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Freestanding Emergency Departments: Strategic And Policy Implications

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FREESTANDING EMERGENCY DEPARTMENTS: STRATEGIC AND POLICY IMPLICATIONS

by

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A DISSERTATION

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ABSTRACT

The dissertation examined the role of Freestanding Emergency Departments (FSEDs) in the current United State health care system. The study collected the primary data on FSEDs in the United States and analyzed the factors associated with the hospitals operating FSEDs and its effect on hospital financial performance. The relationship of presence of FSEDs in the market and Medicare expenditure per person was also studied.

The Resource Dependency Theory was used to study the effect of market and organizational factors on the hospital decision to operate an FSED. Panel data from 2002 to 2011 was analyzed using logistic multivariate regression with year and state fixed effects, with standard error correction for clustering at hospital level. Partial evidence was found to support the hypothesis that environmental munificence and complexity were related to hospital's decision to operate an FSED. Organizational size, higher financial performance, and affiliation with hospital system were also significantly related to hospital operating FSEDs.

Based on Transaction Cost Economic Theory, we hypothesized that hospitals may use FSED as a vertical integration strategy to lower transaction costs, and as a consequence increase their financial performance. The relationship between hospital operating FSED and financial performance was analyzed by market share as mediation factor. The results showed that the relationship between hospital operating FSEDs and

financial performance, measured as operating margin, was positive and significant. The aforementioned relationship was partially mediated by market share.

Finally, the presence of FSEDs in the market was found to be positive and significantly associated with the higher total Medicare expenditure per person.

Key Words: Freestanding emergency departments, financial performance, market share, Medicare expenditure, innovation strategy

DEDICATION

This dissertation is dedicated to my grandparents, parents, and my wife for their love, support and sacrifice.

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INTRODUCTION

Freestanding emergency departments (FSEDs) are recently growing entities in the health care system in the United States. FSEDs started back in late 1970s but they were not popular at that time. Also, back in 1970, the FSEDs did not treat patients with higher acuity, and they lacked emergency medicine trained providers. A recent study shows that the FSEDs are increasing in number across the United States (William & Pfeffer, 2009). FSEDs are located outside the hospital campus unlike the regular emergency departments (EDs). Also, FSEDs differ from Urgent Care Centers by offering emergency care services through emergency medicine trained physician. There are two types of FSEDs. First, those operated by hospitals or hospital systems are called satellite FSEDs. Second, those operated by emergency physicians or organizations other than hospitals are called autonomous FSEDs.

EDs increasingly play an important role in hospital inpatient admissions. On an average, 36% of total hospital admissions came through EDs in 1996 (McCaig & Burt, 1997), while this number increased to 50% in 2006 (Pitts et al., 2008). Hospitals can use satellite FSEDs for various strategic purposes such as, to increase their inpatient admission rates, expand their existing market areas from a strategic and competitive perspective so to curtail future competition, prepare a foundation for prospective hospital site, and strengthen their brand image in unfamiliar territories.

Satellite FSEDs may be used by hospitals or hospital systems as a vertical integration strategy to improve their financial performance. For example, FSEDs can lead

to an increase referral to the hospitals, which may increase the hospital's market share (Hill & Steelman, 2008). An increase in inpatient market share, may ultimately lead to better financial performance.

The proximity of EDs is directly related to the utilization of emergency care (Henneman et al., 2011; Ludwick et al., 2009). FSEDs provide the care closer to the patient locations, and may lead to higher utilization of emergency services. The higher utilization may lead to higher healthcare cost. The CMS pays for 17% of total emergency visits all over the United States. The presence of FSED may lead to higher Medicare cost per person.

On the other hand, the proponents of FSEDs argue that FSEDs improves access to emergency care by decreasing the burden from traditional EDs and locating the facilities close to patient locations. However, hospitals as an organization have a vested interest in running these facilities as a profitable entity. Therefore, FSEDs will tend to locate in higher socioeconomic areas and may avoid the geographical areas which currently lack such access.

