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SPECIAL ARTICLE

Insurance Coverage of Emergency Care for Young Adults under Health Reform

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ABSTRACT

BACKGROUND

The Affordable Care Act (ACA) established nationwide eligibility for young adults 19 to 25 years of age to retain coverage under their parents' private health plans. We conducted a study to determine how the implementation of this provision changed rates of insurance coverage for young adults seeking medical care for major emergencies.

METHODS

We evaluated more than 480,000 nondiscretionary visits made to emergency departments from 2009 through 2011, as recorded in a large, geographically diverse data set of hospital claims, to estimate how the ACA provision affected private insurance coverage of such visits by young adults (19 to 25 years of age). To adjust for underlying trends in insurance coverage, we compared changes in the target age group with changes among adults 26 to 31 years of age, who were unaffected by the provision (control group).

RESULTS

After the ACA provision took effect, private coverage of nondiscretionary visits to emergency departments by young adults increased by 3.1 percentage points (95% confidence interval [CI], 2.3 to 3.9; relative increase, 5.2%; $P < 0.001$), as compared with similar visits in the control group. The percentage of visits by uninsured young adults also fell significantly (−1.7 percentage points; 95% CI, −2.8 to −0.7; relative decrease, 9.1%; $P < 0.001$). The rates of nondiscretionary visits that were covered by Medicaid or other nonprivate insurers remained relatively steady throughout the study period. The coverage expansion led to an estimated 22,072 visits to emergency departments by newly insured young adults and \$147 million in associated costs that were covered by private insurance plans during a 1-year period.

CONCLUSIONS

Enactment of the dependent-coverage provision was associated with a significant increase in the proportion of young adults who were protected from the financial consequences of a serious medical emergency. (Funded by the Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services.)

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IN 2009, MORE THAN ONE QUARTER OF adults in the United States between the ages of 18 and 34 years had no health insurance coverage.¹ There are several reasons for this. First, many young adults enter the workforce in relatively low-paying positions that do not include the offer of health insurance, and others pursue postsecondary education at institutions that do not offer affordable insurance. Second, because most young adults are healthy and have limited income, many opt not to purchase non-group coverage.^{2,3} Third, young adults are more likely to be unemployed than are older adults and therefore lack access to employer-sponsored coverage. In 2011, the unemployment rate for adults between the ages of 18 and 24 years (19.5%) was more than twice the rate for those between the ages of 25 and 64 years (8.3%).⁴

Lack of health insurance leaves young adults and their families financially vulnerable to the consequences of a major illness or injury.⁵ Data suggest that lack of insurance is also associated with restricted access to care.⁶ Finally, because federal law requires hospitals to provide emergency care to all in need, without regard for the ability to pay, reduced rates of insurance coverage increase the burden on hospitals for providing uncompensated care.⁷ Ultimately, these costs must be absorbed by health care providers or defrayed by shifting a portion of the cost to other payers.⁸

To address these problems, the Affordable Care Act (ACA)⁹ extended the age of eligibility for dependent coverage under parents' health insurance. As of September 23, 2010, all adults between the ages of 19 and 25 years in all states can obtain coverage under a parent's employer-sponsored or individually purchased health insurance plan. Previously, provisions for dependent coverage contained in state laws and health plan contracts were typically less generous than the ACA provision.¹⁰

Several studies have shown that the new law has decreased the number of uninsured young adults by increasing rates of private insurance coverage.^{11,12} One recent report on data from the Centers for Disease Control and Prevention (CDC) estimated that the ACA provision extended coverage to an additional 3.1 million young adults.¹³ Although these findings are encouraging, little is known about the role that the coverage expansion has played in providing financial

protection to individuals and health care providers. To fill in this knowledge gap, we conducted a study to determine whether the percentage of young adults covered by private insurance for nondiscretionary visits to emergency departments for serious conditions, such as long-bone fractures, dislocations, and intracranial injuries, increased after the implementation of the ACA provision.

Whether, when, and where a person seeks health care depend on a number of factors, including insurance status.^{14,15} Since the utilization of many types of health services changes when a person acquires insurance coverage, it can be challenging to determine whether expansion of coverage affects access and affordability. To address this problem, we narrowly focused our evaluation on a set of unpredictable and serious conditions for which patients would seek care in an emergency department, regardless of their insurance status. We focused on the proportion of visits covered by private insurance that were recorded after the dependent-coverage expansion, since such an approach would be less influenced by aggregate trends in emergency department utilization¹⁶ than would the absolute number of visits.

