Impact of Medicaid Cutbacks on Emergency Department Use: The Oregon Experience

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Study objective: Federal policy changes and tightened state budgets may reduce Medicaid enrollment in many states. In March 2003, the Oregon Health Plan (Oregon's Medicaid expansion program) made substantial changes in its benefit package that resulted in the disenrollment of more than 50,000 beneficiaries. We sought to study the impact of these Oregon Health Plan policy changes on statewide emergency department (ED) use.

Methods: In this observational study, hospital billing data on 2,680,954 visits to 26 Oregon EDs were obtained, sampled up to 24 months before and 24 months after the cutbacks. These visits represent approximately 62% of all visits to Oregon's 58 EDs. We ascertained counts of ED visits by payer group before and after the Oregon Health Plan cutback date, plus hospital admissions from the ED as a measure of acuity.

Results: After the Oregon Health Plan policy changes, ED visits by the uninsured underwent an abrupt and sustained increase, from 6,682 per month in 2002 to 9,058 per month in 2004. Oregon Health Plan–sponsored and commercially insured visits decreased, resulting in a slight decrease in overall ED visits. Multivariable models adjusting for secular trends and seasonality showed a 20% (95% confidence interval 13% to 28%) increase in uninsured ED visits, whereas the adjusted number of Oregon Health Plan–sponsored visits decreased. The proportion of uninsured ED visits resulting in hospital admission increased (odds ratio 1.50; 95% confidence interval 1.39 to 1.62).

Conclusion: Oregon's Medicaid cutbacks were followed by increases in ED use and hospitalizations by the uninsured. Recent federal legislation facilitating similar Medicaid changes in other states may lead to replication of these events elsewhere. [Ann Emerg Med. 2008;xx:xxx.]

0196-0644/$-see front matter
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doi:10.1016/j.annemergmed.2008.01.335

INTRODUCTION

Recent federal policy changes, including the Deficit Reduction Act of 2005, may lead to substantial restructuring of Medicaid programs in many states.[1] Large federal deficits and tightened state budgets suggest that cuts in Medicaid programs may be inevitable. A number of states have already adopted measures to restrict eligibility, cut benefits, or increase copayments.[2] Cutbacks in Medicaid eligibility and reduction in Medicaid enrollment because of nonpayment of mandatory premiums may increase the number of uninsured, low-income Americans.

This study reports on changes in ED use that occurred after policy changes in Oregon's Medicaid expansion program, the Oregon Health Plan.[3,4] Faced with a budget crisis because of a recession, the state introduced substantial changes to the Oregon Health Plan benefit package that were implemented in February and March 2003.[5] Oregonians meeting federally mandated Medicaid eligibility criteria (approximately 300,000 individuals) were not affected. However, those in the Oregon Health Plan expansion program (generally adults below the federal poverty level but without children) faced stricter enforcement of premiums ($6 to $12 per person per month), with forced disenrollment if premiums were not paid monthly. The immediate effect of this stricter premium payment policy was that enrollment in the Oregon Health Plan expansion program decreased from 103,000 enrollees in 2002 to approximately 51,000 by late 2003.[6]

Editor's Capsule Summary

What is already known on this topic

To save money, some states have restricted eligibility for publicly funded health insurance such as Medicaid. This increases the number of persons who have no health insurance.

What question this study addressed

Did tightening of Oregon's Medicaid eligibility criteria in 2003 affect utilization of the state's emergency departments (EDs)?

What this study adds to our knowledge

This study of 62% of ED visits from 2002 to 2004 showed that the restriction of Medicaid eligibility in Oregon was associated with an increase in ED visits by uninsured patients, without any increase in overall ED volumes.

How this might change clinical practice

Policymakers contemplating changes to insurance eligibility need to consider the risk to patients and the clinical and financial burden placed on hospitals and EDs as a result of these decisions.

Table 1. Comparison of hospitals included in the study versus other Oregon hospitals.

Characteristics	Included	Not Included	Total
Location, No. (%)			
Urban	15 (58)	5 (16)	20 (34)
Rural	11 (42)	27 (84)	38 (66)
Office of Rural Health designation, No. (%)*			
Type A	3 (12)	9 (28)	12 (21)
Type B	5 (19)	15 (47)	20 (34)
Other	18 (69)	8 (25)	26 (45)
Critical Access hospital, No. (%)			
Yes	3 (12)	13 (41)	16 (28)
No	23 (88)	19 (59)	42 (72)
Inpatient beds			
Mean	199	71	128
Median	146	48	49
Range	21–554	11–406	11–554
ED census July 1, 2002, to June 30, 2003			
Mean	25,169	12,293	18,065
Median	24,858	9,810	13,154
Range	7,714–63,721	687–57,854	687–63,721

Data from the Office for Oregon Health Policy and Research, the Oregon Office of Rural Health, and individual health care systems.
*As defined by the Oregon Office of Rural Health, type A and type B rural hospitals both have fewer than 50 beds. Type A rural hospitals are more than 30 miles from the nearest hospital, whereas type B hospitals are 30 miles or less from the nearest hospital.

