

## Brief Report

# A Ten-Year before–after Study on the Impact of the Affordable Care Act Health Insurance Expansion on Emergency Department Visits in California, U.S.

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**Abstract:** The Affordable Care Act (ACA) implemented in the U.S. aimed to improve healthcare access by expanding insurance coverage. To study the impact of ACA on Emergency Departments (Eds), we conducted a multi-center observational retrospective study of ED visits from all nonfederal acute care hospitals in California over a 10-year period (2009 and 2018), 5 years before and after ACA implementation. Primary outcome measures included total ED visits, health insurance, disposition, and diagnoses, including ambulatory-care-sensitive conditions (ACSCs), and were analyzed each year to assess for trends during the 10-year study period. Overall, ED visits increased from 8,475,330 (30,791/100,000 population) in 2009 to 11,389,384 in 2018 (37,255/100,000 population), an increase of 21.0%, with the largest increase in 2014, the first year of ACA. The payer mix also dramatically changed, with a significant drop in uninsured patient visits (21.5% to 7.8%) and an increase in government-funded Medicaid visits (18.9% to 35.7%). There was a slight decrease in visits resulting in hospitalization or transfer (21.2% to 18.1% of all D visits) and ASCS visits (173.2 to 144.3 per 1000 ED visits). In conclusion, ED visits increased significantly in California following ACA, with a decrease in uninsured patients and small decreases in both hospitalizations/transfers.



**Citation:** Chan, T.C.; Brennan, J.J.; Castillo, E.M. A Ten-Year before–after Study on the Impact of the Affordable Care Act Health Insurance Expansion on Emergency Department Visits in California, U.S. *Emerg. Care Med.* **2024**, *1*, 31–38. <https://doi.org/10.3390/ecm1010005>

Academic Editor: Raimundas Lunevicius

Received: 18 December 2023

Revised: 6 January 2024

Accepted: 23 January 2024

Published: 29 January 2024



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**Keywords:** emergency department; healthcare access; insurance coverage; Affordable Care Act; healthcare utilization

## 1. Introduction

The Patient Protection and Affordable Care Act (ACA) of 2010 represented a major expansion of health insurance coverage in the United States. The overarching goal of ACA was to improve access, lower costs, and improve the quality of healthcare in this country. As part of ACA, the federal law included new health insurance requirements for both employers and individuals, the expansion of Medicaid coverage (government medical insurance for lower-income populations) in those states that agreed, and the establishment of marketplace health insurance exchanges, run by the states or the federal government, to improve access for all Americans.

Following the initial open enrollment period for ACA (late 2013 and early 2014), an estimated 14 to 16 million net individuals obtained health insurance coverage, significantly reducing the uninsured population in the United States [1]. Given this remarkable expansion, many believe the ACA would have “far-reaching influence on the practice of Emergency Medicine” in this country [2]. Aspects of the law and the expansion of coverage focused on impacting both the demand for unscheduled care and the utilization of Emergency Departments (EDs).

However, data on whether ACA has resulted in significant and lasting changes in ED utilization are variable. In terms of insurance coverage, studies have indicated a significant decrease in ED visits by patients who were uninsured [3]. However, it is unclear whether increased insurance coverage led to greater access to primary care that

would impact ED utilization. Specifically, the impact on acute and chronic ambulatory-care-sensitive conditions (ACSCs)—what others call “potentially avoidable” conditions (assuming optimal access to primary care)—is unclear [4,5].

To assess the impact of ACA over a longitudinal period, we analyzed ED utilization each year for 5 years prior to ACA compared to 5 years following implementation to assess the impact of ACA on ED visits throughout California, the largest state in the U.S. by population and which participated in both the ACA Medicaid expansion, as well as operating its own state insurance exchange.