METHODS

DATA SOURCE

We obtained data for this study from the IMS Health Charge Data Master (CDM) database. The CDM contains adjudicated health insurance claims documenting care provided in a large, geographically diverse U.S. convenience sample of 392 nonfederal general hospitals providing short-term care. As compared with national data,¹⁷ the CDM overrepresents hospitals with more than 100 beds, hospitals in eastern states, and teaching hospitals. Conversely, it underrepresents hospitals in midwestern and western states. Our data extract included all visits to emergency departments made by adults 19 to 31 years of age from January 2009 through December 2011. It included information on the primary diagnosis, the payer, whether the visit resulted in an inpatient admission, and hospital characteristics (e.g., bed size, urban or rural location, teaching status, and Census region). To produce representative estimates for the nation, we weighted our data according to national data on nondis-

cretionary emergency department visits, using an approach described below.

STUDY SAMPLE

To formalize our concept of nondiscretionary emergency visits, we collaborated with two outside analysts from the Department of Health and Human Services. Thus, the total ad hoc panel of experts included one emergency medicine physician, two primary care physicians, four social scientists, and a health informatics expert. Using the *International Classification of Diseases, 9th Revision* (ICD-9), we identified candidate diagnoses that are associated with serious or painful illnesses and injuries and that are highly likely to prompt patients to seek care in an emergency department, regardless of their insurance status (Table 1). We removed diagnoses that were highly uncommon in this age group, such as myocardial infarction, and also removed ICD-9 codes that might be subject to substantial ambiguity in coding by physicians, which might introduce bias correlated with insurance status.

On the basis of this stringent definition, only 6% of emergency department visits by persons between the ages of 19 and 31 years met our inclusion criteria. After the exclusion of duplicative visits and those that lacked data regarding hospital characteristics, our final study sample contained records of 483,562 nondiscretionary emergency department visits by patients in this age range from January 1, 2009, to December 31, 2011.

We applied poststratification weights constructed from publicly available data^{17,18} to approximate a nationally representative sample of emergency department visits, as described in the Methods section in the Supplementary Appendix, available with the full text of this article at NEJM.org. The final weighted file represented 3.5 million nondiscretionary emergency department visits during the 3-year study period. Table 2 shows nationally weighted data for such visits according to age group (19 to 25 years and 26 to 31 years), sex, whether the visit resulted in a hospital admission, and payer type.

STATISTICAL ANALYSIS

To analyze the effects of coverage expansion among persons between the ages of 19 and 25 years (hereafter referred to as young adults), we compared their experience with that of persons

Table 1. Nondiscretionary Emergency Department Visits, According to Reason for Visit, 2009–2011.*

Reason for Visit and ICD-9 Codes	19–25 Yr of Age (N=1,986,578)	26–31 Yr of Age (N=1,486,203)
	no. (%)	
Fracture, 800–829	911,339 (45.9)	690,266 (46.4)
Poison — toxic effects, 960–989	321,398 (16.2)	252,006 (17.0)
Dislocation, 830–839	166,705 (8.4)	106,776 (7.2)
Intracranial injury, 850.11–854.19	153,728 (7.7)	88,308 (5.9)
Appendicitis, 540–542†	132,898 (6.7)	95,124 (6.4)
Foreign body, 870–871 and 930–939	120,640 (6.1)	102,692 (6.9)
Internal injury, 860–869.1	56,347 (2.8)	32,150 (2.2)
Ectopic pregnancy with rupture, 633†	42,676 (2.1)	47,263 (3.2)
Crush injury, 925–929.9	38,568 (1.9)	28,972 (1.9)
Bowel obstruction, 560†	20,353 (1.0)	22,121 (1.5)
Blood-vessel injury, 900–904.9	5,353 (0.3)	4,437 (0.3)
Other nondiscretionary condition‡	16,573 (0.8)	16,133 (1.1)

* Results were calculated after the application of post-stratification weights so that the sample would approximate the volume of visits to national emergency departments according to the categories of hospital region, urban or rural location, number of beds, and teaching status. Percentages may not total 100 because of rounding. ICD-9 denotes *International Classification of Diseases, 9th Revision*.