To date, to our knowledge there is no evidence which support that FSEDs increase the access where is most required currently. In addition, there is no research analyzing the antecedents of operating FSEDS by the hospital. Also, there have been no published studies examining whether FSEDs are related to better financial performance for hospitals. If the FSEDs are related to higher financial performance, it is not clear whether this relationship is mediated by increase in market share. The relationship of presence of FSEDs in the market and higher Medicare cost has not been studied.

Today, emergency care is still mostly provided in hospital settings but there is also an increasing trend to move into nonhospital settings. This study is timely given the fast growth of FSEDs in few states, and given other several states planning to permit the operation of FSEDs. Most of the states are in midst of formulating and modifying regulations for FSEDs, while others are still debating their role in healthcare system (William & Pfeffer, 2009). States like Texas have already amended the regulations for operations of FSEDs to provide better access, closely monitor the facilities, and ease the reimbursement by third party payers. The goal of this study is to provide the information to policy makers and organizational leaders to make informed decisions.

This study was conducted in three research papers: (a) Analysis of organizational and market factors associated with hospitals decision of opening FSEDs titled "Contextual Factors Associated with Hospitals' Decision to Operate Freestanding Emergency Departments"; (b) Examination of financial performance of hospitals operating FSEDs with market share as mediating factor titled "Relationship Between Hospital Operating Freestanding Emergency Department and Financial Performance"; and (c) Studying the relationship between the Medicare cost and the presence of FSEDs in the county titled " The Relationship Between the Presence of Freestanding Emergency Department and Medicare Cost in the Market".

Paper 1: Antecedent Factors

The purpose of this paper was to identify the relationship between various antecedent factors associated with hospital's operating an FSED. Six hypotheses were developed based on Resource Dependency Theory of firms. The sample consisted of the

hospitals in the states where FSEDs were operated at the beginning of study period (2002). The study consisted of 1,518 hospital-year observation between 2002 and 2011 from the following data sources: Survey for FSED, American Hospital Association Annual Survey (AHA), Healthcare Cost Report Information System database (CMS), and the Area Resource File (ARF). A logistic regression analysis was used for the binary dependent variable with state and year fixed effects and correction of standard errors for clustering by hospital ID. Results were reported both in odds ratios and marginal effects for multivariate logistic regression analysis.

Paper 2: Effect of FSED Operation on Financial Performance and Market Share

The purpose of this paper was to study the effect of hospital operation of an FSED on their financial performance. The relationship was hypothesized to be mediated by market share of the hospital. The relationship was explained by the vertical integration model based on Transaction Cost Economics was explained. The sample consisted of the hospitals in the states where FSEDs were operated at the beginning of study period (2002). The data collected on FSED for this study was merged with the following secondary datasets: AHA, CMS, and ARF. The final analytic sample consisted of 1,347 hospitals in 14 states at the beginning of study (2002), which increased to 1,575 at the end of study (2011). Panel data were also used in this study and analyzed with fixed effects regression to control for the effect of time invariant factors. The standard errors were corrected for clustering at the hospital level. The Baron and Kenny method was used to study the mediating effect of market share between hospitals operating FSEDs and financial performance.

Paper3: Medicare Cost and Presence of FSEDs in the Market

The purpose of this paper was to study the effect of the presence of FSEDs in the market with total Medicare costs. We hypothesized the number of FSEDs in a market was related to higher Medicare cost. The sample consisted of all the counties in fifty states and Washington DC (N = 3,134). The survey data of FSED was merged with the following secondary data sets: AHA, Dartmouth Atlas, and ARF. The panel data from year 2003 to 2009 was analyzed using fixed effects multivariate regression model to study the above relationship. The standard errors were corrected for clustering at the county level.

CONTEXTUAL FACTORS ASSOCIATED WITH HOSPITALS' DECISION TO OPERATE FREESTANDING EMERGENCY DEPARTMENTS

by

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ABSTRACT

Objective: The study used the resource dependency theory as a means to justify the relationship between the market and organizational factors, and the hospital operating FSEDs.

Data Sources: All acute care hospitals in the states with the presence of FSEDs at the beginning of study period (year 2002) from 2002 to 2011. Data on FSEDs collected by telephonic survey merged with American Hospital Association Annual Survey, CMS cost report, and Area Health Resource File.