## 2. Materials and Methods

### 2.1. Study Design, Data Collection, and Processing

This was a multi-center retrospective cohort study of hospital ED visits from all nonfederal acute care hospitals in the State of California between 2009 and 2018. We reviewed data from the Department of Health Care Access and Information (HCAI) in the State of California. All state-licensed hospitals in California (excluding veteran or Department of Defense facilities) are required to report healthcare utilization data in a standardized format to HCAI each year. These data are reported in real time from all non-military acute care hospitals in California to HCAI and do not involve claims data which can be delayed.

Data reported here were from two separate encounter-based data sources. Patients included in the patient discharge dataset who were admitted from an ED were extracted and merged with the emergency department dataset to construct a complete ED utilization database. Utilization can be assessed over time by using a record-linking number. Population estimates used to calculate rates were provided by the California Department of Finance. Visits for adult patients 18 years or older during the 10-year study period were included for analysis. All maternity-related visits were excluded based on International Classification of Disease 9th Revision Clinical Modification (ICD-9-CM) primary diagnoses codes (630.x to 676.x, 678.x to 679.x, and V24). This study was approved by our local Human Subjects Institutional Review Board.

### 2.2. Outcome Measures

We analyzed data from all ED visits for the 326 nonfederal acute care hospitals operating in the state during the 10-year study period reported by HCAI. Outcome measures included ED visit/utilization rates, payer mix, disposition, and diagnoses. Measures for this study consisted of standardized utilization data reported to HCAI, which included demographic information (age, gender, ethnicity/race), service date, hospital, primary source of payment or insurance coverage, discharge disposition, and up to 25 diagnoses and 20 procedure codes (ICD-9-CM). Patient characteristics, including age, gender, race/ethnicity, expected payer, and discharge disposition, are reported for the five years prior (pre-ACA: 2009–2013) to and the five years after (post-ACA 2014–2018) the implementation of the ACA.

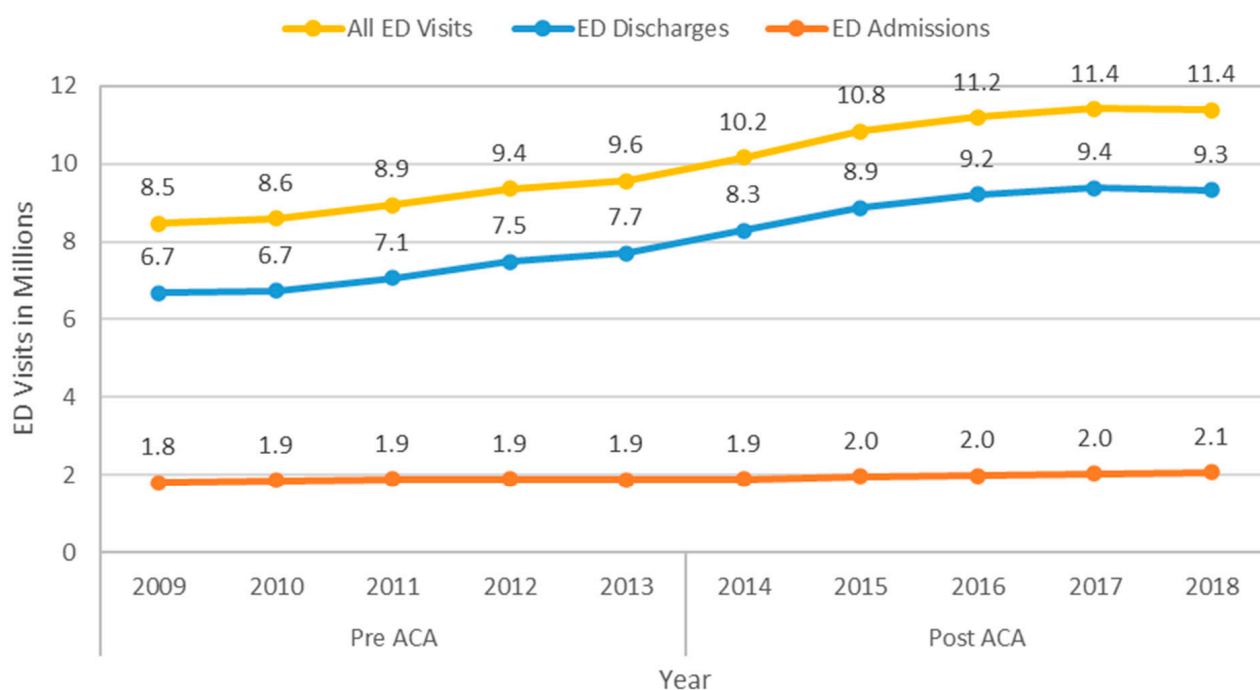
ACSC diagnoses were determined for each visit utilizing the criteria for prevention quality indicators as defined by the Agency for Healthcare Research and Quality [5]. Acute ACSC included three prevention quality indicators: dehydration, bacterial pneumonia, and urinary tract infection. Chronic ACSC included eight prevention quality indicators: diabetes mellitus (short-term, long-term, uncontrolled, and amputation), chronic obstructive pulmonary disease, asthma, hypertension, and congestive heart failure. While these prevention quality indicators are primarily applied to ED visits resulting in an admission, ACSCs were assessed separately for ED discharges in addition to ED hospitalizations. The primary outcomes for this study include the number of ED visits and number of ACSC diagnoses by year over the 10-year period (both raw counts and rate per 1000 visits).

