Increased Emergency Department Use in Illinois After Implementation of the Patient Protection and Affordable Care Act

Scott M. Dresden, MD, MS*; Emilie S. Powell, MD, MS; Raymond Kang, MA; Megan McHugh, PhD; Andrew J. Cooper, MPH; Joe Feinglass, PhD

*Corresponding Author. E-mail: s-dresden@northwestern.edu, Twitter: @SMDresdenMD.

Study objective: We examine emergency department (ED) use and hospitalizations through the ED after Patient Protection and Affordable Care Act (ACA) health insurance expansion in Illinois, a Medicaid expansion state.

Methods: Using statewide hospital administrative data from 2011 through 2015 from 201 nonfederal Illinois hospitals for patients aged 18 to 64 years, mean monthly ED visits were compared before and after ACA implementation by disposition from the ED and primary payer. Visit data were combined with 2010 to 2014 census insurance estimates to compute payer-specific ED visit rates. Interrupted time-series analyses tested changes in ED visit rates and ED hospitalization rates by insurance type after ACA implementation.

Results: Average monthly ED visit volume increased by 14,080 visits (95% confidence interval [CI] 4,670 to 23,489), a 5.7% increase, after ACA implementation. Changes by payer were as follows: uninsured decreased by 24,158 (95% CI −27,037 to −21,279), Medicaid increased by 28,746 (95% CI 23,945 to 33,546), and private insurance increased by 9,966 (95% 6,241 to 13,690). The total monthly ED visit rate increased by 1.8 visits per 1,000 residents (95% CI 0.6 to 3.0). The monthly ED visit rate decreased by 8.7 visit per 1,000 uninsured residents (95% CI −11.1 to −6.3) and increased by 10.2 visit per 1,000 Medicaid beneficiaries (95% CI 4.4 to 16.1) and 1.3 visits per 1,000 privately insured residents (95% CI 0.6 to 1.9). After adjusting for baseline trends and season, these changes remained statistically significant. The total number of hospitalizations through the ED was unchanged.

Conclusion: ED visits by adults aged 18 to 64 years in Illinois increased after ACA health insurance expansion. The increase in total ED visits was driven by an increase in visits resulting in discharge from the ED. A large post-ACA increase in Medicaid visits and a modest increase in privately insured visits outpaced a large reduction in ED visits by uninsured patients. These changes are larger than can be explained by population changes alone and are significantly different from trends in ED use before ACA implementation. [Ann Emerg Med. 2016;■:1-9.]

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

0196-0644/$-see front matter

http://dx.doi.org/10.1016/j.annemergmed.2016.06.026

INTRODUCTION

Background and Importance

The passage of the Patient Protection and Affordable Care Act (ACA) in 2010 introduced a number of changes designed to increase health insurance coverage, including employer and individual health insurance mandates, creation of insurance exchanges and subsidies for private health insurance, continuation for young adults on parents' health insurance to aged 26 years, and expansion of Medicaid for adults.[1] Policymakers who crafted the law believed that expanded insurance coverage would provide greater access to primary and preventive care, potentially leading to a reduction in the use of higher-cost services, including emergency department (ED) visits.[1-3]

However, previous state-level insurance expansions have shown that ED visits increased after expansion of coverage.[4-13] The few studies investigating ED use after the ACA have been limited by data from a few hospitals, a very short post-ACA period, or both.[14,15] In the absence of strong data, emergency physicians report a perceived increase in ED patient volume since implementation of the ACA.[16] However, it is unclear whether the perceived increase in ED use is accurate, whether it can be attributed to the ACA, or whether it is a continuation of long-term trends in the growth of ED visits over time.

Editor's Capsule Summary

What is already known on this topic

Millions of Americans have gained health insurance coverage as a result of the Patient Protection and Affordable Care Act (ACA).

What question this study addressed

How did the ACA affect the number of emergency department (ED) visits in Illinois?

What this study adds to our knowledge

In the post-ACA implementation period (2014 to 2015), increases in ED visits by Medicaid beneficiaries and the privately insured were not completely offset by decreased visits among the uninsured.

How this is relevant to clinical practice

Illinois has experienced a modest increase in overall ED visits during the first 2 years after implementation of the ACA.

Goals of This Investigation

The objective of this study was to describe changes in total ED visit volume, ED visit rates per 1,000 residents, and ED hospitalization rates by insurance status for 18- to 64-year-olds in Illinois between 2011 and 2015. To our knowledge, this study is the first to use statewide data on ED visits before and after ACA health insurance expansion. We analyze data up to 2 years post-ACA implementation from Illinois, a Medicaid expansion state with large urban, suburban, and rural populations, and large variations in income and baseline insurance coverage.

MATERIALS AND METHODS

Study Design and Data Collection and Processing

We performed a retrospective analysis of administrative data, using the Illinois Hospital Association Comparative Health Care and Hospital Data Reporting Services (COMPdata) during 60 months that cross the ACA health insurance expansion. These data are reported to the Illinois Hospital Association and Illinois Department of Public Health as mandated by the latter. This database provides visit-level administrative billing data for all ED visits to all nonfederal American Hospital Association member hospitals in Illinois.[17] The American Community Survey census data provided information on median household income and insurance status for the Illinois population. The survey is a representative sampling of the US population performed by the US Census Bureau, which collects data on a variety of demographic, economic, social, housing, and financial data, including health insurance coverage. Respondents were instructed to report their current coverage and to mark "yes" or "no" for each of 8 insurance types listed. The 1-year estimates of insurance coverage reported on the American FactFinder Web site were used.[18,19] The Northwestern University institutional review board determined that this analysis of publicly available, deidentified data was exempt.

