Do Freestanding Emergency Departments in Texas Alleviate Congestion in Hospital-based Emergency Departments?

**Journal:** Academic Emergency Medicine

**Author**: Yingying Xu (initial: YX)

**Author Affiliations**: Department of Economics, Baker Institute for Public Policy, Rice University

**Keywords**: Freestanding Emergency Departments, Hospital Congestion, Visit Volume, Effective Emergency Care

**Word Count**:

**Prior Presentations: ASHEcon Poster**

**Funding Sources/Disclosures:** Rice University

**Acknowledgments:**

**Abstract:**

**Objectives**: Ever since the passage of the Texas Freestanding Emergency Medical Care Facility Licensing Act in 2009, freestanding Emergency Departments (EDs) have flourished in Texas. This study aims to answer the question of whether the entry of freestanding EDs alleviated congestion in hospital-based EDs.

**Methods**: I used hospital-based ED annual visit volume, median wait time, length of visit for discharged patients and drop-out rate as the dependent variables of interest. My main explanatory variables were the numbers of freestanding EDs within the same markets of hospital-based EDs, and a dummy variable for whether the hospital owned satellite EDs in outlying areas. I used generalized linear models to investigate the impacts.

**Results**: My results reveal that hospital ED visits, wait times, length of visit for discharged patients, and drop-out rates were not influenced by the entry of freestanding EDs, neither independent freestanding EDs nor hospital satellite EDs. Setting up hospital-affiliated satellite EDs significantly increased the overall ED visits, but did not help with the wait times, length of visit or drop-out rates in main hospital-based EDs.

**Conclusions**: The entry of freestanding EDs didn’t help relieve congestion in nearby hospitals. By offering more choices, they expanded the market and increased the usage of emergency services. As a result, the existing policy, instead of relieving the hospital burden, stimulated the demand for emergency services and increased healthcare spending in Texas.

**Introduction:**

The past decade has witnessed a growing trend in using emergency care. Based on the 2015 National Hospital Ambulatory Medical Care Survey[[1]](#footnote-1), the number of Emergency Department (ED) visits reached 136.9 million nationally, with an average of 0.43 visit per person annually. Texas, as the second most populous US state, had nearly 12 million ED visits in 2016[[2]](#footnote-2). It is often argued that the sharp rise in ED visits limits access to timely emergency care.

In an effort to relieve hospital emergency congestion and help patients access care in emergency service shortage areas, freestanding EDs were introduced in many states in the U.S. Seeking emergency care is not necessary to be a traditional hospital-based ED. Freestanding EDs, which are structurally separate and distinct from hospitals, flourished in urban communities and changed the emergency service markets.

Two types of freestanding EDs, independent freestanding EDs and hospital-affiliated satellite EDs, can be found in Texas. The first independent freestanding ED opened in 2010 when the 81st Texas State legislature created the Texas Freestanding Emergency Medical Care Facility Licensing Act[[3]](#footnote-3). Those independent freestanding EDs are not required to function under a hospital’s license and can be operated by private parties. The hospital-affiliated satellite EDs are owned and operated by their parent hospitals or hospital systems. Different from independent freestanding EDs, satellite EDs receive Medicare and Medicaid reimbursement and get paid by private insurance under the name of their parent hospitals. Both types of freestanding EDs thrive in the loose regulatory environment in Texas. By the end of 2016, the state had over 300 freestanding EDs, and about two-thirds were privately owned and for-profit independent freestanding EDs.

**Importance**

The proliferation of freestanding EDs has provided both opportunities and challenges for healthcare providers, legislators, and payers. Freestanding EDs provide time-effective emergency care without long wait times in hospitals. For those patients with low-acuity suffering from long wait times in hospitals, a shorter wait time at freestanding EDs is attractive. However, critics argue that the facilities increased overall healthcare spending, by serving as supplements rather than substitutes to traditional emergency rooms. Offering more choices in the healthcare market is likely to increase utilization and spending[[4]](#footnote-4). By locating in wealthy communities[[5]](#footnote-5) [[6]](#footnote-6), freestanding EDs delivered emergency care in a high cost setting. The cost at freestanding EDs was 10 times higher than urgent care centers under the same diagnosis[[7]](#footnote-7). According to Ho’s analysis, the bills from freestanding ED services show rates similar to full-service hospital EDs, even though they often provide less resource‐intensive care. Additional research also suggested patients in freestanding EDs had fewer comorbidities, shorter length of stay and lower hospital admission rates[[8]](#footnote-8). Both the 2017 and 2018 MedPAC reports to congress[[9]](#footnote-9) suggested reducing Medicare payment rates for visits to satellite EDs in urban areas. Any revision in Medicare payments might also trigger changes in private insurance reimbursements. Blue Cross Blue Shield, one of the biggest insurers in Texas, made a controversial announcement that they would not pay for non-emergency ER visits in early 2018[[10]](#footnote-10).