### 2.3. Analysis

ED visits and utilization were normalized to per capita rates based on annual California census data. The ACSC Prevention Quality Overall Composite rate per 1000 ED visits was reported by payer mix for the pre and post periods annually for both ED admissions (admitted/transferred) and ED discharges (not admitted/transferred). We compared ED patient visits based on payer mix, disposition, and ACSC diagnoses. The differences in the proportion and 95% confidence interval (CI) were calculated by assessing trends annually for the 10-year study period. All statistical analyses were conducted using the IBM SPSS Statistics for Windows, Version 28.0 software package (IBM Corp, Armonk, NY, USA).

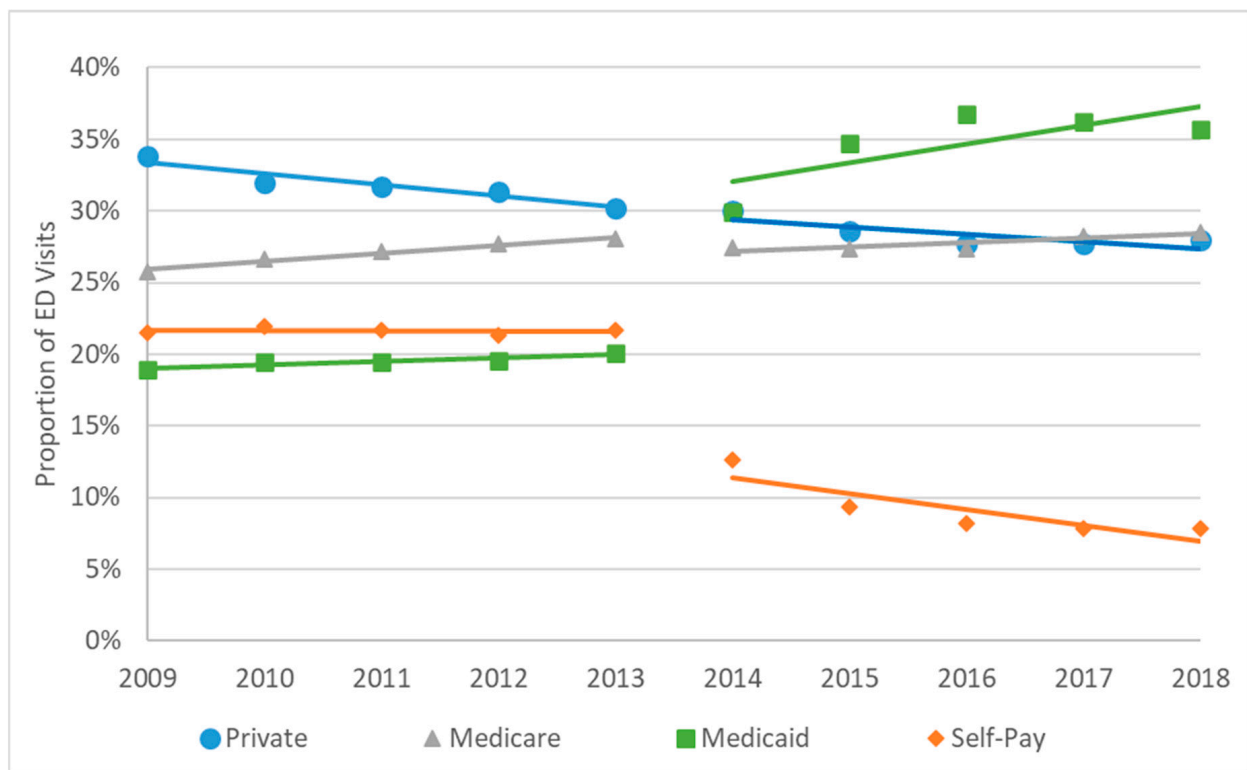
### 3. Results

ED visit rates per 100,000 population from 2009 to 2018 by year and disposition among patients 18 years of age or older are reported in Figure 1. Overall, ED visits increased year-over-year during the 10-year study period, from 8,475,330 (30,791/100,000 population) in 2009 to 11,389,384 (37,255/100,000 population), an increase of 21.0%. The largest increase in ED visit rate occurred between 2013 and 2014, the first year of ACA implementation, from 9,565,082 (32,873 per 100,000 population) in 2013 to 10,165,092 (34,516 per 100,000 population), an increase of 5.0%. In terms of disposition, ED visits resulting in hospital admission or transfer slightly increased over the 10-year period (21.2% to 18.1%) with no change in trend during pre-ACA to post-ACA years. Although overall and discharge visit rates increased from 2013 to 2014, admission visits and rates remained relatively stable.