† This term denotes an illness category. All other codes denote injury categories.

‡ This category includes ICD-9 codes for intracranial hemorrhage (430–432), nerve injury (950–954), ovarian torsion (620.5), testicular torsion (608.2), third-degree burns (941.3–941.59, 942.3, 942.40–942.59, 943.30–943.59, 944.30–944.58, 945.30–945.59, 946.3, 946.4, 946.5, and 948.1–948.99), volvulus (537.3), and sepsis (995.91).

between the ages of 26 and 31 years, who were unaffected by this provision of the law (control group). To evaluate this natural experiment, we used a difference-in-differences approach,¹⁹ with adjustment for underlying trends under the assumption that those trends were not differentially associated with the groups under study. We relied on the difference-in-differences approach to adjust for trends in health insurance status that were unrelated to the dependent-coverage expansion. We considered a positive and statistically significant result of this analysis (a two-tailed significance level of 0.05 or less) to be evidence of greater financial protection for young adults and entities that assume liability for uncompensated care.

We determined that slightly older adults, between the ages of 26 and 31 years, would make a suitable control group, since they have similar health concerns and high rates of noncoverage.² However, because the ACA's expansion of depen-

Table 2. Nondiscretionary Emergency Department Visits, According to Sex, Primary Payer, and Subsequent Hospital Admission, 2009–2011.*

Variable	Age 19 to 25 Yr (N = 1,986,578)	Age 26 to 31 Yr (N = 1,486,203)
	no. (%)	
Sex†		
Female	719,424 (36.2)	587,386 (39.5)
Male	1,267,136 (63.8)	898,748 (60.5)
Primary payer		
Private insurance	1,226,041 (61.7)	863,687 (58.1)
Medicaid	300,626 (15.1)	241,230 (16.2)
Other insurance‡	121,993 (6.1)	124,607 (8.4)
No insurance§	337,918 (17.0)	256,679 (17.3)
Hospital admission		
Yes	409,336 (20.6)	323,065 (21.7)
No	1,577,242 (79.4)	1,163,138 (78.3)

* Results were calculated after the application of post-stratification weights so that the sample would approximate the volume of visits to national emergency departments according to the categories of hospital region, urban or rural location, number of beds, and teaching status. Percentages may not total 100 because of rounding.

† Data with respect to sex were missing for 13 visits.

‡ Other types of insurance included military coverage, Medicare, other public insurance sources, and worker's compensation.

§ This category included self-payment and charity care.

dent coverage did not apply to this older group, its use of emergency department care should be unaffected by this provision. The dependent-coverage provision took effect for insurance plan years beginning September 23, 2010. Many insurance plans, including those covering federal workers, have plan years that begin on January 1. In view of this timing, we defined the period before dependent coverage as January 2009 through August 2010 and the period after implementation of expanded dependent coverage as January 2011 through December 2011. We treated the period of September 2010 through December 2010 as a washout period that was excluded from the difference-in-differences analysis.

We defined a set of four dichotomous, dependent payer variables equal to 1 according to the primary source of payment for the visit: private insurance, Medicaid, other insurance (including worker's compensation, Medicare, military insurance, and miscellaneous sources of coverage), or no insurance (including self-pay and charity care). We estimated a linear probability model for each payer variable as a function of a difference-in-differences (treatment) indicator equal to 1 for visits by young adults after the

coverage expansion, after adjustment for hospital characteristics (including Census region, urban or rural location, bed-size category, and teaching status), sex, month of visit, age, and subsequent hospital admission (yes or no). Models were estimated with the use of Stata/MP 11 software. We clustered standard errors at the hospital level to allow for correlated visit-level errors. Linear-probability models yielded results similar to those produced by logistic-regression models.

Using the same method, we assessed the sensitivity of our results to assumptions about the existence of preexisting (and generally more restrictive²⁰⁻²²) state policies allowing dependent children to remain on their parents' health insurance plans after the age of 19 years, the length of the implementation period, and alternative age thresholds for the study treatment group.