Though many physicians and policy makers claimed that freestanding EDs would reduce patient volume at hospitals, the literature contains only limited quantitative studies about the impact of freestanding EDs on access to emergency care. Different from California and many other states with restrictive state regulations towards freestanding EDs[[11]](#footnote-11), Texas has a relatively loose policy and a range of cities with different sizes. As the second most populous state with more than 300 freestanding EDs, Texas is a good example to study the phenomenon of emergency market competition after introducing freestanding EDs.

**Overall work**

This work aims to argue whether freestanding EDs in the emergency market help relieve the burden of hospital-based EDs. My hypothesis is that the entry of freestanding EDs decreased ED visits, wait times, length of visit for discharged patients and drop-out rates in nearby hospital EDs. The entry was defined in two aspects, the number of freestanding EDs nearby, and whether the hospital built its own satellite EDs. I examined all hospitals in Texas and showed the impact of new freestanding EDs on hospital-based EDs. For direct comparison of hospital performance before and after, I identified the volume of visits, wait times, length of visit for discharged patients and drop-out rates as the most important determinates to measure congestion in hospital-based EDs during 2010 to 2016.

**Methods:   
Study design, setting and population**

The goal of this work is to investigate whether the entry of freestanding EDs helped relieve ED congestion in nearby hospitals and improve hospital emergency service efficiency. This study was approved by the Institutional Review Board (IRB) at Rice University.

There are two types of freestanding ED facilities: Independent freestanding EDs and hospital-affiliated satellite EDs. Locations and entry/exit dates for independent freestanding EDs and hospital-based EDs were acquired online from the Texas Department of State Health Services for facilities. Locations for hospital satellite EDs were recorded by visiting the website for each hospital with satellite ED(s) and contacted by through website search or phone calls to obtain their opening dates. This search process identified 325 independent freestanding EDs and 121 hospital satellite EDs between 2010 and 2016.

Hospital-based ED annual visit volumes were obtained from the American Hospital Association’s Annual Survey from 2010 to 2016. For hospitals owned satellite EDs, annual visits also included visits to affiliated satellite EDs. I excluded military/behavioral hospitals in the sample. A total of 370 hospitals remained open during my target period.

Hospital ED efficiencies were defined as emergency room wait time, length of visit for discharged patients and drop-out rate in main hospital-based ED. The measurements were obtained from the Centers for Medicare and Medicaid Service (CMS) “Hospital Compare Timely and Effective Care Survey” from 2012 (the earliest year available) to 2016. The **Wait Time** was the median time from door to diagnostic evaluation by a qualified medical professional. Length of visit for discharged patients (short for “**Discharge Time**” thereafter) measured the time from ED arrival to ED departure for discharged patients. ED annual **Drop-out Rate** was the percentage of patients that left without being seen.

Public Use Microdata Area (PUMA)-level data on population; average household income; percentages of residents with Medicaid, Medicare, private, or any type of insurance; percentage of residents who were Hispanic or Black; and percentage of residents with age above 65 were obtained from the 2010 to 2016 American Community Surveys.

**Data Analysis**

I used **generalized linear models** to examine which factors were most closely associated with the changes in the target variables in hospital-based EDs. I identified Gamma-distributed dependent variables for visit volume, wait time and discharge time with log-linked function. Poisson distribution was used for the ED drop-out rate. The time efficiency regressions (wait time, discharge time and drop-out rate) were weighted by hospital visit volume. The estimated equation was the following:

where ***IFED, SED, and HBED*** represented independent freestanding ED, hospital satellite ED, and hospital-based ED, respectively. The **dependent variables** were hospital annual visits, median wait time, median discharge time, and annual drop-out rate. The **exploratory variables** included number of competitors and in the located PUMA *L* in year *t*. PUMA was also used to define the market and count number of competitors in the same areas. I also tested number of competitors within a 3-mile radius of a hospital, and the results were unaffected by using this measurement.

Whether hospital-owned satellite ED(s) at time *t*, , was another crucial element in my analysis. I suggested those satellite EDs served as feeders to their parent hospitals by attracting patients far away from the main campus. They might also improve hospital efficiency by diverting patients to locations with short wait time. The hospital-owned satellite ED was not counted as a competitor in if it located in the same PUMA as its main hospital.

was used for demographic characteristics, including PUMA-level household income, percentage of residents above 65, percentage of Hispanic/Black residents, and population density. Some other relevant demographic characteristics were dropped due to multicollinearity concerns. I excluded variables with a variance inflation factor greater than 2.5 from the regressions. and controlled fixed effects for years and hospitals.