**Figure 1.** ED utilization and disposition rate, California, 2009–2018.

The payer mix markedly changed from the 5-year pre-ACA period to the 5 years following ACA implementation, which is reported in Figure 2. In particular, the proportion of uninsured or self-pay patient visits decreased from 21.5% in 2009 to 7.8% in 2018, with the largest decrease occurring from 2013 to 2014 (21.7% to 12.6%). In contrast, the proportion of Medicaid (government-funded insurance coverage for lower-income populations) visits increased from 18.9% to 35.7% during the 10-year period, with the largest increase occurring from 2013 to 2014 (20.1% to 29.9%).



**Figure 2.** Proportion of ED visits by payer status, California, 2009–2018.

The prevention quality indicators or the overall composite of ACSC for ED visits by disposition (discharge vs. admitted/transferred) from 2009 to 2018 by the expected payer are presented in Table 1a,b. For all payers, there was a gradual decrease in ACSC ED visits from 2009 (95.8 per 1000 ED visits) to 2018 (91.3 per 1000 ED visits, diff—4.5 visits per 1000 ED visits [CI −4.7 to −4.2]). The largest decreases were seen in Medicaid and Medicare patients (diff −15.1 [CI −15.6 to −14.5] and diff −15.1 [CI −15.7 to −14.4], respectively), with the greatest annual change occurring from 2013 to 2014, the first year of ACA implementation.

**Table 1.** (a) Ambulatory-care-sensitive ED admissions (admitted/transferred) by payer per 1000 visits, California, 2010–2018. Prevention Quality Overall Composite (all except PQI2). (b) Ambulatory-care-sensitive ED discharges (not admitted/transferred) by payer per 1000 visits, California, 2010–2014. Prevention Quality Overall Composite (all except PQI2).

