED use, after adjusting for recent changes in health insurance status. Changes in state Medicaid eligibility criteria, as well as changes to individuals' Medicaid eligibility (eg, a new or higher-income job that causes individuals to exceed the Medicaid income threshold), are likely responsible for more frequent gaps in insurance coverage among this vulnerable population. Although the most common source of payment for ED visits is private insurance, prior data suggest that individuals with Medicaid coverage have rising ED visit rates per individual and account for most ED visit volume increases nationally.^{25,26} Our results also indicate that individuals newly enrolled in Medicaid had greater ED use than those newly enrolled in other forms of insurance. This is consistent with the greater challenges that Medicaid enrollees face in finding primary care providers who are willing to accept Medicaid, greater transportation and geographic barriers for lower-income patients, greater difficulty in leaving work or finding child care to attend outpatient appointments during business hours, and greater burden of comorbid illness.⁹⁻¹³

Implementation of the 2010 Patient Protection and Affordable Care Act is expected to increase health insurance coverage up to 94% of the US population by 2019,

primarily with Medicaid or Medicaid-like insurance, and will test the availability of primary care and the patient-centered medical home model.^{27,28} The effect of these changes and the anticipated increase in disruptions to health insurance coverage seem likely to lead to greater ED use.

Our study has some limitations. Using data from an existing national survey, we were limited to questions that were already in the survey and could not alter or add other questions. For example, not captured in the survey were prior health insurance type for newly uninsured adults, recent changes in health insurance type for insured adults, reasons for gain or loss of insurance coverage, and nature or severity of ED visits. The prevalence of these factors may change over time and influence ED use. In addition, reported associations may be confounded by unmeasured factors not included in the NHIS. Although the NHIS sampling method was designed to provide representative data for the US population, several subpopulations were not surveyed, including homeless and institutionalized individuals, who also tend to have higher ED use rates.²⁹ Although survey questions were validated before implementation and were thought to elicit reliable responses, the NHIS is based on self-reported data, and answers are subject to recall bias.

In conclusion, although adjusted ED use rates were similar for insured adults and uninsured adults, those with recent changes in health insurance status had greater ED use. Adults with new Medicaid coverage were disproportionately likely to use EDs, suggesting that their reduced out-of-pocket cost for care was not associated with increased access to primary care services. Because health policy changes and economic forces are expected to create disruptions in health insurance status, policy makers and health care administrators should anticipate new surges in ED use. Consistency in provision and health insurance type may improve access to primary care services and reduce patient reliance on ED services.

Accepted for Publication: December 3, 2012.

Published Online: March 26, 2012. doi:10.1001/archinternmed.2012.34

Correspondence: Adit A. Ginde, MD, MPH, Department of Emergency Medicine, University of Colorado School of Medicine, 12401 E 17th Ave, Mail Stop B-215, Aurora, CO 80045 (adit.ginde@ucdenver.edu).

Author Contributions: Dr Ginde had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. **Study concept and design:** Ginde. **Acquisition of data:** Ginde. **Analysis and interpretation of data:** Ginde, Lowe, and Wiler. **Drafting of the manuscript:** Ginde. **Critical revision of the manuscript for important intellectual content:** Ginde, Lowe, and Wiler. **Statistical analysis:** Ginde.

Financial Disclosure: None reported.

Previous Presentation: An abstract of this study was presented at the Society for Academic Emergency Medicine Annual Meeting; June 2, 2011; Boston, Massachusetts.