Study Design: Hospitals operating FSEDs is binary dependent variable. Independent variables consist of: per capita income, urban location, physician per capita, percent population over age 65 years, percent population with health insurance, Medicare Advantage Penetration, unemployment rate, market competition, total FSEDs in the HSA, hospital bed, total margin, and system membership. The logistic regression analysis, with state and year fixed effects with standard errors clustered by hospital ID is used in the study.

Principal Findings: The number of hospitals operating satellite FSEDs increased from 34 (2.52%) in 2002 to 94 (5.96%) in 2011. The results partially support the hypothesis that hospitals located in less munificent environment and higher competitive environment are more likely and to operate an FSED. The organizational level factors such as large hospitals, better profit margin, and system membership are more likely to associate with hospital operating an FSED.

Conclusion: The hospitals located in higher socioeconomic and urban areas are more likely to operate an FSED. The findings of this study may be used by hospitals to make informed decisions while formulating strategies for FSEDs.

INTRODUCTION

Recently, there has been a growing interest in providing emergency care outside the standard hospital settings by healthcare organizations. A product of this growing interest is the implementation of freestanding emergency departments (FSEDs), and their numbers are growing fast in some parts of the United States. The concept of FSEDs is not new, but it became more visible with an approximately 50% increase in the number of FSEDs between 2005 and 2009 (American Hospital Association [AHA], 2011; T Paul, 2012; Williams & Pfeffer, 2009). FSEDs differ from regular emergency departments (EDs) by being located outside the hospital campuses, and differ from Urgent Care Centers (UCCs) by employing emergency medicine specialists instead of general practitioners. FSEDs operated by hospitals are classified as satellite FSEDs, while those not operated by any hospital are classified as autonomous FSEDs. Autonomous FSEDs are owned by either physician groups or independent organizations other than hospitals.

Historically, emergency care in the United States has been provided mostly in hospital settings. In addition, hospital EDs have served as the primary census provider in hospital admissions (S. Pitts, Niska, Xu, & Burt, 2008). In 1996, ED admissions accounted for 36% of total hospital inpatient admissions (McCaig & Burt, 1997), and increased to 50% in 2006 (S. Pitts et al., 2008). The sheer number of admissions generated from hospital EDs make them an important source for hospital admittance and increased in-patient census. Today, emergency care is still mostly provided in hospital settings but there is also an increasing trend to move into nonhospital settings.

Hospitals may use satellite FSEDs as a strategy to increase their inpatient admission rates, expand their existing market areas from a strategic and competitive

perspective so to curtail future competition, prepare a foundation for prospective hospital site, and strengthen their brand image in unfamiliar territories.

Consumer behavior and demand may be another driver for FSEDs. Patients expect short waiting times and comfortable facilities; therefore, they may prefer FSEDs because of their expedited out-patient approach as compared to the regular EDs (T Paul, 2012). Taking in consideration the demand for immediate care, hospitals can operate FSEDs in growing communities that may currently lack full-service hospitals. This approach may circumvent the certificate of need (CON) requirements that some hospitals face when establishing a full-service hospital. Additionally, it is possible that FSEDs may reduce crowding in the regular hospital EDs.

To date, there is no published study examining the contextual factors that may influence U.S. hospitals' decision to operate FSEDs. This paper examines the environmental and organizational factors associated with hospital's decision to operate a FSED. Hospitals may operate FSED through different organizational structures: 1) hospital's ownership of FSED; 2) FSED is owned by hospital system and hospital is receiving patients from FSEDs; or 3) contractual arrangement between hospital and FSED to transfer majority of patient from FSEDs to that particular hospital. This study comes at a time when many states are on the verge of formulating regulations on FSEDs. With this paper, we aim to provide information to policy makers for formulating the FSED regulations. They may use the findings of this study in designing regulations that may incentivize operating of FSEDs in areas where they are most needed. Moreover, this paper aims to inform hospital administrators in developing their strategic moves related to FSEDs. Lastly, this study, by being the first organizational level research that has

collected national level data on FSEDs from organizational research perspective, will not only address an important gap in current status of an FSED literature but also facilitate future research.