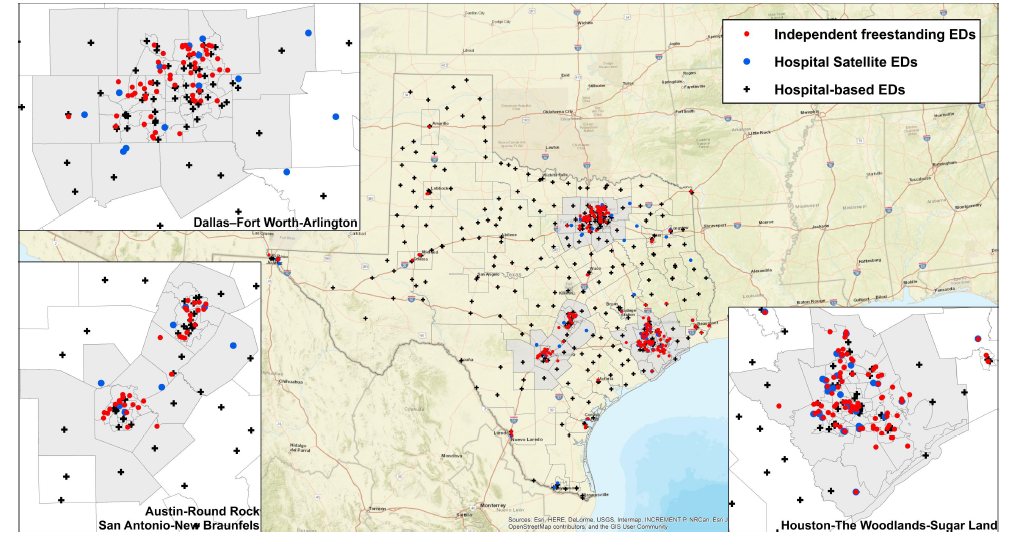
To avoid type II error for accepting the null hypothesis incorrectly, I also conducted **power calculation**[[12]](#footnote-12)[[13]](#footnote-13). With a probability of <0.05 for a type I error and a power level of 0.9, my sample sizes were large enough to detect differences if it existed.

**Results**

**Geographic Analysis:**

Figure 1 shows four major metropolitan areas in Texas, covering most of independent freestanding EDs and satellite EDs. Independent freestanding EDs and hospital satellite EDs were clustered around major metropolitan centers such as Houston, Dallas-Fort Worth, San Antonio and Austin. However, hospital-based ED were scattered throughout the state. Most of the satellite EDs were built close to their parent hospitals.

**Figure 1. Location of facilities providing emergency care in Texas, 2016 (ArcGIS)**



**SOURCE**: Author’s analysis of data from the American Hospital Association and the Texas Department of State Health Services. **NOTE**: There were 420 hospital-based emergency departments (black dots), 275 independent freestanding emergency departments (red dots), and 121 hospital satellite emergency departments (blue dots) in my sample. The grey areas are four biggest metropolitan areas in Texas, with the represented cities Dallas, Houston, Austin and San Antonio.

A total of 288 independent freestanding EDs opened in Texas between 2010 and 2016, and 68 independent freestanding EDs had closed before the end of 2016. Independent freestanding EDs exploded in Texas between 2014 and 2016 (Table 1 and Appendix Figure 1). Though satellite EDs were available before the licensing Act in Texas, the booming of independent freestanding EDs also brought development and prosperity of satellite EDs in this industry. Over 100 new satellite EDs were set up between 2010 and 2016.

**Table 1. Numbers of hospital-based emergency departments and freestanding emergency departments from 2010 to 2016**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Hospital EDs | Hospital EDs with visits>100 | Independent freestanding EDs | Hospital Satellite EDs |
| 2010 | 431 | 409 | 22 | 12 |
| 2011 | 427 | 407 | 28 | 20 |
| 2012 | 427 | 408 | 52 | 31 |
| 2013 | 426 | 410 | 88 | 39 |
| 2014 | 422 | 408 | 139 | 48 |
| 2015 | 417 | 401 | 208 | 66 |
| 2016 | 420 | 404 | 275 | 121 |

**Note:** The number of Independent freestanding EDs and Hospital Satellite EDs

**Descriptive Analysis:**

The descriptive statistics in Table 2 demonstrate that average hospital-based ED visits increased over the past 7 years. The annual growth rate of visits was 2.3% in my sample. Wait times in the hospital-based ED and overall drop-out rates decreased from 2012 to 2016. However, the discharge time, which measured the time from ED arrival to ED departure for discharged patients, showed a slight increase.

**Table 2. Hospital-based emergency department visits, wait time, discharge time, and drop-out rate in Texas, from 2010 to 2016**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | HBED Visits  (Texas) | Visits/Pop  (Texas) | Avg. ED Visits  (N=370) | Wait Time  (N=276) | Discharge Time  (N=276) | Drop-out Rate  (N=271) |
| 2010 | 10,403,602 | 0.412 | 26,683 | - | - | - |
| 2011 | 10,606,956 | 0.413 | 27,517 | - | - | - |
| 2012 | 11,021,832 | 0.423 | 28,793 | 31.4 | 139.1 | 2.7 |
| 2013 | 11,061,800 | 0.418 | 28,560 | 29.4 | 137.8 | 2.2 |
| 2014 | 11,168,465 | 0.414 | 29,657 | 26.7 | 142.8 | 2.3 |
| 2015 | 11,464,788 | 0.417 | 29,829 | 24.8 | 141.9 | 2.1 |
| 2016 | 11,824,246 | 0.424 | 29,361 | 22.3 | 140.7 | 2.0 |

**Note**: The ED visits, wait time, discharge time and drop-out rate are annual average for hospitals in my sample for regressions.