REFERENCES

- Centers for Disease Control and Prevention (CDC). Vital signs: health insurance coverage and health care utilization: United States, 2006-2009 and January-March 2010. *MMWR Morb Mortal Wkly Rep.* 2010;59(44):1448-1454.
- Patient Protection and Affordable Care Act. Pub L No. 111-148, 124 Stat 119-1025.
- Pauly MV. The economics of moral hazard. *Am Econ Rev.* 1968;58(3, pt 1):531-537.
- Saha S, Solotaroff R, Oster A, Bindman AB. Are preventable hospitalizations sensitive to changes in access to primary care? the case of the Oregon Health Plan. *Med Care.* 2007;45(8):712-719.
- Chernew M, Cutler DM, Keenan PS. Increasing health insurance costs and the decline in insurance coverage. *Health Serv Res.* 2005;40(4):1021-1039.
- Newton MF, Keirns CC, Cunningham R, Hayward RA, Stanley R. Uninsured adults presenting to US emergency departments: assumptions vs data. *JAMA.* 2008;300(16):1914-1924.
- DeLia D, Cantor J. Emergency department utilization and capacity. July 2009. Robert Wood Johnson Foundation research synthesis report 17. <http://www.rwjf.org/files/research/072109policysynthesis17.emergencyutilization.pdf>. Accessed September 10, 2011.
- Pitts SR, Carrier ER, Rich EC, Kellermann AL. Where Americans get acute care: increasingly, it's not at their doctor's office. *Health Aff (Millwood).* 2010;29(9):1620-1629.
- Billings J, Parikh N, Mijanovich T. Emergency department use in New York City: a substitute for primary care? *Issue Brief (Commonw Fund).* 2000;(433):1-5.
- Lowe RA, Localio AR, Schwarz DF, et al. Association between primary care practice characteristics and emergency department use in a Medicaid managed care organization. *Med Care.* 2005;43(8):792-800.
- Ludwick A, Fu R, Warden C, Lowe RA. Distances to emergency department and to primary care provider's office affect emergency department use in children. *Acad Emerg Med.* 2009;16(5):411-417.
- Lowe RA, Fu R, Ong ET, et al. Community characteristics affecting emergency department use by Medicaid enrollees. *Med Care.* 2009;47(1):15-22.
- Cheung PT, Wiler JL, Ginde AA. Changes in barriers to primary care and emergency department utilization. *Arch Intern Med.* 2011;171(15):1397-1399.
- Centers for Disease Control and Prevention. National Health Interview Survey. <http://www.cdc.gov/nchs/nhis.htm>. Accessed September 10, 2011.
- Adams PF, Martinez ME, Vickerie JL. Summary health statistics for the U.S. population: National Health Interview Survey, 2009. *Vital Health Stat 10.* 2010;(248):1-115.
- Weber EJ, Showstack JA, Hunt KA, et al. Are the uninsured responsible for the increase in emergency department visits in the United States? *Ann Emerg Med.* 2008;52(2):108-115.
- Devoe JE, Baez A, Angier H, Krois L, Edlund C, Carney PA. Insurance + access not equal to health care: typology of barriers to health care access for low-income families. *Ann Fam Med.* 2007;5(6):511-518.
- Smulowitz PB, Lipton R, Wharam JF, et al. Emergency department utilization after the implementation of Massachusetts health reform. *Ann Emerg Med.* 2011;58(3):225-234.e1.
- Lowe RA, Schull M. On easy solutions. *Ann Emerg Med.* 2011;58(3):235-238.
- Freeman JD, Kadiyala S, Bell JF, Martin DP. The causal effect of health insurance on utilization and outcomes in adults: a systematic review of US studies. *Med Care.* 2008;46(10):1023-1032.
- McWilliams JM, Meara E, Zaslavsky AM, Ayanian JZ. Use of health services by previously uninsured Medicare beneficiaries. *N Engl J Med.* 2007;357(2):143-153.
- McWilliams JM, Meara E, Zaslavsky AM, Ayanian JZ. Medicare spending for previously uninsured adults. *Ann Intern Med.* 2009;151(11):757-766.
- Rimsza ME, Butler RJ, Johnson WG. Impact of Medicaid disenrollment on health care use and cost. *Pediatrics.* 2007;119(5):e1026-e1032. <http://pediatrics.aappublications.org/content/119/5/e1026.long>. Accessed January 29, 2012.
- Kasper JD, Giovannini TA, Hoffman C. Gaining and losing health insurance: strengthening the evidence for effects on access to care and health outcomes. *Med Care Res Rev.* 2000;57(3):298-325.
- Sommers BD, Epstein AM. Medicaid expansion: the soft underbelly of health care reform? *N Engl J Med.* 2010;363(22):2085-2087.
- Tang N, Stein J, Hsia RY, Maselli JH, Gonzales R. Trends and characteristics of US emergency department visits, 1997-2007. *JAMA.* 2010;304(6):664-670.
- Congressional Budget Office. Letter to the Honorable Nancy Pelosi, Speaker, U.S. House of Representatives. <http://www.cbo.gov/ftpdocs/113xx/doc11379/AmendReconProp.pdf>. Accessed September 10, 2011.
- Rittenhouse DR, Shortell SM. The patient-centered medical home: will it stand the test of health reform? *JAMA.* 2009;301(19):2038-2040.
- Kushel MB, Perry S, Bangsberg D, Clark R, Moss AR. Emergency department use among the homeless and marginally housed: results from a community-based study. *Am J Public Health.* 2002;92(5):778-784.