Copayments were implemented for most services, such as $5 for primary care visits, $50 for emergency department (ED) visits, and $250 for hospitalizations.[7] Primary care providers were authorized to refuse care to patients who could not afford the copayments, but EDs, mandated by the Emergency Medical Treatment and Active Labor Act to provide a medical screening examination, did not have the option of refusing service. Oregon Health Plan expansion enrollees also faced a reduction in the scope of services covered, including the elimination of outpatient mental health and chemical dependency coverage.

One potential effect of these changes was on ED use. The nature of the effect was uncertain. One might expect decreased ED use by patients losing Medicaid coverage because ED utilization rates by the uninsured are lower than rates for Medicaid enrollees[8] and because poor patients respond to the risk of increased out-of-pocket costs by reducing ED use.[9] On the other hand, patients with worse access to primary care are more likely to use EDs for primary care–treatable conditions and for emergencies caused by exacerbations of inadequately treated chronic diseases.[10-12] A previous study in a single ED had shown an increase in uninsured ED visits after the Oregon Health Plan policy changes,[13] but there was concern that findings in the academic medical center studied, which had a higher proportion of uninsured and Oregon Health Plan–sponsored ED visits than most other Oregon EDs, might not be generalizable.

Therefore, the purpose of this study was to evaluate the effect of the Oregon Health Plan changes on ED use in a representative sample of Oregon EDs before versus after the Oregon Health Plan cutbacks to determine the change in payer mix. Because of the specific cutbacks in mental health services, we also examined behavioral health diagnoses, and we studied hospital admissions as a measure of the urgency of ED visits.

MATERIALS AND METHODS

Study Design

This project was an observational study of ED visits, using administrative data.

Setting and Selection of Participants

We sought electronic claims data from a purposive sample of Oregon EDs. In selecting EDs, we considered patient volume, urban versus rural location, designation as a Critical Access Hospital, rural hospital subgroup as defined by the Oregon Office of Rural Health,[14] and the region of Oregon where the hospitals were located. According to these criteria, we identified 16 EDs that represented the range of Oregon EDs. Twelve of the 16 had informatics systems that could provide the necessary data and agreed to participate. The 4 EDs that did not participate were all small, rural EDs. However, we were able to recruit an additional 6 rural EDs. Finally, an opportunity arose to include an additional 8 urban EDs in the Portland region. Including these EDs allowed us to study 12 of the 13 EDs in the 3-county Portland region, representing 94% of ED visits in the region. Table 1 compares characteristics of the 26 participating hospitals to all 58 Oregon acute care hospitals in existence as of February 2005 (the end of our data collection

period). The 58 Oregon EDs reported 1,047,780 visits between July 1, 2002, and June 30, 2003. EDs included in the study reported 654,404 (62%) of these visits. Although rural EDs are underrepresented, we included sufficient small, rural EDs to allow comparison of ED utilization patterns in these facilities versus larger, urban EDs.

The Oregon Health Plan policy changes of interest occurred in February and March 2003. We sought claims data on all ED visits for 24 months before and 24 months after the cutbacks, ie, from March 1, 2001, through February 28, 2005. Of the study EDs, 20 provided data for all 48 months and 22 could provide data for at least 43 months (August 1, 2001, through February 28, 2005). Four smaller EDs were able to provide data for a shorter period only; our analytic approach to incorporate these EDs is described below.

Patients whose zip codes of residence were outside Oregon were eliminated from the analyses because only Oregon residents were affected by the Oregon Health Plan changes. Visits without valid *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnosis codes (0.09% of visits) were excluded.

The key predictor variable was a binary variable indicating whether the ED visit occurred before versus after March 1, 2003, the date of the most substantial Oregon Health Plan cutbacks.

The main outcome variable was the number of ED visits in a month. Although we recognize that many urgent ED visits do not require hospital admission, we examined the proportion of ED visits leading to hospital admission as one measure of urgency. We also examined ED visits in which any listed *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnosis reflected each of 3 behavioral health conditions: chemical dependency, alcohol-related conditions, and other psychiatric conditions. Analyses of each of these outcome variables were stratified by payer class (ie, whether the ED patient was uninsured, an Oregon Health Plan beneficiary, or covered by commercial insurance, Medicare, or other insurance). Because of the importance of payer class in this study and because different hospitals reported this variable differently, a staff member with expertise in third-party payers manually reviewed the list of payer names for each health care system and classified them into the 5 payer categories.