Center for Medicare & Medicaid Services started collecting Hospital Emergency Department Timely and Effective care measurements in 2012.

**Regression Results:**

The results in Table 3 revealed that annual visits in hospital EDs were not associated with the entry of freestanding EDs. Neither the total number of freestanding EDs, nor the separate effects from independent freestanding EDs and satellite EDs were associated with hospital-based ED visits. The results remained the same with the tests for ED efficiency measurements. No significant association between the hospital-based ED wait time, discharge time, drop-out rates and the presence of freestanding EDs in the same PUMA. It failed to state that the establishments of freestanding EDs relieved congestions in local hospitals.

Setting up a hospital-affiliated satellite ED significantly increased owner hospitals’ visits (p<0.01). However, owning satellite EDs did not influence ED wait times, discharge times, and drop-out rates in owner hospitals, which means hospital-based ED congestion didn’t change by owning satellite EDs.

The year fixed effects showed the trends in hospital visits and ED congestion over time. ED visits increased over the past years compared to the base year 2010. The increased rates were significant with an increased magnitude, except for 2016. Contradictory to visit volume, wait times and drop-out rates decreased over the years in spite of increased visits. However, the length of visit for discharged patients didn’t change much.

Changes in demographic characteristics did not show any significant impact on hospital visits. The PUMA-level percentage of patients over age 65 (usually insured with Medicare) increased ED visits, although the effect was imprecisely estimated (p<0.1).

The results were unaffected by using a 3-mile distance band of the hospitals to calculate nearby competitors (Appendix Table 1). The weights in the regressions did not change the main conclusions I had above (Appendix Table 2).

**Table 3. Estimates of the changes in hospital-based emergency departments, associated with nearby competitors and various factors in the same Public Use Microdata Area in Texas.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Visit Volume | Visit Volume | Wait Time | Discharge Time | Drop-out Rate |
| own SEDs (dummy) | 0.130\*\*\* | 0.129\*\*\* | 0.00162 | -0.0196 | 0.0432 |
| FSEDs in the puma | 0.00776 |  | 7.60E-05 | 0.00447 | -0.00195 |
| IFEDs in the puma |  | 0.00155 |  |  |  |
| SEDs in the puma |  | 0.0313 |  |  |  |
| Avg. HH income/10k | 0.0035 | 0.0036 | 0.0123 | -0.00333 | -0.0541 |
| Pop Density/10k | -0.7 | -0.75 | -1.071 | 0.226 | 1.751 |
| % Hispanic | -0.676\* | -0.686\* | 0.0972 | -0.156 | 0.0745 |
| % Black | -0.570\* | -0.578\* | -1.058 | 0.0258 | -1.58 |
| age\_above65 | 1.572\* | 1.523\* | -0.877 | -0.382 | -2.577 |
| year = 2011 | 0.0425\*\*\* | 0.0427\*\*\* |  |  |  |
| year = 2012 | 0.0661\*\*\* | 0.0655\*\*\* |  |  |  |
| year = 2013 | 0.0614\*\*\* | 0.0612\*\*\* | -0.0718\*\* | -0.0145 | -0.187\*\*\* |
| year = 2014 | 0.0596\*\* | 0.0601\*\*\* | -0.270\*\*\* | 0.0195 | -0.158\*\* |
| year = 2015 | 0.0675\*\* | 0.0686\*\*\* | -0.418\*\*\* | 0.0114 | -0.227\*\*\* |
| year = 2016 | 0.0352 | 0.0347 | -0.529\*\*\* | -0.00886 | -0.328\*\*\* |
| Constant | 10.96\*\*\* | 10.97\*\*\* | 3.990\*\*\* | 5.072\*\*\* | 0.425 |
| Obs. | 2,590 | 2,590 | 1,380 | 1,380 | 1,350 |
| Hospitals | 370 | 370 | 276 | 276 | 270 |
| Hospital Fixed Eff. | Yes | Yes | Yes | Yes | Yes |
| Weights | NO | NO | ED Visits | ED Visits | ED Visits |

**Note:** SED, IFED, and HBED are short for satellite ED, independent freestanding ED, and Hospital-based ED.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Appendix Table 1. Estimates of the changes in hospital-based emergency departments, associated with nearby competitors and various factors in 3-mile distance bands of the hospital-based emergency departments in Texas.