Hospitals and Freestanding Emergency Departments

An FSED is defined as a facility that is (a) open to all types of emergencies; (b) not located within a hospital; (c) open to the general public; (d) open daily; and (e) open holidays, and at least 156 hours of the 168 hour per week (Sullivan et al., 2012). The 156-hour criterion was meant to allow for occasional facility closure during the middle of night (eg, between midnight and 5:59 am on Saturday and Sunday mornings) but the expectation is that vast majority of FSEDs are open for all 168 hours (ie, 24/7). FSEDs are usually approved by state health departments and, because of they may see patients of higher acuity, they often are staffed by health care providers trained in emergency medicine.

Urgent care centers also play a role in providing immediate healthcare services, but there are differences between FSEDs and urgent care centers. The primary difference between FSEDs and urgent care centers is that FSEDs perform additional procedures such as defibrillation, intubation, and conscious sedation delivered by health care providers trained in emergency medicine. Also, most FSEDs are open 24 hours/day but, by definition, UCCs are not. We also included UCCs that are open 24/7 hours and comply with the FSED definition for this study. In both cases, patients requiring inpatient admission or higher levels of care are stabilized and transferred to hospitals via

ambulance. Those patients who perceive their situation to be critical may prefer an ED over an urgent care center.

The California Health Care Foundation report showed 55 FSEDs recorded nationally in 1978, with slow growth until 2002. An increase in the opening of FSEDs started after 2003, especially after the Centers for Medicare and Medicaid Services (CMS) began to recognize and reimburse FSEDs in 2004 as dedicated EDs (Williams & Pfeffer, 2009). In order for an FSED to receive reimbursement for Medicare and Medicaid patients, it must comply with the federal Emergency Medical Treatment and Active Labor Act (EMTALA) (CMS, 2008) such as being licensed by state as an "emergency room" (or ED), and being open to the general public without need of prior appointment. However, regulations for FSEDs vary widely from state to state, and in some states, FSEDs can operate without EMTALA when not receiving CMS reimbursement. This variation ranges from states with very strict requirements for FSEDs, to states without any formal requirements for FSEDs. Some states let FSEDs decide whether to accept Medicare and Medicaid patients, while other states make it mandatory for FSEDs to accept all patients regardless of their insurance status. According to Sullivan et al. (2012), there were 80 FSEDs operating in the United States in 2007, William and Pfeffer (2009), using a different methodology, estimated there were 222 FSEDs operating in 2008.

There are several factors that may motivate hospitals to operate an FSED. First, FSEDs could, at least theoretically, decrease the patient load in the regular EDs, while providing better access to emergency care for the population in their own communities. According to National Hospital Ambulatory Medical Care Survey, there was a 32 %

increase in demand for emergency medicine services from 1999 to 2009 (McCaig & Burt, 2001; National Center for Health Statistics, 2009; S. Pitts et al., 2008). The previous study shows that the higher number of patients seeking emergency care instead of primary care providers (S. R. Pitts, Carrier, Rich, & Kellermann, 2010; Richman, Clark, Sullivan, & Camargo, 2007), increase in number of uninsured patients (Garcia, Bernstein, Bush, & Statistics, 2010), and increase in the number of elderly patients (Roberts, McKay, & Shaffer, 2008) may be some of the reasons for increase in the demand of emergency care. At the same time there was decrease in the EDs by approximately 5% in the United States (McCaig & Burt, 2001; National Center for Health Statistics, 2009; S. Pitts et al., 2008). Both of the above factors may have contributed to overcrowding in EDs. This has provided an opportunity to FSEDs to fill a possible gap to provide emergency health care services. While not proven, FSEDs may reduce the volume previously presenting to hospital-based EDs and, thereby, ease the burden on traditional EDs, and reduce misuse of costly hospital-based ED resources.