Methods of Measurement

This study analyzes COMPdata from January 2011 to December 2015. COMPdata included date of ED visit, hospital, patient zip code, age, sex, race and ethnicity, disposition from the ED, and primary insurance category. Patients' median household income estimates by zip code were matched to COMPdata with 5-year (2009 to 2013) American Community Survey census estimates. Low-income zip codes were defined as those with a median income below $35,000.

Payer-specific visit rates were calculated for all patients with an Illinois zip code. Population denominators for calculating annual rates per 1,000 Illinois residents aged 18 to 64 years were obtained from 2011 to 2014 annual American Community Survey insurance coverage estimates, which were based on the number of individuals in this age group in Illinois who reported being uninsured or being primarily covered by Medicaid, Medicare (disability), or private insurance. We calculated annual percentage change in population by insurance coverage and used American Community Survey estimates from 2011 to 2014 as denominators to compute ED use rates. Because 1-year estimates of insurance status for the population aged 18 to 64 years for 2015 are still unavailable, we used 2014 American Community Survey population estimates to compute 2015 ED visit rates. To address the limitation of using population denominators from 2014, we also calculated ED rates with inflated populations that mirrored changes in Illinois insurance coverage rates as reported for 2015 quarters 1 to 3 in the National Health Interview Survey.[20]

Outcome Measures

The primary outcomes of interest are total ED visit volume, ED visit rates per 1,000 residents, and ED hospitalization rates. Each outcome is examined by insurance type (uninsured, Medicaid, private insurance, and Medicare disability).

Primary Data Analysis

We present annual ED visits and proportion of ED visits by patient sociodemographic characteristics. Visit-level data were aggregated by month. Statewide mean monthly ED visit volumes and ED visit rates were calculated by primary payer for the 36-month pre-ACA period (2011 to 2013) and the 24-month post-ACA period (2014 to 2015), and 95% confidence intervals (CIs) of the difference in means are reported. We used interrupted time series analyses to test the significance of changes in monthly ED visit and ED hospitalization rates overall and by each insurance category before and after January 2014. Interrupted time series is a segmented ordinary least squares regression of time series data that measures statistically significant changes to the intercept and slope coefficients after an intervention.[21] It can determine whether postintervention there is a change in the outcome's level (significant intercept change) or a change in the outcome's trend (slope change). Because this approach, unlike traditional pre-post regression techniques, can account for secular trends such as generally increasing ED visits, it is best suited for population-level rates, rather than individual-level observations. Interrupted time series does not require adjustments for individual-level characteristics because confounding by individual-level variables will not introduce serious bias unless it occurs with the intervention.[21,22] By comparing an estimated counterfactual outcome based on pre-ACA levels and trends to the actual post-ACA value, we present estimates of intervention effects on the post-ACA changes in mean monthly ED visits and per-resident ED visit rates. Changes in slope and intercept for the trend line after the intervention are reported as slope and intercept changes. This analysis used the Durbin-Watson statistic to control standard errors for autocorrelation. Season was included as a covariate in the interrupted time series model. Stata (version 13; StataCorp, College Station, TX) and SAS (version 9.3; SAS Institute, Inc., Cary, NC) were used for analyses.

RESULTS

There were approximately 15.2 million ED visits to 201 Illinois nonfederal hospitals during the 60-month study period after excluding 2.5% of the visits for patients with out-of-state or unknown zip codes (Table 1). Annual ED visit volume increased from 2.9 million in 2011 to 3.2 million in 2015, an 8.1% increase during the period. There were steady increases in the proportion of visits by patients aged 55 to 64 years, those from low-income zip codes, and those with other or unknown race and ethnicity.

Table 1. ED visits by Illinois residents aged 18 to 64 years to nonfederal Illinois hospitals, January 2011 to December 2015.

Year	2011	2012	2013	2014	2015	Total
Number of visits	2,939,472	3,024,561	2,977,854	3,098,958	3,179,000	15,219,845
Hospitalization, %	12.1	11.5	12.0	11.3	11.1	11.6
Sex						
Female	57.6	57.7	57.8	57.7	57.6	57.7
Insurance status						
Private	39.4	39.6	38.6	39.9	41.8	39.9
Medicare	9.1	9.2	9.6	8.9	8.3	9.0
Medicaid	27.8	27.4	27.6	35.7	38.6	31.5
Uninsured	22.7	22.6	23.5	14.7	10.3	18.6
Other	1.0	1.2	0.7	0.8	1.1	1.0
Age, y						
18–25	21.5	21.2	20.7	20.4	20.4	20.8
26–33	17.6	17.4	17.1	17.0	17.1	17.3
34–44	26.7	26.7	26.7	26.7	26.7	26.7
45–54	18.7	18.8	18.7	18.5	18.0	18.5
55–64	15.4	15.9	16.8	17.3	17.8	16.7
Race/ethnicity						
Non-Hispanic white	54.6	54.2	52.0	50.9	49.9	52.3
Non-Hispanic black	27.7	27.6	27.6	27.3	26.3	27.3
Hispanic	11.9	11.1	11.7	11.8	11.3	11.6
Asian	1.2	1.2	1.1	1.2	1.2	1.2
Other/unknown	4.5	5.9	7.6	8.8	11.2	7.7
Zip code median income <$35,000	15.3	15.3	16.2	16.6	16.6	16.0
Region						
Cook County	42.4	42.3	41.5	41.1	42.6	42.0
Suburban Chicago counties	18.8	18.8	17.9	17.8	16.9	18.0
Other Illinois	38.7	38.8	40.5	41.1	40.5	40.0