As a final step, we used our difference-in-differences results to estimate the number and costs of additional emergency department visits that were covered by private insurance. We multiplied our estimate of the change in the proportion of privately insured visits (i.e., the private insurance difference-in-differences estimate) by the national volume of annual nondiscretionary emergency department visits by persons between the ages of 19 and 25 years in our weighted sample. We multiplied the resulting change in visits by the average cost of a nondiscretionary emergency department visit (as defined on the basis of the same nondiscretionary diagnostic codes as those used to construct the sample). Cost estimates were from the IMS Health CDM data and were calculated by applying hospital-specific cost-to-charge ratios to charges. The cost estimates included hospital costs for emergency department visits resulting in hospital admission.

RESULTS

EMERGENCY DEPARTMENT VISITS

Figure 1 shows the unadjusted trends in the proportion of nondiscretionary emergency department visits that were covered by private insurance or other payers from January 2009 through December 2011 for the two age groups. The trend in private payers shifted upward in January 2011 among young adults who were eligible for the dependent-coverage provision but was less pronounced among those in the control group. There was an absolute increase of 7.3 percentage

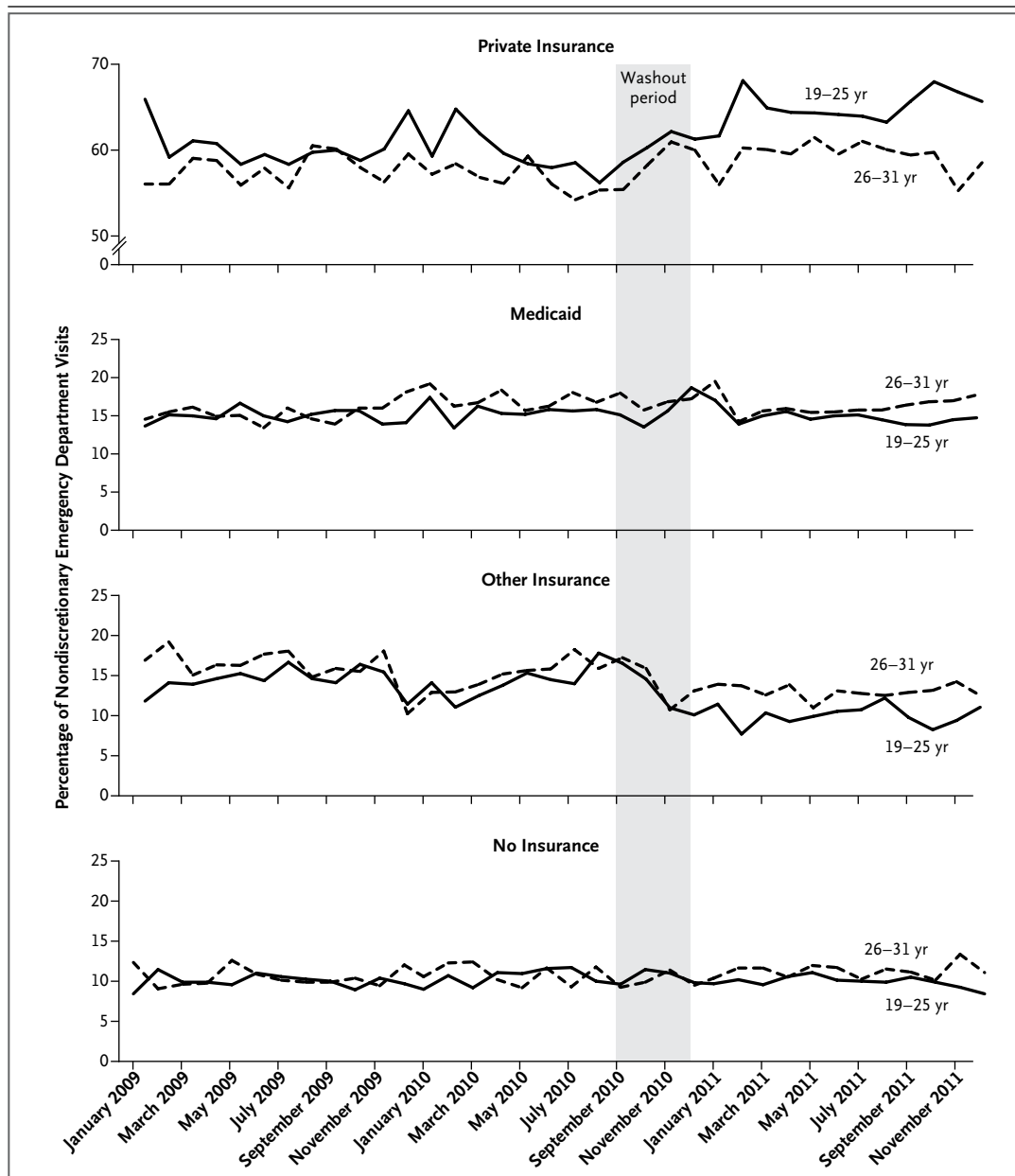


Figure 1. Percentage of Nondiscretionary Emergency Department Visits Covered by Various Types of Payers before and after Implementation of the Dependent-Coverage Provision.

Shown are comparisons of young adults between the ages of 19 and 25 years, who were eligible for inclusion in their parents' private insurance plans under the Affordable Care Act, with persons between the ages of 26 and 31 years, who were not eligible for this coverage. The shaded area from September 2010 through December 2010 indicates a washout period between enactment and full implementation of the dependent-coverage provision. The reported percentages reflect post-stratification weighting but have not been adjusted for covariates.

points in the proportion of nondiscretionary emergency department visits covered by a private primary payer from the second quarter of 2010 to the first quarter of 2011 among young adults.

Table 3 shows the change in the proportion of nondiscretionary emergency department visits

covered by insurance in the two age groups after implementation of the extended-coverage provision, according to the type of insurance, as well as difference-in-differences estimates for each payer category from the multivariate analysis. The proportion of nondiscretionary emergency

Table 3. Changes in the Proportion of Nondiscretionary Visits to Emergency Departments, According to Type of Insurance and Age Group, 2009–2011.*