We included 2 confounder variables. First, because ED use may vary by season, we included the month of the visit. Second, there was an increase in unemployment related to the recession during the study period, and as Oregonians lost their jobs, they often lost their health insurance. To distinguish the effect of job loss from the effect of the Oregon Health Plan policy changes, we adjusted for secular trends by including date of visit as a linear term ranging from 0 (first month of data) to 47 (last month of data). Thus, in examining the outcome of uninsured ED visits, a positive coefficient for the linear term would be consistent with an effect caused by job loss (or other secular trends), whereas a positive coefficient for the binary variable (before versus after the Oregon Health Plan changes) would be consistent with an effect caused by the policy changes after controlling for the effect of increasing unemployment.

Data Analysis

For the 43 months for which 22 EDs were able to provide data, graphs are presented showing the total number of visits to these EDs by month in each payer group. In addition, counts of visits are compared in 2002 versus 2004; these counts are presented as the total number of ED visits per month in each payer class, averaged over the calendar year. We chose these periods to eliminate any seasonal variation and to avoid including the months closest to the 2003 cutbacks, when there might have been instability in ED utilization patterns.

Data are not available on changes in the numbers of uninsured, Oregon Health Plan–sponsored, and commercially insured patients in the service areas of the participating hospitals during the study period. Therefore, changes in rates of ED use could not be calculated. As a means of inferring whether there was a change in the rate of ED use by the uninsured, we compared statewide changes in the number of uninsured Oregonians with changes in uninsured visits to our sample of EDs. Because of a concern that the EDs participating in this study might not be representative of all EDs statewide, we also compared data from 12 of the 13 EDs in the Portland metropolitan area with data on population changes in that region. In each case, we calculated the proportionate change as [(count in 2004)–(count in 2002)]/(count in 2002), where counts were of ED visits by uninsured Oregonians.

To estimate monthly statewide ED visits for each payer class, we used generalized linear models, assuming that the error terms were Poisson distributed with a log transformation. Covariates in this model included monthly and secular time trends, as well as a binary variable to indicate whether the observations occurred in the postcutback period (on or after March 1, 2003). The correlation structure was modeled as first-degree autoregressive, which allows for correlation in the error term of sequential observations. Results were qualitatively insensitive to less restrictive assumptions about the correlation structure.

The primary multivariable models included the 22 EDs with at least 43 months of data. These models were performed separately for each of 4 outcomes: all ED visits, alcohol-related visits, drug-related visits, and other psychiatric visits. Sensitivity analyses were performed using only the 20 EDs for which all 48 months of data were available and using all 26 EDs while limiting the analysis to the 28 months (November 2002 through February 2005) for which complete data were available. Because the results of these analyses were very similar to those of the primary analysis, only the multivariable analyses with 22 EDs are presented.

In a separate analysis, we assessed whether changes in payer mix were consistent across all hospitals. In this analysis, our outcome variable took a value of 1 if the patient was uninsured and 0 otherwise. Independent variables included dummy variables for each hospital, a dummy variable that took a value

of 1 if the visit occurred after the 2003 policy change and 0 otherwise, and 25 interaction terms (before/after status×hospital dummy). Because the interpretation of the interaction effect cannot be directly calculated from the coefficient on the interaction term,[15] our approach was to estimate the model, save the coefficients, and use the coefficients to estimate the changes in the probability of a visit by an uninsured patient after the 2003 policy change, for each hospital. We derived confidence intervals (CIs) through bootstrapping with 500 replications.

To detect changes in urgency of visits, a separate analysis was performed examining changes in the proportion of ED visits leading to hospitalization. We conducted individual patient-level analyses using logistic regression, adjusting for monthly and secular trends as in the previous analyses. In these estimations, we modeled the error term using an individual-level random effect and hospital-level fixed effect.

The study was approved by the institutional review board at Oregon Health & Science University.

RESULTS

Characteristics of Study Subjects

The participating EDs provided data on 2,680,954 ED visits by Oregon residents. Individual EDs' patient volumes during the last 12 months ranged from 6,435 to 70,850 per year (mean 27,354; median 29,386). There was a slight decrease in patient volumes throughout the study period. For the 22 EDs that provided complete data for 2002, the average ED volume was 29,153, decreasing to 28,618 in 2004. However, 11 of these 22 EDs had an increase in ED volume from 2002 to 2004.