From 2011 to 2015, the overall state population was essentially unchanged throughout the study period (Table 2). During the pre-ACA period (2011 to 2013), Medicaid coverage increased by 22,713, a 1.7% annual rate of increase. In 2014, it increased by 173,536, a 25% increase in 1 year. Private insurance coverage increased by 4,971 pre-ACA, an annual increase of <0.1%, but increased by 164,165 (3.0%) in 2014. The uninsured population decreased by 55,523 pre-ACA, an annual decrease of 1.8%. In 2014 it decreased 351,884, or 23.9%.

Comparing the pre-ACA period (2011 to 2013) to the post-ACA period (2014 to 2015), average monthly ED visit volume increased by 14,080 (95% CI 4,670 to 23,489), a 5.7% increase (Table 3). However, average monthly hospitalizations through the ED were essentially unchanged. Average monthly ED visit volume for uninsured patients decreased by 24,158 (95% CI –27,037 to –21,279), a decrease of 42.4%. Average monthly Medicaid visit volume increased by 28,746 (95% CI 23,945 to 33,546), an increase of 41.9%. Average monthly private insurance visit volume increased 9,966 (95% CI 6,241 to 13,690), an increase of 10.2%. When statewide changes in health insurance coverage were accounted for, there was a mean monthly decrease of 8.7 visits per 1,000 (95% CI –6.3 to –11.1) for uninsured residents, from 38.0 to 29.3, a 22.9% reduction. Mean monthly Medicaid visit rates increased from 101.8 to 112.0, a difference of 10.2 visits per 1,000 beneficiaries (95% CI 4.4 to 16.1), a 10.0% increase, whereas private insurance visit rates increased from 17.9 to 19.1, a difference of 1.3 visits per 1,000 beneficiaries (95% CI 0.6 to 1.9), a 7.3% increase (Table 3). After payer-specific population denominators according to 2014 to 2015 changes reported in the National Health Interview Study were inflated, there was no significant change in these results.

Figure 1 provides trends in monthly ED visit volumes by disposition before and after ACA health insurance expansion. The overall ED visit volume increased significantly, corresponding with ACA insurance expansion in January 2014. The interrupted time series reveals a post-ACA change in slope of ED visits over time that was positive and significant (slope change=898; P=.004); however, there was no significant change in intercept (intercept change=292; P=.95). Comparing actual post-ACA ED visits to the counterfactual, on average, monthly ED visits increased by 11,566, which is smaller than the pre-post difference in Table 3 because the interrupted time series takes into account the preexisting positive trend (or slope). There was no significant change in ED hospitalization volume throughout the period (slope change=–641.9, P=.22; intercept change 4.62, P=.74).

Mean monthly ED visits by insurance category are shown in Figure 2. The overall ED visit volumes from Figure 1 are again presented for comparison. The interrupted time series analysis demonstrated a significant reduction post-ACA in mean monthly ED visits of 28,493 (driven by significant changes in slope [slope change=–1,086; P<.001] and intercept [intercept change=–15,242; P<.001]) for uninsured patients. There were significant increases for Medicaid (mean change=29,672; slope change=1,230, P<.001; intercept change=14,756, P<.001), and privately insured patients (mean change=10,307; slope change=764, P<.01; intercept change=690, P=.79).

Figure 3 presents monthly ED visit rates per 1,000 residents by insurance category. For the total population, the interrupted time series analysis demonstrated a significant increase of 1.47 ED visits per 1,000 residents post-ACA, driven only by a significant change in slope (slope change=0.11, P=.005; intercept change=0.07, P=.91). Again, the comparison to the counterfactual is lower than the pre-post estimate of 1.8 because there was a positive trend pre-ACA. The mean monthly ED visit rates per 1,000 residents decreased significantly, by 13.0 for uninsured patients (slope change=–0.99, P<.001; intercept change=–0.80, P=.62), whereas the mean monthly Medicaid ED rate increased by 14.47 visits per 1,000 beneficiaries (slope change=1.55, P<.001; intercept change=–4.73, P=.36), and the mean monthly private insurance rate increased by 1.35 visits per 1,000 beneficiaries (slope change=0.14, P<.001; intercept change=–0.38, P=.40). Medicare rates did not change significantly (slope change=–0.15, P=.47; intercept change=–5.13, P=.16).

Table 2. American Community Survey estimates of primary insurance status for the Illinois population aged 18 to 64 years.*

	2011	2012	2013	2014
All residents	8,014,095	8,006,505	8,010,771	7,998,369
Uninsured	1,526,413	1,501,494	1,470,890	1,119,046
Medicaid	672,608	654,528	695,321	868,857
Medicare (disability)	153,285	159,295	172,882	174,234
Private	5,442,787	5,455,333	5,447,758	5,611,923

*Excludes approximately 2.8% of Illinois residents aged 18 to 64 years with other or unknown insurance status; estimates have 1% to 2% margins of error.