Second, FSEDs may provide patient volume through inpatient admissions. Between 2006 and 2010, an average of 12.9% of patients who visited an ED were admitted to the hospital (National Center for Health Statistics, 2008, 2009, 2010; Niska, Bhuiya, & Xu, 2010; S. Pitts et al., 2008). According to Health Finance Management Association (HFMA), FSEDs may increase the market share and revenue of a hospital by providing improved access to emergency care, reduced ED wait times, and improved clinical quality and patient satisfaction (Hill & Steelman, 2008). The hospital admission rates from FSEDs are approximately 5%, compared to 13 % in regular hospital EDs (Williams & Pfeffer, 2009). The hospital admission rate from UCCs is close to zero

percent, as most of the patient required further care are referred to EDs. FSED patients requiring inpatient admission are generally referred to the hospital that owns the FSED. Even with these relatively low admission rates, the FSEDs may extend the market share of a hospital, especially if these new patients may have visited a different adjacent hospital. Therefore, referrals from FSEDs may increase the hospital's revenue through the additional patient volume. The market share may eventually increase the profit margin for hospitals that own FSED through an increase in patient referrals.

Third, hospitals may operate FSEDs close to competitor hospitals to siphon their patients. This strategy may increase the geographical market served by hospital. The operating of an FSED can give a hospital a 'first mover' advantage in a growing community that currently lacks a local emergency care facility. The FSEDs not only serve to address the increase in flow of patient volume, but they may also address any potential competition in growing markets. The hospital operation of FSEDs may attenuate the opportunity for other providers in the growing market area that currently lacks health care services.

Finally, FSEDs may serve as a potential site for opening a new facility in the future when the market begins to experience sufficient demand. There are many anecdotal examples showing that hospitals operate FSEDs in markets where the demand was not sufficient to sustain an inpatient health facility or to get approval of CON for a full service hospital investment. Over time, these FSEDs were converted into hospitals with inpatient beds (Williams & Pfeffer, 2009)

CONCEPTUAL FRAMEWORK

This paper utilizes resource dependence theory (Pfeffer & Salancik, 1978) as a conceptual framework given that this theory suggests that organizations formulate strategies to acquire relatively scarce resource from their environment. Resource dependence theory has been used widely in health care research to address the strategy formulation by organizations under the influence of environmental changes (Jacqueline S. Zinn, Weech, & Brannon, 1998). The resources in the hospital industry include, but are not limited to, patients, physicians, capital, and favorable regulations (Alexander & Morrisey, 1989). Similar to all open system theories, resource dependence theory emphasizes that organizations are not autonomous, and constantly interact with their environments for resources. Organizations depend on the external environment to acquire scarce resources necessary for their survival (Alexander & Morrisey, 1989; Pfeffer & Salancik, 1978). Based on the resource dependence perspective, organizations have the ability to control their environment by controlling the flow of resources and information (Pfeffer, 1972; Starbuck, 1971). Therefore, all organizations are intertwined in the web of dependencies on each other. Organizations maintain relationships with the environment for acquisition of resources. Organizational survival will be threatened if they are not able to secure the required resources. Hospitals may address this issue by of acquiring resources (in the form of patients) to some extent without losing their autonomy through patient referral for inpatient services. For example, hospitals may pursue FSEDs as a strategy to increase the market area for their hospital by feeding patients from a wide range of geographical locations.

Organizations remain in dynamic equilibrium with their environment. Various environmental factors affect the strategies formulated by the organization. The environmental factors can be categorize in three dimensions described by Dess and Beard (1984) as munificence, dynamism, and complexity. Munificence represents the availability of resources in the external environment of an organization; dynamism represents the uncertainty in environment; and complexity represents the web of interactions with other organizations. Various studies have used the resource dependence perspective for analyzing the effect of organizational environment on inter-organizational relationships with other hospitals (Alexander & Morrisey, 1989; Song, 1995; J.S. Zinn, Proenca, & Rosko, 1997). For example, Menachemi et al. (2011) found that all three components of environment (munificence, dynamism, and complexity) were significantly associated with the selection of health information technology strategy.