Main Results

Immediately after the date of the Oregon Health Plan cutbacks, there was an abrupt and sustained increase in ED visits by the uninsured (Figure 1, B), from 6,682 per month in 2002 (12.5% of visits) to 9,058 per month (17.3% of visits) in 2004 (Table 2). ED visits per month by Oregon Health Plan enrollees decreased beginning around the March 2003 date of the Oregon Health Plan policy changes (Figure 1, C), from 13,964 per month in 2002 to 11,973 per month in 2004 (Table 2). There was a decrease in commercially insured visits (Figure 1, D) for most of the study period but without an inflection point after the policy changes (most likely attributable to Oregon's increasing unemployment rate during this period and the resultant loss in employer-sponsored insurance).

Multivariable analyses showed that the March 2003 policy change was followed by a 20% (95% CI 13% to 28%) increase in the number of uninsured ED visits per month, after adjusting for seasonal variation and for a secular trend showing an additional increase of 7% per year (95% CI +4% to +10%). Oregon Health Plan–sponsored ED visits decreased 20% (95% CI –25% to –14%) after the Oregon Health Plan cutbacks, despite a secular trend showing a 5% per year increase (95% CI +1% to +9%). Medicare-sponsored visits increased 6% per year (95% CI +3% to +8%) but were not significantly affected by the Oregon Health Plan changes (–3%; 95% CI –8% to +1%). Commercially sponsored visits decreased a statistically insignificant 2% per year (95% CI –5% to +0.2%) and were unaffected by the Oregon Health Plan changes (–3%; 95% CI –8% to +1%). The magnitude of the increase in uninsured ED visits was similar for different types of EDs, ranging from a 19% increase (95% CI +13% to +26%) for urban hospitals with more than 100 inpatient beds to 23% (95% CI +13% to +35%) for smaller urban hospitals and 26% (95% CI +17% to +36%) for rural hospitals. (The full models for the primary analysis are presented in Appendix E1, available online at http://www.annemergmed.com.)

We conducted a separate analysis to identify whether changes in payer mix were consistent across all hospitals. The probability that a visit was by an uninsured patient increased for all hospitals; this increase was statistically significant for 24 out of 26 EDs.

Table 3 shows the changes in ED visits for selected diagnostic categories after the Oregon Health Plan policy changes. Comparing ED use for psychiatric conditions other than chemical dependency, the mean number of visits per month for uninsured Oregonians was 298 per month before the Oregon Health Plan changes, increasing to 616 per month after the cutbacks. Oregon Health Plan–sponsored visits for these conditions decreased from 1,030 to 943 per month, with an increase in commercially sponsored visits from 896 to 1,024 per month. In the multivariable models, drug-related ED visits by uninsured patients increased a striking 173%, psychiatric visits increased by 106%, and alcohol-related visits increased 82%. Oregon Health Plan–sponsored visits for these conditions decreased but by comparatively small amounts. No other payer class showed changes of this magnitude, although Medicare patients displayed a fairly large increase in drug-related visits (41%).

Although the proportion of ED visits leading to hospital admission was lowest for uninsured patients, the adjusted odds of an ED visit leading to hospitalization increased by 50% after the cutbacks, a much larger increase than in any other payer class (Table 4).

Between 2002 and 2004, the number of uninsured Oregonians increased 29%, from 471,778 in 2002 to 609,041 in 2004.[16-18] Meanwhile, the number of visits to the study EDs by uninsured patients increased 36%, from 6,682 per month to 9,058 per month (Table 2). Within the Portland metropolitan area, there was an increase in the number of uninsured ED visits from 4,977 per month in 2002 to 6,363 per month in 2004 (28% increase) and an increase from 201,844 to 257,286 (27% increase) in the number of uninsured residents (H. Day, written communication, March 2007[16-18]).

LIMITATIONS

A limitation of this study is that it cannot determine whether the rate of ED use by the uninsured changed or whether there was merely an increase in the number of uninsured Oregonians. As noted in the "Results" section, the