LIMITATIONS

This study is a retrospective one using pre-ACA trends as the control for post-ACA results; therefore, any policy or

Table 3. Mean monthly ED visit volumes and ED visit rates for 18- to 64-year-olds by insurance status and disposition before and after ACA insurance expansion.

	Pre-ACA (2011–2013)	Post-ACA (2014–2015)	Difference (95% CI)
ED visit volumes			
Total	248,386	262,466	14,080 (4,670 to 23,489)
Uninsured	56,950	32,792	−24,158 (−27,037 to −21,279)
Medicaid	68,564	97,310	28,746 (23,945 to 33,546)
Private	97,384	107,350	9,966 (6,241 to 13,690)
Medicare	23,093	22,436	−657 (−1,520 to 206)
Hospitalization	29,407	29,346	−61 (−1,024 to 902)
Discharge	218,979	233,120	14,141 (5,472 to 22,810)
ED visit rates per 1,000 residents			
Total	31.0	32.8	1.8 (0.6 to 3.0)
Uninsured	38.0	29.3	−8.7 (−11.1 to −6.3)
Medicaid	101.8	112.0	10.2 (4.4 to 16.1)
Private	17.9	19.1	1.3 (0.6 to 1.9)
Medicare	142.9	128.7	−14.1 (−19.2 to −9.0)
Hospitalization	3.7	3.7	0 (−0.1 to 0.1)
Discharge	27.3	29.2	1.8 (0.7 to 2.9)

economic events in Illinois causing change in ED use may also affect our results if they occurred with the ACA health insurance expansion. However, interrupted time series analysis mitigates this limitation because it adjusts for any baseline trends or changes that do not occur simultaneously with the intervention (ACA health insurance expansion).[21] Other limitations include the absence of out-of-state ED visits by Illinois residents. Because out-of-state ED visits were not

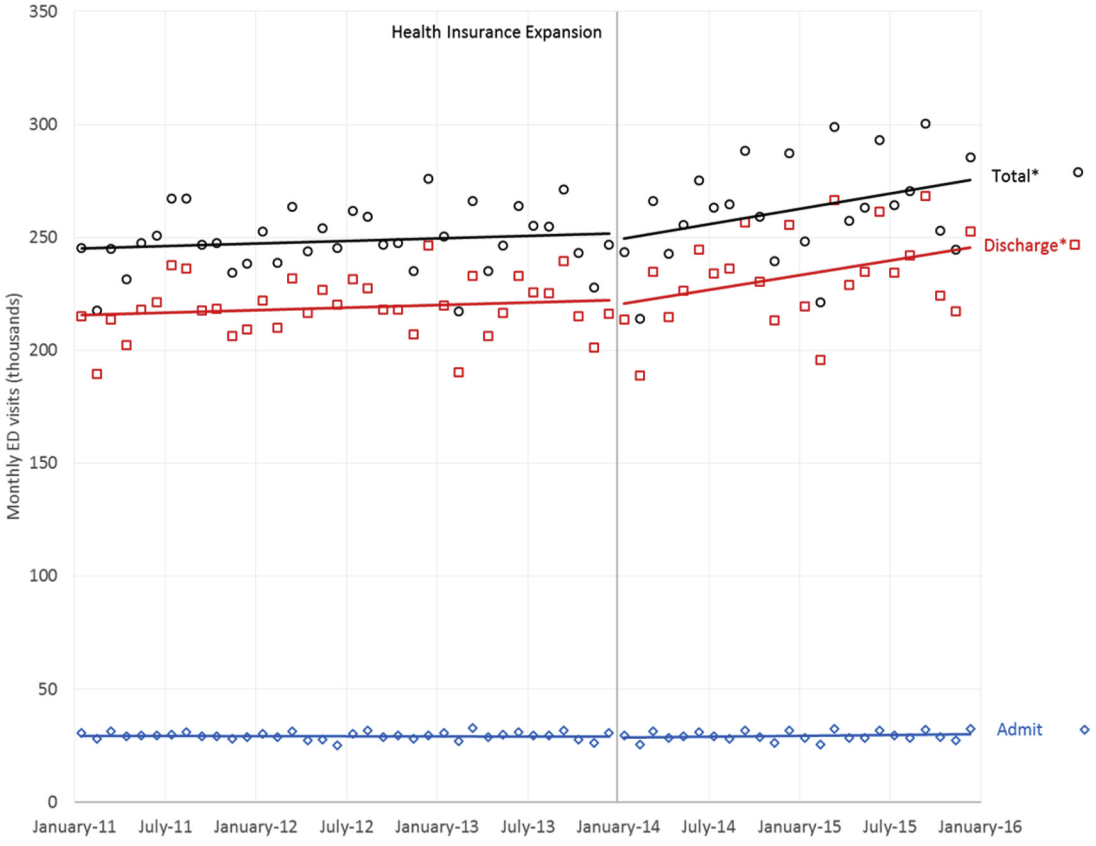

Figure 1. Monthly Illinois ED visits for patients aged 18 to 64 years by disposition from the ED (2011 to 2015). **P* value for change in interrupted time series analysis slope coefficient <.05.