Type of Insurance	Change from Baseline		Difference-in-Differences Estimate†
	19–25 Yr of Age	26–31 Yr of Age <i>percentage points</i>	
Private	5.0 (4.0 to 6.0)‡	2.0 (0.8 to 3.1)‡	3.1 (2.3 to 3.9)‡
Medicaid	-0.4 (-1.2 to 0.3)	0.2 (-0.7 to 1.1)	-0.6 (-1.6 to 0.3)
Other insurance	-0.0 (-0.6 to 0.4)	0.6 (0.0 to 1.3)§	-0.7 (-1.4 to -0.1)§
Uninsured	-4.5 (-5.3 to -3.7)‡	-2.9 (-3.8 to -1.9)‡	-1.7 (-2.8 to -0.7)‡

* Shown are changes in coverage (according to the type of insurance) before and after implementation of the extended-coverage provision in the two age groups and difference-in-differences estimates between the two groups. P values were calculated after the application of post-stratification weights.

† Difference-in-differences estimates were calculated with the use of a multivariate model.

‡ P<0.001.

§ P<0.05.

department visits covered by a private insurance payer increased by 5 percentage points among young adults (P<0.001), a finding that was consistent with the unadjusted trends shown in Figure 1. The difference-in-differences estimate of the expansion effect was an increase of 3.1 percentage points (95% confidence interval [CI], 2.3 to 3.9) in emergency department visits covered by a private payer, with a relative increase of 5.2% (P<0.001). The change in the proportion of nondiscretionary emergency department visits covered by Medicaid did not differ significantly in either of the two age groups. The difference-in-differences estimate for other insurance payers (-0.7 percentage points) was significant (P<0.05) but small enough to be of limited policy relevance. Identifying drivers of the results for other insurance payers was challenging, since the insurance programs in this category, including worker's compensation and means-tested insurance programs, vary across states. Visits for which there was no insurance payer declined significantly for the two age groups (P<0.001 for each within-group comparison), with a difference-in-differences estimate of -1.7 percentage points (95% CI, -2.8 to -0.7) and a relative decrease of 9.1% (P<0.001).

SENSITIVITY ANALYSES

Overall, our results were robust with respect to assumptions regarding the existence of preexisting state policies allowing dependent children to remain on parents' health insurance plans after

the age of 19 years, the length of the implementation period, and the age of those in the treatment group. Specifically, we found a positive difference-in-differences estimate (2.5 percentage points) for private payers, even in the 37 states that had dependent-coverage provisions before the implementation of the ACA (relative increase, 4.1%; P<0.001). Although the difference-in-differences estimate for private payers was larger in states without pre-ACA dependent-coverage provisions (4.3 percentage points; relative increase, 7.7%), the difference between estimates for states with and those without pre-ACA laws was not significant (P=0.41).