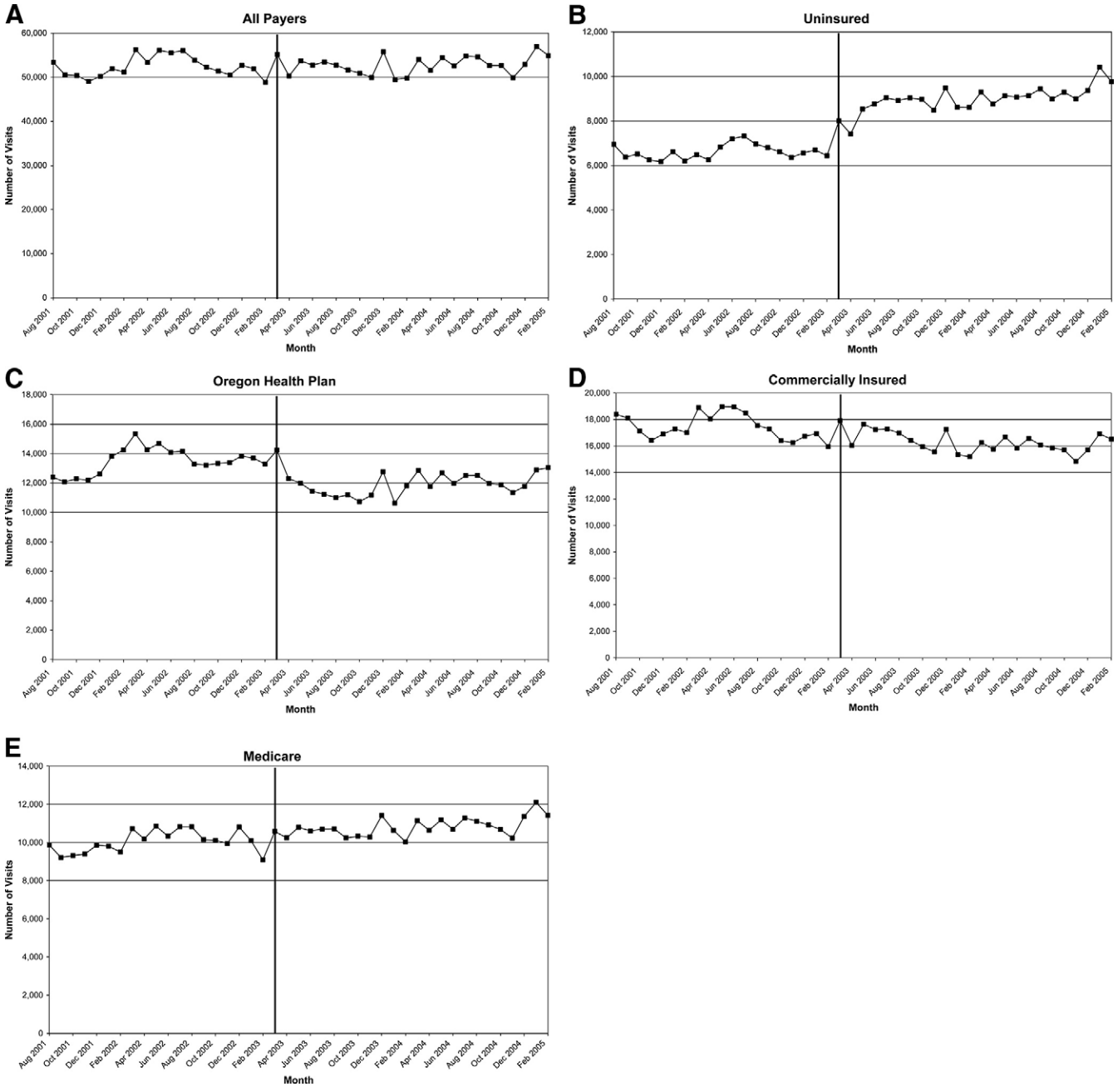

Figure 1. ED visits per month, by payer class (22 Oregon EDs). *A,* All payers (includes worker's compensation, automobile, etc, as well as the payers listed for B through E). *B,* Uninsured. *C,* Oregon Health Plan. *D,* Commercially insured. *E,* Medicare. Vertical line on charts indicates March 2003, the date of the Oregon Health Plan policy changes.

36% increase in uninsured ED visits was greater than the 29% increase in uninsured Oregonians. The disproportionate increase in uninsured ED visits might suggest that 2 factors were responsible for the increase in uninsured ED visits: an increase in the number of uninsured Oregonians and an increase in the rate of ED use by the uninsured. However, our sample of 26 EDs differed in some ways from Oregon EDs that were not included (Table 1), so it is also possible that participating EDs experienced larger increases in uninsured visits than did other Oregon EDs. When we limited the analysis to the Portland metropolitan area, where data were available from 12 of the 13 EDs, the 28% increase in uninsured ED visits paralleled the 27% increase in the uninsured population. As described in the "Discussion" section below, either an increase in the rate of ED use by uninsured Oregonians or an increase in the number of uninsured ED visits due solely to an increase in the number of uninsured people has important policy implications.

Table 2. ED visits per month before and after changes to the Oregon Health Plan.