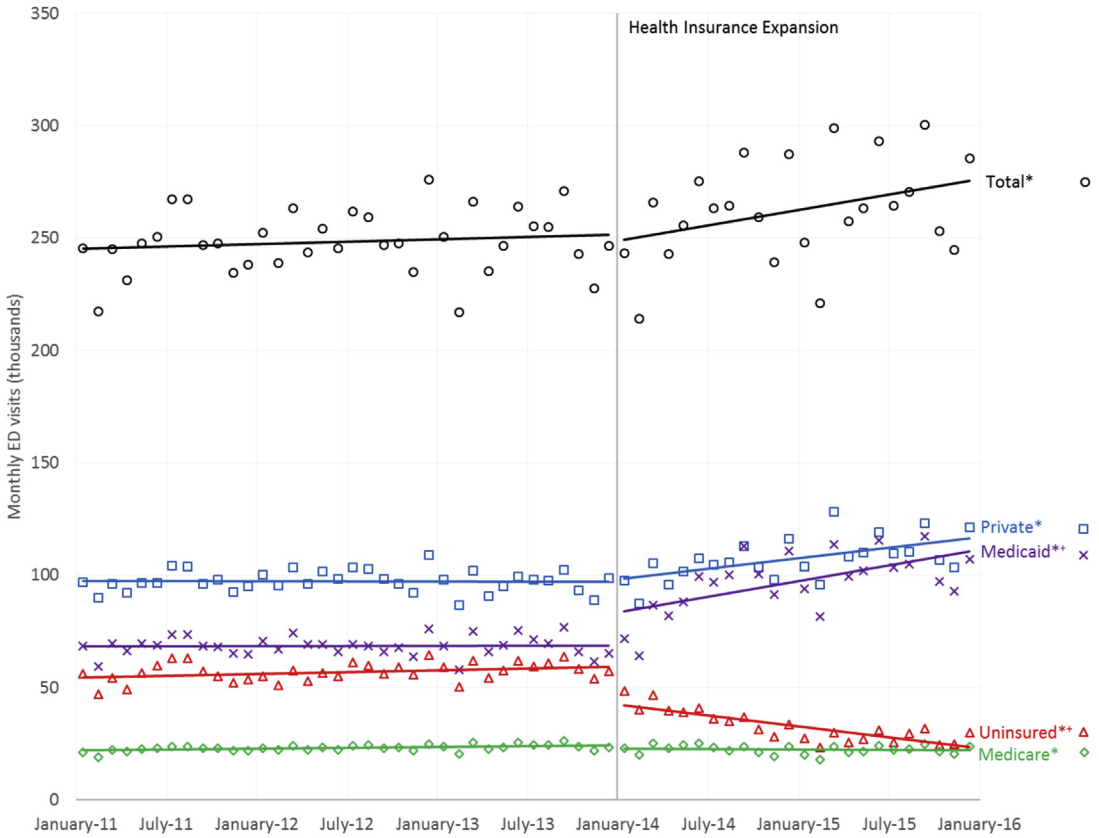

Figure 2. Monthly Illinois ED visits for patients aged 18 to 64 years by primary payer (2011 to 2015). **P* value for interrupted time series analysis slope coefficient <.05. †*P* value for change in interrupted time series analysis intercept coefficient <.05.

included in the data set, ED use rates are an undercount. However, this effect is likely to be limited. With the exception of the area surrounding St. Louis, MO, most hospital beds near Illinois population centers are located in Illinois, not out of state.[23] Additionally, the denominators of health insurance coverage are likely a slight overcount because some patients may note more than 1 insurance type.[19]

We used annual estimates of health insurance coverage as the denominator for payer-specific monthly rates of ED use. Large year-over-year changes in health insurance coverage may artificially increase the difference in monthly payer-specific ED visit rates from December to January in each year. However, the interrupted time series analysis included season in the model to adjust for the seasonal differences affected by using annual estimates for insurance coverage. Using 2014 estimates to compute 2015 ED visit rates may not accurately reflect changes in payer-specific populations for 2015 and may alter our results. However, inflating population denominators according to 2015 results of the National Health Interview Study did not produce any significant changes in our results. We were unable to determine whether patients with private insurance purchased it through the health insurance exchanges implemented as part of the ACA or whether it was provided through their employer. COMPdata do not contain patient identifiers, so the data presented here do not identify patients who had changes in their insurance coverage. Using counterfactual projections to estimate the effect of the ACA assumes that the pre-ACA trends would continue as expected. Finally, this study was limited to 2 years after ACA health insurance expansion. If changes in health insurance coverage stabilize or if care coordination efforts increase for Medicaid patients, the "final" effect of ACA health insurance expansion on ED use may be different.

DISCUSSION

This study demonstrates that average monthly ED visit volume by adults aged 18 to 64 years in Illinois increased after ACA health insurance expansion. The increase in total ED visit volume was driven by an increase in visits resulting in discharge from the ED. Hospitalizations through the ED were essentially unchanged through the study period.