**Discussion**

In this study, I did not find evidence that the entry of freestanding EDs relieved ED visits in hospitals. However, the booming and survival of freestanding EDs in Texas suggests freestanding EDs found their business in local communities. It also suggests that the emergency service markets expanded by introducing more choices to consumers, increased healthcare expenditures. The freestanding EDs might compete with primary care and urgent care in local communities[[14]](#footnote-14). By offering high-profit services to non-emergency patients, they added a burden to the already-expensive healthcare system by functioning as luxury products for well-insured patients. Previous work (Pines 2018) showed that almost all patients had private health insurance and had fewer comorbidities with data from 74 independent freestanding EDs during 2013 to 2015.

Another important finding in my study was that freestanding EDs didn’t relieve congestion problem in hospitals. Neither owning satellite EDs, nor having all kinds of freestanding EDs around helped hospital-based EDs reduce wait time, length of visit for discharged patients or drop-out rate. Owning satellite EDs did increase the visits, since satellite EDs billed insurance under the name of their parent hospitals. However, hospital ED efficiency was unaffected by owning satellite EDs, suggesting that the congestion problem remained in main hospitals.

In general, wait times and drop-out rates in the hospital-based EDs decreased over the past years, shown in the descriptive analysis (Table 2) and the regression results (Table 3). On one side, it was possible that hospitals put in efforts to reduce wait times, since those indicators were main measurements in the CMS’s Hospital Compare survey. Hospitals usually advertise their current ED wait times on the website to attract patients. Additionally, patients might also choose a hospital strategically by checking the wait times online. Noticeably, the study showed the length of visit for discharged patients did not change much, suggesting times for overall procedures didn’t improve. The anxiety about improvement in ED efficiency remained.

Setting up satellite EDs is a way to attract patients and gain more market share. They function like feeders to owner hospitals and attract patients by their big brand names in local markets. Under the current payment system for ED visits, providers have incentives to add new satellite EDs, rather than independent freestanding EDs or urgent care centers, to get reimbursements from public and private insurances. In the past few years, more and more hospitals established satellite EDs in local communities. Houston Methodist and CHI St. Luke’s Health set up 8 and 10 satellite EDs, respectively. Independent freestanding EDs also started working with hospitals to get better payments. First Choice freestanding EDs operating under Adeptus Health, with 27 locations, became aligned with Texas Health Resources in the Dallas-Fort Worth area[[15]](#footnote-15) in early 2016. First Texas Hospital (located in Houston) also opened in 2016 to take care of claims in First Choice freestanding EDs in Houston area.

There is considerable ongoing debate about the value and cost of freestanding ED services. To ensure appropriate use of emergency services and avoid over-payment to low-acuity emergency visits, the 2018 MedPAC report[[16]](#footnote-16) suggested reducing Medicare payment rates for those visits in satellite EDs in urban areas. The reduced payment from Medicare rates can dent freestanding EDs’ prospects. In addition, the freestanding ED ACT did not solve one of its initial purposes – to help patients access care in emergency service shortage areas. Almost all the freestanding EDs in Texas found their roots in urban wealthy communities (Dark et al., 2017). The current policy fails to address the concerns “Improve efficiency and preserving access to emergency care in rural areas” raised in the 2016 Report to the Congress[[17]](#footnote-17).

From the patients’ perspective, it is also a paradox to use freestanding EDs to wean them from hospital congestion. For those with low acuity and no priority to get immediate treatment in hospital EDs, the congestion may also be a way to keep them away from unnecessary high-cost ED services. Many patients complained on Google review or Yelp that the charges from freestanding EDs, especially independent freestanding EDs were unexpected. People assumed it would be at similar rates to those urgent care centers or clinics in local communities. But the cases that hurt the most patients was private insurance companies rejecting the bill from independent freestanding EDs since they were out-of-network providers. Patients were often left to pay the balance of thousands of dollars of emergency bills on their own[[18]](#footnote-18). Though news and criticism on social media are informative, it is not the best way to educate the public on how to distinguish true emergency cases.

Overall, I am concerned that the current policy, instead of relieving the hospital burden, stimulates the demand for emergency services and expands healthcare spending by siphoning off patients from urgent care centers and physician offices to the high-cost ED setting. In addition, by focusing on low-acuity and well-insured patients, freestanding EDs may have a negative impact on the financial status of hospital-based EDs.

**Limitations**

My research has a number of limitations. The first is the inability to separate the visits in main hospitals and its satellite EDs. Noticeably, the increase in ED visits stems in part from building up satellite ED sites. Though I found a significant increase in visits by owning satellite EDs, it is hard to say whether the increased visits were fully contributed by the satellite EDs. If the main hospitals also had strong increase in ED visits compared with hospitals without satellite EDs, then having no changes in the wait times or the drop-out rates does not mean that hospitals had not put in efforts to solve overcrowding situations. In addition, the AHA data doesn’t provide hospital population information. It is hard to measure whether the visit volume reached hospital capacity. No influence in volume of visits and wait times may due to hospital capacity. It is possible that the entry of freestanding EDs changed population structure in traditional EDs by attracting low-acuity and well-insured patients away from hospitals. The entry of freestanding EDs might make hospitals financially vulnerable.