	Average Number of ED Visits/Month*		
Payer categories	**2002**	**2004**	**Change**
Commercial	17,654	15,814	−1,840
Oregon Health Plan	13,964	11,973	−1,991
Uninsured	6,682	9,058	+2,376
Medicare	10,341	10,830	+489
Other	4,808	4,792	−16
Total	53,449	52,467	−982

*Combined census in the 22 EDs for which full data for these calendar years are available.

We did not attempt to classify visits that did not result in hospitalization into categories such as "nonurgent" or "ambulatory care sensitive." No classification instrument has been adequately validated.[19] Attempts to apply one commonly used classification system[10] to this data set raised concerns about its validity.[20]

DISCUSSION

Almost immediately after the Oregon Health Plan policy changes, Oregon's EDs experienced a substantial decrease in the number of Oregon Health Plan–sponsored visits and a large increase in the number of visits by uninsured patients. In multivariable modeling adjusting for seasonal and secular trends, the adjusted increase of 7% per year in uninsured visits may be due to increasing unemployment during a recession, with loss of employer-sponsored insurance. However, the abrupt 20% adjusted increase in uninsured ED visits immediately after the Oregon Health Plan cutbacks is seen clearly (Figure 1, B) and strongly suggests that much of the increase in uninsured ED visits is attributable to the Oregon Health Plan cutbacks. The magnitude of the effects was even larger for behavioral health conditions, with an 82% adjusted increase in alcohol-related visits by uninsured patients and more than doubling of the adjusted number of drug-related and other psychiatric ED visits. That the increase in uninsured visits was observed in all 26 EDs argues against artifactual causes such as a change in data systems in 1 hospital.

There was a slight decrease in average ED volume after the policy changes, a reassuring finding, given concerns about worsened ED crowding in the face of increased numbers of uninsured persons.

As noted in the "Limitations" section, this study cannot distinguish between 2 possible explanations for the increase in uninsured ED visits: (1) whether the rate of ED use by uninsured patients changed or (2) whether there was merely an increase in the number of uninsured Oregonians. However, each possibility has important implications. If the rate of ED use by Oregon's uninsured increased, it would suggest worsened access to medical care outside the ED because population groups with impaired access to traditional sources of primary care use EDs more frequently.[21-37] If the rate of ED use by the uninsured remained constant as the number of uninsured increased, the increased number of uninsured ED patients affects the medical care delivery system as an increasing burden of uncompensated care for hospitals.[38] Oregon hospitals experienced an increase in charges for uncompensated care from $256 million in 2002 to $509 million in 2004,[39] suggesting that the changes in Oregon's EDs mirrored the effect of the Oregon Health Plan cutbacks on inpatient care. These large uncompensated care burdens may have important consequences for hospitals' financial solvency,[40] nurse staffing decisions,[41] support for the safety net, and patient outcomes.[42] Moreover, commercially insured populations may ultimately pay the bill for the increased utilization by the uninsured as hospitals attempt to raise their rates to commercial health plans in response to increased uncompensated care.[43]

These data also address the question of whether the increased ED use by the uninsured represents use of the ED for primary care that was previously provided in a traditional primary care setting, versus care for more acute problems. After the Oregon Health Plan policy changes, the odds that an uninsured ED visit led to hospital admission increased by 50%. Therefore, a disproportionate amount of the increase in ED use by uninsured patients was for medical conditions that the treating physicians deemed acute enough to require emergency hospitalization. At the same time, the observation that the proportion of ED visits requiring hospitalization was lower for uninsured patients than for other payer groups suggests that uninsured patients are forced to rely on EDs for primary care that insured patients are able to obtain in traditional primary care settings or that other factors such as nonfinancial barriers or patient preference lead uninsured patients to use EDs.

The disproportionate increase in drug- and alcohol-related ED visits and in other psychiatric visits among uninsured patients is consistent with other data about deteriorating access to outpatient care for these conditions.[44] Although this study does not provide definitive evidence about the cause of this increase, it is plausible that Oregon Health Plan enrollees with behavioral health conditions may have stopped paying Oregon Health Plan premiums when services such as methadone maintenance and outpatient counseling were no longer covered, using EDs instead.

Other research has also demonstrated the adverse effect of loss of Oregon Health Plan coverage. More than half of those who lost Oregon Health Plan coverage reported unmet health needs,[45] including unmet needs for urgent care.[46] However, these previous studies relied on patient self-report, whereas the current study examines actual use of a large group of EDs.

Our findings can be compared to published projections of the effect of changes in Medicaid and State Children's Health Insurance Program enrollment on ED use.[47,48] A previous study conducted a cross-sectional analysis that compared ED use by uninsured patients in communities with different levels of Medicaid enrollment. It noted that 24% of ED visits by low-income Americans are currently by uninsured patients and

Table 3. Changes in ED visits for selected diagnostic categories after the Oregon Health Plan Policy changes.