Results from a regression analysis that incorporated a 12-month washout period were similar to those from the analysis of private payers reported above, without a washout period (difference-in-differences coefficient, 2.6 percentage points; relative increase, 4.3%; P<0.001). Results were also similar across age subgroups — for example, a comparison of persons between the ages of 19 and 22 years (3.0 percentage points; relative increase, 4.9%; P<0.001) and those between the ages of 23 and 25 years (3.3 percentage points; relative increase, 5.7%; P<0.001). Finally, an analysis that excluded visits by 26-year-olds, who may have maintained (for at least some period of time) the private coverage they gained under the ACA provision, produced similar difference-in-differences estimates for private payers (3.4 percentage points; relative increase, 5.7%; P<0.001).

ECONOMIC EFFECT

Our main difference-in-differences result suggests that an additional 22,051 emergency department visits by young adults were paid for by private insurance in calendar year 2011, after the full implementation of the dependent-coverage provision. These additional visits represented \$147 million in hospital costs.

DISCUSSION

In this study of nationally representative hospital claims, we found that since the implementation of the ACA's provision allowing young adults between the ages of 19 and 25 years to remain on their parents' insurance plans, persons in this age group who had to visit the emergency department for treatment of a serious injury or illness were more likely to be insured than were adults between the ages of 26 and 31 years, who were not affected by the ACA's provision. The increase in the share of nondiscretionary visits covered by private insurance was 3.1 percentage points after adjustment for changes in insurance for the control group in order to remove bias from secular trends. In the two age groups, the proportion of nondiscretionary emergency department visits covered by Medicaid and other public insurers remained relatively steady throughout the study period, whereas the proportion of visits that were not covered by any insurance significantly declined.

Our findings are consistent with analyses of national survey data, which have shown estimates of gains in coverage ranging from roughly 3 percentage points^{22,23} to 10 percentage points,¹¹ depending on the data source and analytic approach used. Furthermore, our findings show changes not only in coverage but also in access to care and use of services, observations that are consistent with the results of another recent analysis of this provision.²⁴

On the basis of our narrow definition of a nondiscretionary emergency department visit, we estimated that the coverage expansion led to 22,072 additional emergency department visits that were covered by private insurance during calendar year 2011, as compared with 2009. Our estimates suggest that the ACA's provision resulted in the transfer of \$147 million in emergency department and hospital costs to private insurance pools. In the absence of the coverage expansion, some of these costs would have been

uncompensated and might have resulted in greater losses for hospitals and emergency care providers.

We acknowledge several limitations of our analysis. First, our weighted sample may differ from actual nondiscretionary emergency department visits by young adults, although our weighting approach based on national data improves generalizability. Second, the results of our analysis should be generalized with caution beyond the narrow set of nondiscretionary conditions for which care-seeking behavior was unlikely to be affected by implementation of the law. Third, our analysis is based on unadjudicated claims, some of which may ultimately have been covered by a payer other than the documented payer. However, there is no evidence that implementation of the dependent-coverage provision triggered a sudden, systematic change in claims processing or payment patterns across payers.

We note that the baseline rate of uninsured visits by young adults in our sample was lower than such rates that have been documented in national surveys. We found that roughly 17% of visits by adults between the ages of 19 and 25 years were classified as uninsured, as compared with an uninsured rate of 30% for this age group in Census data.²⁵ One possible explanation for this discrepancy is that unadjudicated claims overreport insurance coverage, classifying as insured some persons who are actually uninsured. A second possibility is that hospitals treating large numbers of uninsured patients are underweighted in our data. The high baseline rate of insured visits in our data set probably reduced the magnitude of proportional gains in coverage estimated in our study. In addition, the young adults with serious illnesses and injuries in our study sample probably differ from the overall population of persons between the ages of 19 and 25 years, both in demographic composition and in baseline insurance coverage.

In conclusion, our results suggest that the ACA's dependent-coverage provision increased financial protection for young adults, their parents, and hospitals by sheltering them from the potentially catastrophic cost of treating emergency medical conditions.

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