(a)										
Payer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private	114.7	108.9	107	102.7	102.1	97.1	98.5	93.7	93.2	91.2
Medicare	214.7	207.1	201.4	193.6	191.6	182.2	184.1	181.3	184	176.3
Medicaid	174.6	169.5	164.7	159.3	160	146.1	141.5	136.7	137.37	131.24
Uninsured	121.6	118.9	117.7	115.4	115.9	92.3	89.01	87.9	88.11	85.6

(b)										
Payer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private	62.4	61.6	62.4	61.5	61.8	61.8	62.5	61.6	63.4	62.8
Medicare	105.8	105.2	105.7	106.2	107.8	106	109.6	112.4	114.9	114
Medicaid	81.79	80.8	81	79.5	79.8	75.1	74.9	74.8	77.3	76.4
Uninsured	62.8	62.4	62.4	63	62.4	58.1	56.9	56.6	58.3	56.7

#### 4. Discussion

In our study, we report on the impact of the first 5 years (2014–2018) of ACA compared with the 5 year period before ACA (2009–2013) on ED care utilizing data collected by the state from non-military, nonfederal hospitals in California, the largest state in the U.S., representing approximately 10% of the nation's population. We found a notable increase in the absolute volume of ED and per capita visits, particularly in the first year of ACA implementation, with a decreasing trend in the proportion of visits requiring admission. Moreover, there were significant changes in insurance coverage, with a marked increase in ED patients covered by the government-funded Medicaid program for low-income patients and a corresponding decrease in uninsured patients. These changes were most significant in the first year of ACA but persisted throughout the 5 year study period after the plan's implementation.

These findings are unsurprising as the state both participated in Medicaid expansion and the creation of its own state health insurance exchange. Nationally, rates of ED visits by patients who had at least one form of health insurance increased markedly, with significantly lower rates of visits by uninsured patients [3,6]. In a review of National Hospital Ambulatory Medical Care Survey (NHAMCS) data, Orgel reported that the increase in insured ED patients was largely driven by Medicaid [6]. Accordingly, this finding was most significant in states that participated in Medicaid expansion compared with those that did not implement this aspect of ACA [6–9].

The changes in the payer mix seen in the ED reflect state and national data regarding the changes in healthcare insurance throughout the U.S. population with the implementation of ACA and the extension of coverage to nearly 20 million previously uninsured individuals [10]. The impact of ACA and increased health insurance coverage on ED utilization, which has steadily climbed over the last 3 decades prior to 2020, is less clear [11]. Changes in insurance coverage have been shown to result in significantly more ED utilization within the first year than in subsequent years [12].

Our study looked at a period of time of 5 years after the implementation of ACA. We found ED utilization rates per capita were increasing annually in the 5 years before ACA and continued to increase in the 5 years after ACA, with the largest proportional increase seen in the first year of implementation. These findings mirror similar reports on ED visits and utilization in California and on a national level [3,13,14].

Because of the overall trend in ED visits during this time, the actual impact of ACA on global ED utilization is a matter of some debate. Increased financial coverage may have contributed to increased ED visit rates to address “pent-up” demand for medical care [15,16]. Data from Medicaid suggest this population has a high rate of non-emergency and lower-acuity visits to the ED [16]. In addition, expansion of Medicaid eligibility to more uninsured could result in an increase in ED visits for health problems that have been untreated or undertreated previously [17]. Keyes et al. reported an increase in low-acuity visits to the ED by insured patients after ACA [18].

Alternatively, greater access to primary and other alternative care settings as a result of new insurance coverage may have reduced reliance on the ED, possibly slowing the rise in visits. Private insurance obtained from the exchange marketplace, often with high-deductible plans and cost-sharing with the patient, may discourage visits to the ED in that population, with fewer lower-acuity presentations and possibly more cases in which medical treatment is delayed.

While reporting persistent growth in ED visits nationally in the first few years after ACA, Singer et al. also reported a decrease in hospitalization rates, possibly reflective of improved access to other outpatient care venues [3]. McConville et al. reported lower rates of so-called “frequent users” of the ED amongst Medicaid and uninsured patients after ACA in California [19].