	Payer Category							
	Uninsured		OHP		Commercial		Medicare	
Characteristics	**2002**	**2004**	**2002**	**2004**	**2002**	**2004**	**2002**	**2004**
Mean number of visits per month								
Alcohol-related	228	415	474	319	274	301	229	240
Drug-related	103	280	280	239	106	129	73	103
Other psychiatric	298	616	1,030	943	896	1,024	1,017	1,215
Adjusted change in number of ED visits/month after the OHP cutbacks (95% CI)*								
Alcohol-related	+82% (+71% to +93%)		–33% (–38% to –27%)		+10% (+3% to +16%)		+5% (0% to +9%)	
Drug-related	+173% (+152% to +194%)		–15% (–23% to –6%)		+22% (+14% to +31%)		+41% (+30% to +54%)	
Other psychiatric	+106% (+96% to +118%)		–8% (–14% to –3%)		+14% (+11% to +18%)		+19% (+17% to +22%)	

OHP, Oregon Health Plan.
*Adjusted for seasonal and secular trends.

Table 4. Changes in proportion of ED visits leading to hospital admission after Oregon Health Plan Policy changes.

	Payer Category									
	Uninsured		Oregon Health Plan		Commercial		Medicare		Overall	
	Before	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
Proportion of ED Visits, %*										
Admitted	4.7	7.0	8.8	8.8	10.6	12.1	36.8	36.5	14.3	15.3
Adjusted odds ratios for Admission (95% CIs)†										
Admitted	1.50 (1.39–1.62)		1.09 (1.03–1.16)		0.99 (0.95–1.04)		1.10 (1.06–1.13)		1.06 (1.04–1.08)	

*The raw proportions are limited to the 22 EDs for which full data for 2002 and 2004 are available and compare these 2 years. Calculating the adjusted odds ratios allows inclusion of data from longer periods, as described in the "Materials and Methods" section.
†Adjusted for patient age and sex, as well as month of visit and secular trends in visits.

projected that a 25% reduction in Medicaid enrollment nationally would lead to an increase in uninsured visits of 29% but little change in total ED census.[47] The present longitudinal study examined actual changes in utilization in the face of Medicaid cutbacks. Although the results cannot be compared directly because the previous projections focused on low-income patients, we observed a 36% increase in the number of ED visits by uninsured patients after a cutback of less than 15% in Medicaid enrollment.

Cutbacks in the Oregon Health Plan were followed by an abrupt and sustained increase in ED use by uninsured Oregonians and an increase in the proportion of those visits requiring hospitalization. Those with behavioral health diagnoses were especially affected. As policymakers contemplate fundamental changes to Medicaid nationwide,[47] these events could be harbingers of a large increase in ED use by the uninsured in the United States. Cost-cutting measures may have substantial and lasting effects on medical care providers and, more important, on their most vulnerable patients.

The authors acknowledge the valuable assistance of the project's advisory committee, whose members guided the project with respect to policy implications of the work and facilitated interactions with collaborating hospitals for data acquisition. Members include Beverly Bauman, MD (Oregon Health & Science University Department of Emergency Medicine), Kevin C. Earls, MS (Oregon Association of Hospitals and Health Systems), Charles A. Gallia, PhD (Oregon Office of Medical Assistance Programs), Bruce Goldberg, MD (Oregon Department of Human Services), Paul McGinnis, MPA (Oregon Office of Rural Health; Oregon Health & Science University Department of Family Medicine); James Jensen, MD (Oregon Chapter, American College of Emergency Physicians), Judy Mohr Peterson, PhD (Oregon Department of Human Services), John Moorhead, MD (Oregon Health & Science University Department of Emergency Medicine), and Janette Paquette, MD (Adventist Medical Center of Portland, Department of Emergency Medicine). We greatly appreciate the assistance of personnel in the Office for Oregon Health Policy and Research, namely, Heidi Allen, MSW, Tina D. Edlund, MSc, and Lisa Krois, MPH, who have contributed their time and their expertise in Oregon health policy issues. We thank Cody Weathers, BS, and Jill Boyer-Quick, MS, for working with the collaborating hospitals to obtain electronic data and Vickie Morton, BS, BA, for completing the laborious task of classifying individual insurers and other payers into meaningful categories for analysis. The article has benefited from valuable comments by Robert Hurley, PhD.

Supervising editors: Michael J. Schull, MD, MSc; Michael L. Callaham, MD

Author contributions: RAL, KJM, and JAS conceived the study, developed the study design, and obtained grant funding to

support it. RAL and MEV obtained electronic data sets from the participating hospitals and conducted extensive data validation and correction. RAL and KJM performed statistical analyses; specifically, KJM performed the multivariable analyses presented in the article. RAL drafted the article, and all authors contributed substantially to its revision. RAL takes responsibility for the paper as a whole.