Evaluation of ED visit volume by insurance type demonstrates that the modest but significant post-ACA increases in total ED visits came in the setting of large shifts

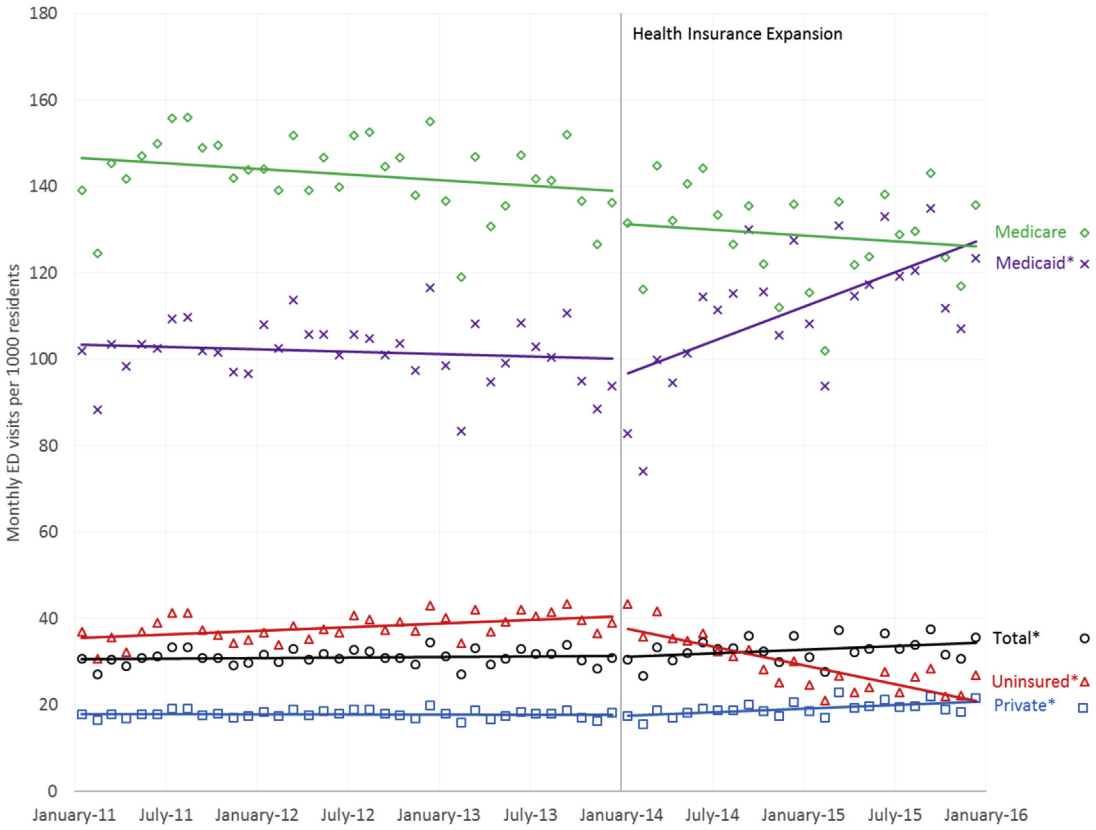

Figure 3. Monthly Illinois ED visit rates per 1,000 residents by primary payer (2011 to 2015). **P* value for interrupted time series analysis slope coefficient <.05.

in insurance coverage of ED patients. A large increase in Medicaid visits and a smaller increase in privately insured visits outpaced a large reduction in ED visits by uninsured patients. When examined as rates per 1,000 residents, there was a modest increase in overall ED visit rates and, for privately insured residents, a large increase for Medicaid patients, but a large decrease for uninsured patients. These post-ACA changes are significantly different from previous trends in ED use before ACA implementation. The 2 interrupted time series models differ in their estimation of the level (intercept) effect. For the uninsured and Medicaid populations, there were significant slope and intercept changes in total volume, but only significant changes in the slope for the population-based rates. It appears that the immediate change in numbers of residents covered by Medicaid and private insurance led to a significant and immediate level change in monthly volume beginning in January 2014. Rates per 1,000 residents appear to have changed more slowly over time.

The increase in total ED visit volume runs contrary to one of the key intents of health insurance expansion, "to reduce higher cost services such as ED visits."[24] However, these results are consistent with many studies of ED use after health insurance expansion in the United States. In Massachusetts, there was a 2.2% annual increase in ED visit volume attributable to the implementation of Massachusetts health reform in 2006, measured 2 years after its implementation.[9] However, that change was not significantly different from changes in ED visits observed in neighboring states, and changes in ED visits varied, depending on pre-expansion health insurance.[10,25] In Oregon, residents randomly selected for Medicaid enrollment and followed for 18 months had a 40% increase in ED visits compared with residents who were not selected.[11] Our results are also consistent with reports on early increases in ED use after ACA implementation in several Medicaid expansion states.[14,26]

However, not all studies of health insurance expansion have shown an increase in ED use. Before ACA implementation in Virginia, low-income adults who had extended health care coverage through a community-based primary care program were shown to have fewer ED visits and lower overall costs.[12] However, this intervention also assigned patients to primary care physicians and reimbursed at a higher rate than Medicaid. It also took up to 3 years of continuous enrollment in the program before significant savings were realized. After expansion of private health insurance to young adults aged 19 to 25 years in 2010 as

part of the ACA, there was a 1.5% decrease in ED visits in this population in California, Florida, and New York.[13] Additionally, ED visits in Maryland and the District of Columbia decreased in the first 4 months after ACA implementation.

The mixed results of previous studies of health coverage expansion suggest that multiple factors may influence changes in ED visit volume. Prevalence of uninsurance, absence of Medicaid expansion, availability of primary care, financial incentives to hospitals and clinicians, and effectiveness of care coordination likely influence the local and statewide responses to the ACA health insurance expansion.

To our knowledge, this is the first study to evaluate statewide ED visit volume with 2 years of data after ACA health insurance expansion. We used a multiyear pre-ACA period to better understand longer-term pre-ACA trends in ED use. This study is also among the first to report ED visit rates that reflect population-level changes in insurance coverage for the 18- to 64-year-old patient cohort.