In our study, we analyzed ACSC ED visits that would potentially be more impacted by the implementation of ACA. These ACSCs in our study are defined as “diagnoses for which timely and effective outpatient care can help to reduce the risks of hospitalization



by preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease or condition” [20,21]. There was a small decrease in ACSC ED visits from 2009 to 2018 but large decreases among Medicaid and uninsured patients after the implementation of the ACA in 2014 that persisted through the post-ACA period. These findings were more pronounced amongst patients who were admitted or transferred from the ED. This finding could be due to ongoing healthcare reforms, particularly for government health insurance programs, including disincentives for inpatient admission and incentives for greater outpatient management of many of these primary care treatable conditions. These findings provide some evidence that the ACA, with increased insurance coverage, along with these other healthcare reform measures, may have had an impact on overall ED patient acuity.

### *Limitations*

This study has a number of limitations. First, data were extracted from ED and hospital administrative data reported to the State of California retrospectively and were limited to the specific data elements required by the HCAI. Second, while data were reported for the nonfederal acute care hospitals in the state, our findings are specific to California, as well as to those that participated in the Medicaid expansion program under ACA. These findings may not be generalizable to other states that enacted ACA elements in a different manner or did not participate in the Medicaid expansion aspect. Our findings are likely conservative because the ACA was already implementing Medicaid-like expansions before the implementation of the ACA [22,23].

Moreover, while our results provide additional information regarding the relationship between healthcare financing and ED utilization, our findings may not be generalizable to other countries with different forms of coverage. Pre-ACA studies comparing ED utilization in Canada, which has universal coverage, versus the U.S. reported similar ED visit rates and patterns [24]. In a descriptive study comparing 15 non-U.S. countries, ED utilization and crowding were common even among countries with universal publicly funded health insurance programs [25]. It is likely that many other factors beyond healthcare financing and insurance drive ED utilization, including demographic factors (i.e., age of the population), environmental influences and health behaviors (i.e., smoking prevalence), and other social determinants and health equity measures [26].

Third, while our study analyzed ED data over 10 years, this time period preceded the COVID-19 pandemic, which has had a significant impact on ED and healthcare utilization overall worldwide [27]. The pandemic resulted in significant declines in ED visits in the U.S. initially, with more recent returns to pre-pandemic utilization levels associated with ED crowding [28].

Finally, while we compared the 5-year period before and after ACA implementation, we cannot absolutely and directly attribute all our findings to ACA. Other important changes in emergency medicine and healthcare economics occurred simultaneously and, in fact, in concert with ACA, including the shift toward population health management, patient/provider cost- and risk-sharing, information technology adoption, and other factors such as changing demographics (including changes in the undocumented population not covered by ACA) that also could have impacted our findings regardless of ACA.

### **5. Conclusions**

In our study of nonfederal acute care hospitals in California, ED visit rates have increased in the context of Medicaid expansion, while the proportion of visits resulting in admission has decreased. At the same time, however, there has been an overall decrease in visits for potentially avoidable conditions, with the most dramatic decreases noted among Medicaid and Medicare patients.

**Author Contributions:** Conceptualization, T.C.C. and E.M.C.; study design, T.C.C. and E.M.C.; methodology, E.M.C. and J.J.B.; validation, E.M.C. and J.J.B.; formal analysis, T.C.C., E.M.C. and J.J.B.; resources, T.C.C.; data curation, E.M.C. and J.J.B.; writing—original draft preparation, T.C.C.; writing—review and editing, T.C.C. and E.M.C.; visualization, E.M.C.; supervision, T.C.C.; project administration, T.C.C. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** This study was conducted in accordance with the Declaration of Helsinki and approved by the State of California, Health and Human Services Agency, Committee for the Protection of Human Subjects and the Institutional Review Board of the University of California, San Diego.

**Informed Consent Statement:** Patient consent was waived due to retrospective data collected without personal identifying information.

**Data Availability Statement:** Restrictions apply to the availability of these data. Data were obtained from the State of California, Department of Health Care Access and Information (<https://hcai.ca.gov/>) downloaded on 14 December 2022.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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