Funding and support: By *Annals* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article, that might create any potential conflict of interest. See the Manuscript Submission Agreement in this issue for examples of specific conflicts covered by this statement. This project was supported by the Office for Oregon Health Policy and Research through grants from the Robert Wood Johnson Foundation State Coverage Initiatives and the Robert Wood Johnson Foundation Changes in Health Care Financing & Organization Initiative.

Publication dates: Received for publication July 20, 2007. Revisions received December 3, 2007, and January 9, 2008. Accepted for publication January 28, 2008.

Presented at the Society for Academic Emergency Medicine annual meeting, May 2006, San Francisco, CA; and the AcademyHealth annual research meeting, June 2006, Seattle, WA.

Reprints not available from the authors.

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Editor's Capsule Summary: *What is already known on this topic:* To save money, some states have restricted eligibility for publicly funded health insurance such as Medicaid. This increases the number of persons who have no health insurance. *What question this study addressed:* Did tightening of Oregon's Medicaid eligibility criteria in 2003 affect utilization of the state's emergency departments (EDs)? *What this study adds to our knowledge:* This study of 62% of ED visits from 2002 to 2004 showed that the restriction of Medicaid eligibility in Oregon was associated with an increase in ED visits by uninsured patients, without any increase in overall ED volumes. *How this might change clinical practice:* Policymakers contemplating changes to insurance eligibility need to consider the risk to patients and the clinical and financial burden placed on hospitals and EDs as a result of these decisions.

Appendix E1. Multivariable models for ED visits before versus after Oregon Health Plan policy change by payer class.

		95% CI		
	Adjusted Ratio	**Lower Bound**	**Upper Bound**	***P* Value**
Uninsured				
February (compared with January)	0.95	0.90	1.01	0.12
March	0.98	0.91	1.06	0.57
April	0.92	0.84	0.99	0.04
May	0.99	0.93	1.06	0.87
June	1.01	0.93	1.10	0.79
July	1.02	0.93	1.12	0.59
August	1.01	0.94	1.08	0.74
September	0.99	0.92	1.06	0.74
October	0.99	0.92	1.06	0.72
November	0.94	0.88	1.01	0.07
December	0.98	0.90	1.08	0.71
Linear time trend (per year)	1.07	1.04	1.10	<0.01
After vs before OHP policy changes	1.20	1.13	1.28	<0.01
Oregon Health Plan				
February (compared with January)	1.02	0.95	1.10	0.54
March	1.17	1.06	1.29	<0.01
April	1.05	0.96	1.15	0.26
May	1.08	1.00	1.10	0.05
June	1.02	0.95	1.11	0.59
July	1.03	0.95	1.08	0.48
August	0.99	0.92	1.04	0.88
September	0.97	0.90	1.03	0.33
October	0.96	0.89	1.03	0.22
November	0.95	0.89	1.02	0.15
December	1.00	0.90	1.12	0.95
Linear time trend (per year)	1.05	1.01	1.09	0.01
After vs before OHP policy changes	0.80	0.75	0.86	<0.01
Commercial				
February (compared with January)	0.97	0.92	1.03	0.34
March	1.06	0.99	1.13	0.07
April	1.00	0.94	1.07	0.98
May	1.07	1.01	1.13	0.02
June	1.05	0.97	1.13	0.23
July	1.06	1.00	1.11	0.04
August	1.02	0.97	1.08	0.42
September	1.01	0.96	1.06	0.71
October	0.97	0.93	1.03	0.32
November	0.94	0.90	0.99	0.03
December	1.00	0.93	1.08	0.99
Linear time trend (per year)	0.98	0.95	1.00	0.07
After vs before OHP policy changes	0.97	0.92	1.01	0.14
Medicare				
February (compared with January)	0.93	0.88	0.99	0.03
March	1.04	0.99	1.09	0.11
April	0.99	0.95	1.04	0.73
May	1.04	0.99	1.10	0.11
June	1.00	0.95	1.05	0.99
July	1.03	0.98	1.09	0.20
August	1.02	0.97	1.08	0.42
September	0.97	0.92	1.01	0.17
October	0.96	0.92	1.01	0.10
November	0.94	0.89	1.00	0.04
December	1.02	0.96	1.09	0.45
Linear time trend (per year)	1.06	1.03	1.08	<0.01
After vs before OHP policy changes	0.97	0.92	1.01	0.12

OHP, Oregon Health Plan.