ED visit rates incorporate both the changes in total ED visit volume (numerator) and those in population by insurance status (denominator). Therefore, changes in visit rates reflect difference in ED use patterns in addition to what can be explained by changes in population. The increase in the overall ED visit rate in Illinois is consistent with the fact that people are more likely to use health services when financial barriers to care are removed.[27] The stable population-based rate of hospitalization suggests that the increase in ED visits may be related to visits for lower-acuity complaints compared with those that require hospitalization. This does not indicate that these are "unnecessary" or "preventable" ED visits. Before the implementation of the ACA, many researchers and policymakers suggested that ED patients with low-acuity complaints use the ED because they have nowhere else to go, and that providing the uninsured with health insurance would increase access to timely and effective primary care.[28-30] However, after Massachusetts health reform, patients with Medicaid or subsidized private insurance (as is currently available nationwide through health insurance exchanges) continued to have financial and nonfinancial barriers to timely and effective outpatient care.[31] As uninsured residents, including many without a history of longitudinal primary care, transitioned to Medicaid or subsidized private health insurance, financial barriers to emergency care lessened and may have influenced the increase in ED visits.[9]

The same dynamic observed after Massachusetts health reform may be occurring in Illinois after ACA health insurance expansion. Low-income adults in 2 Medicaid expansion states were more likely to have a usual source of care outside the ED after Medicaid expansion, but also more likely to have an ED visit because an office visit was unavailable.[32] Having a usual source of care does not necessarily confer access to timely and effective outpatient care, particularly after hours, on weekends, or when care is thought to be too time consuming or complex for the office. A 2013 survey of Medicaid providers in 15 metropolitan areas found that an average wait time to consult a physician was 18.5 days, with a metropolitan high of 45.4 days (Boston).[33] Although it is beyond the scope of this study to measure, if primary care wait times for Medicaid patients are increasing in Illinois, as they did in Massachusetts, patients may believe they have no other option for timely and effective acute care besides the ED. However, as states and hospitals adapt to new care coordination models, including Medicaid managed care, changes in barriers to outpatient care and ED visits may alter the changes in ED use measured in this study.

In summary, ED visit volume among patients aged 18 to 64 years increased modestly but significantly in Illinois after ACA health insurance expansion, but hospitalizations through the ED did not. A large post-ACA increase in Medicaid visits and a modest increase in privately insured visits outpaced a large reduction in ED visits by uninsured patients. These changes are more than can be explained by changes in insurance coverage alone and have persisted for the 2 years since ACA implementation. However, it is still unknown whether these results represent longer-term changes in health services use or a temporary spike in ED use because of pent-up demand. Potential explanations for increased ED visits should be evaluated as new care coordination models are implemented and tested.

The authors acknowledge Matt Stone, BA, and Stephanie Nixon, BA, from Strategic Planning & Business Development, Northwestern Memorial HealthCare, for their assistance with study data acquisition.

Supervising editor: Melissa L. McCarthy, ScD

Author affiliations: From the Department of Emergency Medicine (Dresden, Powell, McHugh), Center for Healthcare Studies (Dresden, Powell, Kang, McHugh), and Division of General Internal Medicine and Geriatrics (Cooper, Feinglass), Northwestern University Feinberg School of Medicine, Chicago, IL.

Author contributions: SMD and JF conceived the study and obtained research funding. RK, AJC, and JF analyzed the data and provided statistical advice on study design. ESP and MM advised about clinical and policy implications of the findings. SMD drafted the article, and all authors contributed substantially to its revision. SMD 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 as per ICMJE conflict of interest guidelines (see www.icmje.org). The authors have stated that no such relationships exist and provided the following details: This research was supported by the 2015 Emergency Medicine Foundation Health Policy Grant.

Publication dates: Received for publication February 29, 2016. Revisions received May 27, 2016, and June 14, 2016. Accepted for publication June 16, 2016.

Presented at the Society for Academic Emergency Medicine annual meeting, May 2016, New Orleans, LA.