My provider data only has the locations of hospital-based EDs and two types of freestanding EDs. I do not have entry and exit data of urgent care centers, or physician offices. If available, the number of those providers in the markets could be another explanatory variable in my analyses to show market competition.

Finally, the opening and closing dates of satellite EDs were collected through website search and phone calls to their located sites. It was hard to catch up with every ownership change, hospital acquisition or merge. By contrast, the independent freestanding ED data from the Texas Department of State Health Services official records, was more accurate. Additionally, I manually assigned each satellite ED to its closest parent hospital(s) if there was more than one campus under the hospital system. For example, the Houston Methodist satellite ED in the Sugar Land area, which is more than 20 miles away from downtown Houston, was assigned to the Houston Methodist- Sugar Land campus.

**Conclusion**

My research shows that the entry of freestanding EDs had no impact on reducing ED congestion in nearby hospitals. That conclusion differs from the traditional view that freestanding EDs might reduce patient volume at nearby hospital-based EDs. The freestanding EDs nearby, neither decrease visit volume, nor improve effectiveness in hospital-based EDs. They might serve as supplements to the already-expensive healthcare system and also function as luxury products for well-insured patients. My work also showed that setting up hospital-affiliated satellite EDs increased owner hospitals’ visits, but it didn’t help with the congestion problem in their main hospitals. These findings convey valuable information for the current debate over the cost and regulations towards the freestanding EDs in the U.S. The initial hopes of the policy have so far proved misplaced. It shifted the incentives from relieving hospital congestion to creating more demand. Regulators must closely consider how to implement effective low-cost solutions to ED crowding.

It calls for future research about how freestanding EDs impact overall healthcare population and healthcare costs within a community, or how population changes within a hospital. My work also raises questions to the benefits in patients’ perspective, and how the freestanding EDs will respond to a reduction in insurance reimbursements.

**Reference**

1. Last Name, First, &Middle Initials, Last Name First&Middle Initials, … up to six authors, then et al. Article Title. Journal Name. Year; Volume(issue):pages.

2. Last Name First&Middle Initials, Last Name First&Middle Initials, …up to six authors, et al. Chapter Title. In: Book Editors. Book Title. City, State: Publisher Name, Year of Pub., pages.

3. Website Owner or authors. Name of web document or sub-site. Available at: URL. Accessed Date (most recent).

Ashwood JS, Gaynor M, Setodji CM, Reid RO, Weber E, Mehrotra A. Retail clinic visits for low-acuity conditions increase utilization and spending. Health Affairs. 2016 Mar 1;35(3):449-55.

Dark C, Xu Y, Ho V. Freestanding emergency departments preferentially locate in areas with higher household income. Health Affairs. 2017 Oct 1;36(10):1712-9.

Muller KE, Lavange LM, Ramey SL, Ramey CT. Power calculations for general linear multivariate models including repeated measures applications. Journal of the American Statistical Association. 1992 Dec 1;87(420):1209-26.

Dark C, Xu Y, Kao E. Comparative throughput at freestanding emergency departments versus hospital-based emergency departments: A pilot study. The American journal of emergency medicine. 2017 Dec 28.

Ho V, Metcalfe L, Dark C, Vu L, Weber E, Shelton Jr G, Underwood HR. Comparing utilization and costs of care in freestanding emergency departments, hospital emergency departments, and urgent care centers. Annals of emergency medicine. 2017 Dec 1;70(6):846-57.

Pines JM, Zocchi MS, Black BS. A Comparison of Care Delivered in Hospital‐based and Freestanding Emergency Departments. Academic emergency medicine. 2018 May;25(5):538-50.

Medicare Payment Advisory Commission. Report to the Congress: Medicare and the health care delivery system. 2016, 2017, 2018. Washington, DC: MedPAC.

Jones SR, Carley S, Harrison M. An introduction to power and sample size estimation. Emergency Medicine Journal. 2003 Sep 1;20(5):453-8.

Schuur JD, Baker O, Freshman J, Wilson M, Cutler DM. Where do freestanding emergency departments choose to locate? A national inventory and geographic analysis in three states. Annals of emergency medicine. 2017 Apr 1;69(4):383-92.

Henneman PL, Nathanson BH, Li H, Tomaszewski A, Pines JM, Handel DA, Lemanski MJ. Is outpatient emergency department care profitable? Hourly contribution margins by insurance for patients discharged from an emergency department. Annals of emergency medicine. 2014 Apr 1;63(4):404-11.[[19]](#footnote-19)

National Center for Health Statistics. Emergency Department Visits. Available at: https://www.cdc.gov/nchs/fastats/emergency-department.htm. Accessed August 1, 2018

Lawner BJ, Hirshon JM, Comer AC, Nable JV, Kelly J, Alcorta RL, Pimentel L, Tupe CL, Vanhoy MA, Browne BJ. The impact of a freestanding ED on a regional emergency medical services system. The American journal of emergency medicine. 2016 Aug 1;34(8):1342-6.[[20]](#footnote-20)

Maryland Health Care Commission. Report on the operation, utilizations, and financial performance of freestanding medical facilities. 2015. Annapolis, MD: MHCC[[21]](#footnote-21)

Weinick RM, Burns RM, Mehrotra A. Many emergency department visits could be managed at urgent care centers and retail clinics. Health affairs. 2010 Sep 1;29(9):1630-6.

Morganti KG, Bauhoff S, Blanchard JC, Abir M, Iyer N, Smith A, Vesely JV, Okeke EN, Kellermann AL. The evolving role of emergency departments in the United States. Rand health quarterly. 2013;3(2).

Pines JM, Decker SL, Hu T. Exogenous predictors of national performance measures for emergency department crowding. Annals of emergency medicine. 2012 Sep 1;60(3):293-8.

Jouriles N, Simon EL, Griffin P, Williams CJ, Haller NA. Posted emergency department wait times are not always accurate. Academic Emergency Medicine. 2013 Apr;20(4):421-3.

In the News:

Texas Health Resources and Adeptus Health Join Forces to Enhance Access to Emergency Care in North Texas. Available at: https://www.texashealth.org/news/texas-health-resources-and-adeptus-health-join-forces-to-enhance-access-to-emergency-care-in-north-texas. Published May 11, 2016. Accessed August 1, 2018

Gabriel B. Anthem Cracks Down on ER Visits – Insurer will only pay for what it deems an emergency. AARP Health Insurance. Available at: https://www.aarp.org/health/health-insurance/info-2018/anthem-non-emergency-visits-fd.html. Published Feb 8, 2018. Accessed August 1, 2018[[22]](#footnote-22)

Rice R. Some Blue Cross policyholders could pay 100% of ER bill if visit is not life threatening. Dallas News. Available at: https://www.dallasnews.com/business/health-care/2016/08/02/free-standingemergency-rooms-helping-wealthy. April 25, 2018. Accessed August 1, 2018

Rice R. Are free-standing emergency rooms helping only the wealthy? Dallas News. Available at: https://www.dallasnews.com/business/health-care/2018/04/25/blue-cross-hmo-emergency-bills-policy. Published Aug 2, 2016. Accessed August 1, 2018

Sutherly B. Free-standing emergency departments will drive up costs, some warn. Columbus Dispatch. Available at: http://www.dispatch.com/content/stories/local/2016/02/29/some-warn-that-free-standing-emergency-departments-will-drive-up-costs.html. Published Feb 29, 2016. Accessed August 1, 2018

**Appendix**

**Appendix Figure 1. Texas Independent Freestanding Emergency Departments: Timing of Opening and Closings**

**Note:** IFED stands for independent freestanding emergency department. Most of the closures happened in 2016 and 2017 were related to hospital acquisition, which means those independent freestanding EDs became hospital-affiliated satellite EDs. So far as observed, 59/113 closures between 2010-2017 were true closure, not related to any ownership change.

**Appendix Table 1. Estimates of the changes in hospital-based emergency departments, associated with nearby competitors and various factors in a 3-mile distance band of the hospital-based emergency departments in Texas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Visit Volume | Visit Volume | Wait Time | Discharge Time | Drop-out Rate |
| own SED | 0.131\*\*\* | 0.131\*\*\* | -0.00172 | -0.02 | 0.0419 |
| FSEDs in 3 miles | 0.0034 |  | -0.0283 | -0.00324 | -0.0282 |
| IFEDs in 3miles |  | 0.0155 |  |  |  |
| SEDs in 3miles |  | -0.0569 |  |  |  |
| Avg. HH income/10k | 0.00467 | 0.00553 | 0.0123 | -0.00314 | -0.0541 |
| Pop Density/10k | -0.689 | -0.559 | -1.05 | 0.207 | 1.757 |
| % Hispanic | -0.687\* | -0.669\* | -0.0131 | -0.174 | -0.0253 |
| % Black | -0.554\* | -0.501 | -1.13 | 0.0238 | -1.666 |
| age\_above65 | 1.572\* | 1.698\* | -0.942 | -0.416 | -2.582 |
| year = 2011 | 0.0427\*\*\* | 0.0416\*\*\* |  |  |  |
| year = 2012 | 0.0665\*\*\* | 0.0665\*\*\* |  |  |  |
| year = 2013 | 0.0619\*\*\* | 0.0602\*\*\* | -0.0706\*\* | -0.0136 | -0.186\*\*\* |
| year = 2014 | 0.0608\*\*\* | 0.0575\*\* | -0.265\*\*\* | 0.0218 | -0.154\*\* |
| year = 2015 | 0.0701\*\*\* | 0.0644\*\* | -0.406\*\*\* | 0.0162 | -0.218\*\*\* |
| year = 2016 | 0.0401 | 0.0376 | -0.508\*\*\* | -0.000381 | -0.311\*\*\* |
| Constant | 10.96\*\*\* | 10.92\*\*\* | 4.090\*\*\* | 5.097\*\*\* | 0.511 |
| Obs. | 2,590 | 2,590 | 1,380 | 1,380 | 1,350 |
| Hospitals | 370 | 370 | 276 | 276 | 270 |
| Hospital Fixed Eff. | Yes | Yes | Yes | Yes | Yes |
| Weights | NO | NO | ED Visits | ED Visits | ED Visits |