REFERENCES

1. United States Congress. House Office of the Legislative Counsel, House Committee on Ways and Means, House Committee on Energy and Commerce, House Committee on Education and Labor. *Compilation of Patient Protection and Affordable Care Act: As Amended Through November 1, 2010 Including Patient Protection and Affordable Care Act Health-Related Portions of the Health Care and Education Reconciliation Act of 2010*. Washington, DC: US Government Printing Office; 2010.
2. *US Department of Health and Human Services Strategic Plan Fiscal Years 2010-2015*. Washington, DC: US Dept of Health & Human Services; 2010.
3. Remarks by the President on the Affordable Care Act. *Speeches & Remarks*. The White House Office of the Press Secretary. Available at: https://www.whitehouse.gov/the-press-office/2014/04/01/remarks-president-affordable-care-act. Accessed May 13, 2016.
4. Feinglass J, Nonzee NJ, Murphy KR, et al. Access to care outcomes: a telephone interview study of a suburban safety net program for the uninsured. *J Community Health*. 2014;39:108-117.
5. Ginde AA, Lowe RA, Wiler JL. Health insurance status change and emergency department use among US adults. *Arch Intern Med*. 2012;172:642-647.
6. Tang N, Stein J, Hsia RY, et al. Trends and characteristics of US emergency department visits, 1997-2007. *JAMA*. 2010;304:664-670.
7. Cheung PT, Wiler JL, Ginde AA. Changes in barriers to primary care and emergency department utilization. *Arch Intern Med*. 2011;171:1397-1399.
8. Smulowitz PB, Lipton R, Wharam JF, et al. Emergency department utilization after the implementation of Massachusetts health reform. *Ann Emerg Med*. 2011;58:225-234.e221.
9. Smulowitz PB, O'Malley J, Yang X, et al. Increased use of the emergency department after health care reform in Massachusetts. *Ann Emerg Med*. 2014;64:107-115, 115.e101-103.
10. Chen C, Scheffler G, Chandra A. Massachusetts' health care reform and emergency department utilization. *N Engl J Med*. 2011;365:e25.
11. Taubman SL, Allen HL, Wright BJ, et al. Medicaid increases emergency-department use: evidence from Oregon's Health Insurance Experiment. *Science*. 2014;343:263-268.
12. Bradley CJ, Gandhi SO, Neumark D, et al. Lessons for coverage expansion: a Virginia primary care program for the uninsured reduced utilization and cut costs. *Health Aff (Millwood)*. 2012;31:350-359.
13. Hernandez-Boussard T, Burns CS, Wang NE, et al. The Affordable Care Act reduces emergency department use by young adults: evidence from three States. *Health Aff (Millwood)*. 2014;33:1648-1654.
14. Impact of Medicaid Expansion on Hospitals: Updated for Second-Quarter 2014: Colorado Hospital Association, Center for Health Information and Data Analytics; 2014. Available at: http://www.cha.com/Documents/CHA-Study/FINAL-CHA-Medicaid-Expansion-Study-Q2-Sept-2014.aspx. Accessed May 13, 2016.
15. Hard data contradicts ACEP survey of emergency physicians. Future of Healthcare, MEP News. Available at: http://www.mephealth.com/the-shift/the-shift/future-of-healthcare/national-narrative-er-volumes-likely-wrong/. Accessed February 10, 2016.
16. *2015 ACEP Poll Affordable Care Act Research Results*. Alexandria, VA: American College of Emergency Physicians; 2015.
17. IHA Business Solutions COMPdata Informatics: About Us. Vol 2016. Available at: https://www.compdatainfo.com/About-Us.aspx. Accessed May 13, 2016.
18. American FactFinder. Vol 2016: United States Census Bureau. Available at: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed May 17, 2016.
19. Report US Census Bureau. American Community Survey and Puerto Rico Community Survey 2014 Subject Definitions 2015. Available at: http://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2014_ACSSubjectDefinitions.pdf. Accessed May 13, 2016.
20. Martinez ME, Cohen RA. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey January-June 2015. National Health Interview Survey Early Release Program.* Atlanta, GA: US Dept of Health & Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2015. Available at: http://www.cdc.gov/nchs/data/nhis/earlyrelease/insur201508.pdf. Accessed May 13, 2016.
21. Penfold RB, Zhang F. Use of interrupted time series analysis in evaluating health care quality improvements. *Acad Pediatr*. 2013;13:S38-S44.
22. Wagner AK, Soumerai SB, Zhang F, et al. Segmented regression analysis of interrupted time series studies in medication use research. *J Clin Pharm Ther*. 2002;27:299-309.
23. Baker LC, Baker LS. Excess cost of emergency department visits for nonurgent care. *Health Aff (Millwood)*. 1994;13:162-171.
24. Statement of Kathleen Sebelius Secretary US Department of Health and Human Services on the President's Fiscal Year 2012 Budget: Committee on Ways and Means, United States House of Representatives; 2011. Available at: http://www.finance.senate.gov/imo/media/doc/041014%20Senate%20Finance%20testimony%20-%20Sebelius%20FINAL.PDF. Accessed May 13, 2016.
25. Lee J, Ding R, Zeger SL, et al. Impact of subsidized health insurance coverage on emergency department utilization by low-income adults in Massachusetts. *Med Care*. 2015;53:38-44.
26. Laditka JN, Laditka SB, Probst JC. More may be better: evidence of a negative relationship between physician supply and hospitalization for ambulatory care sensitive conditions. *Health Serv Res*. 2005;40:1148-1166.
27. Brook RH, Ware JE, Rogers WH, et al. *The Effect of Coinsurance on the Health of Adults: Results From the RAND Health Insurance Experiment*. Santa Monica, CA: RAND Corp; 1984.
28. Guttman N, Zimmerman DR, Nelson MS. The many faces of access: reasons for medically nonurgent emergency department visits. *J Health Polit Policy Law*. 2003;28:1089-1120.
29. Ragin DF, Hwang U, Cydulka RK, et al. Reasons for using the emergency department: results of the EMPATH Study. *Acad Emerg Med*. 2005;12:1158-1166.
30. Young GP, Wagner MB, Kellermann AL, et al. Ambulatory visits to hospital emergency departments. Patterns and reasons for use. 24 Hours in the ED Study Group. *JAMA*. 1996;276:460-465.
31. McCormick D, Sayah A, Lokko H, et al. Access to care after Massachusetts' health care reform: a safety net hospital patient survey. *J Gen Intern Med*. 2012;27:1548-1554.
32. Sommers BD, Blendon RJ, Orav EJ. Both the "private option" and traditional Medicaid expansions improved access to care for low-income adults. *Health Aff (Millwood)*. 2016;35:96-105.
33. *Physician Appointment Wait Times and Medicaid and Medicare Acceptance Rates*. Irving, TX: Merritt Hawkins; 2014.