**Note:** SED, IFED, and HBED are short for satellite ED, independent freestanding ED, and Hospital-based ED.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 2. Estimates of the changes in hospital-based emergency departments, associated with nearby competitors and various factors in the same Public Use Microdata Area in Texas (without weights)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Wait Time | Discharge Time | Drop-out Rate |
| own SED (dummy) | -0.0845 | -0.0323 | -0.0827 |
| FSEDs in the puma | -0.0144 | -0.0022 | -0.0121 |
| Avg. HH income/10k | -0.0453 | 0.00858 | -0.0513 |
| Pop Density/10k | -2.059\*\* | -0.0584 | 2.828\*\* |
| % Hispanic | -0.311 | -0.0146 | -0.244 |
| % Black | -1.513\* | -0.0103 | -1.056 |
| age\_above65 | -1.519 | -0.46 | -1.379 |
| year = 2013 | -0.0351 | -0.00387 | -0.206\*\*\* |
| year = 2014 | -0.145\*\*\* | 0.0329\*\* | -0.145\*\* |
| year = 2015 | -0.188\*\*\* | 0.0289\* | -0.213\*\*\* |
| year = 2016 | -0.256\*\*\* | 0.0302 | -0.274\*\*\* |
| Constant | 4.989\*\*\* | 5.003\*\*\* | 0.228 |
| Obs. | 1,380 | 1,380 | 1,350 |
| Hospitals | 276 | 276 | 270 |
| Weights | NO | NO | NO |

**Note:** SED and HBED are short for satellite ED and Hospital-based ED.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1. Available at: https://www.cdc.gov/nchs/fastats/emergency-department.htm [↑](#footnote-ref-1)
2. Data from the American Hospital Association’s Annual Survey [↑](#footnote-ref-2)
3. Texas Freestanding Emergency Medical Care Facilities Available at: https://www.dshs.texas.gov/facilities/freestanding-emergency-rooms/ [↑](#footnote-ref-3)
4. Ashwood (2016) [↑](#footnote-ref-4)
5. Dark (2017) [↑](#footnote-ref-5)
6. Schuur [↑](#footnote-ref-6)
7. Ho (2017) [↑](#footnote-ref-7)
8. Pines (2018) [↑](#footnote-ref-8)
9. Report to The Congress: Medicare and the Health Care Delivery System [↑](#footnote-ref-9)
10. News [↑](#footnote-ref-10)
11. Gutierrez C, Lindor RA, Baker O, Cutler D, Schuur JD. State regulation of freestanding emergency departments varies widely, affecting location, growth, and services provided. Health Affairs. 2016 Oct 1;35(10):1857-66. [↑](#footnote-ref-11)
12. An introduction to power and sample size estimation (Jones, et al. 2003) [↑](#footnote-ref-12)
13. Muller (1992) [↑](#footnote-ref-13)
14. [↑](#footnote-ref-14)
15. <https://www.texashealth.org/news/texas-health-resources-and-adeptus-health-join-forces-to-enhance-access-to-emergency-care-in-north-texas> [↑](#footnote-ref-15)
16. Report to The Congress: Medicare and the Health Care Delivery System [↑](#footnote-ref-16)
17. 2016 Report to the Congress – Medicare and the Health Care Delivery System [↑](#footnote-ref-17)
18. Rice 2016, Sutherly 2016 [↑](#footnote-ref-18)
19. commercially insured patients were most profitable and Medicaid patients were least profitable. publicly insured ED outpatients with higher acuity (billing level) are less profitable than similar, commercially insured patients. [↑](#footnote-ref-19)
20. The opening of an FED was associated with a modest improvement in time-specific EMS system metrics: a decrease in ambulance turnaround time and shorter out-of-service intervals. [↑](#footnote-ref-20)
21. [↑](#footnote-ref-21)
22. Anthem Blue Cross Blue Shield, the nation’s largest health insurer, is expanding its policy of not paying for emergency room (ER) care that it decides was not an emergency [↑](#footnote-ref-22)