Munificence. Organizations operating in a munificent environment are found to have better financial performance (Yasai-Ardekani, 1989). As mentioned previously, patients are important resources for hospitals, and hospitals may use FSEDs as a strategy to increase inpatient admissions. However, the hospital's decision to operate an FSED may be influenced by the financial resources available in the environment (Lee & Alexander, 1999).

Higher per capita income, and a higher percentage of people over age 65 years have been used as a proxy for ability to pay for health care services (Harrison, McCue, & Wang, 2003; McCue, 2000). Organizations try to maintain a munificent environment by forming complex relationships with other organizations. Hirsch (1975) found that

pharmaceutical companies form relationships with physicians to ensure the flow of resources. Similarly, hospitals may operate FSEDs to maintain or increase the flow of inpatient admissions. The hospitals located in lower munificent environments may use the FSED as a strategy to maintain or increase their market share. When a hospital is unable to achieve the necessary resources in the current market, they may try to increase resources by expanding their market area or exploring new markets.

Hypothesis 1: *Hospitals operating in less munificent environments are more likely to operate an FSED compared to hospitals operating in more munificent environment*

Dynamism. Dynamism represents the uncertainty present in the external environment to predict the supply and demand of key resources (Dess & Beard, 1984). Hospitals address the uncertainty in the environment by adopting several strategies such as long-term contracts with other organizations, coalitions, joint ventures with other organizations, mergers and integration (Hatch & Cunliffe, 2006; Scott, 2003). This increases the survival for an organization in an uncertain environment. FSEDs provide a continuous supply of resources in the form of inpatient admissions, and may decrease the hospital's dependence on other referring providers. As such, a hospital's use of an FSED may reduce the effect of uncertainty in the environment. Based on resource dependence theory, the hospitals would operate FSEDs to decrease the effect of uncertainty in their environments.

Dynamism has been previously measured as managed care penetration and change in unemployment rates (Kazley, 2007, J.S. Zinn et al., 1997). The higher managed care penetration leads to increase in the hospital negotiation with managed care

for contracts. The decreased financial flexibility and increased dependency on managed care leads to increase in the unpredictability.

Hypothesis 2*: Hospitals operating in more uncertain environments are more likely to operate an FSED compared to hospitals operating in less uncertain environments*

Complexity. Environmental complexity has been defined as the complexity in processing market information (Sharfman & Dean, 1991). Organizations operating in more complex or heterogeneous environments will have to process more information in formulating and implementing new strategies, compared to organizations operating in simple environments (Duncan, 1972; Tung, 1979). Therefore, organizations in more complex environments face a more complicated task for acquiring resources (Dess & Beard, 1984) (Dess & Beard, 1984), which creates a difficult situation for organizations to operate smoothly. Hospitals located in more complex environments will attempt to secure resources in the form of new patients by operating FSEDs. The FSEDs will provide more patients by referring patients located farther from the hospital, and patients who in the absence of FSEDs may have visited different healthcare facilities. The complexity is traditionally measured by the market competition (J.S. Zinn et al., 1997). The increase in competition will lead to increase in the number of stakeholders present in the market. Hospitals have to gather more information to acquire resources. The market competition and presence of other FSEDs in market is used to measure market competition.

Hypothesis 3: *Hospitals located in more complex environment are more likely to operate an FSED compared to hospitals located in less complex environment.*

Organizational Factors

Large hospitals have more human resources and power to attain resources from the environment (J.S. Zinn et al., 1997). Large hospitals have the advantage of economies of scale, and more bargaining power with suppliers and third party payers. The economies of scale in operations enable larger hospitals to invest in new projects (Baldridge & Burnham, 1975; Moch & Morse, 1977). Also, the literature shows that large organizations have access to resources that may be used for larger investments. The higher the resources the organization has, the less the organization has to worry about sunken cost. Organizations with higher resources are capable investing in new projects with lesser risk than small organizations (Hannan & Freeman, 1993; Kimberly & Evanisko, 1981). On the other hand, smaller organizations have limited resources; therefore, they face higher financial risks when investing in new projects. Gifford and Mullner (1988) used the term "liability of smallness" to define the risk factors associated with size, and emphasized the importance of size for the investment in new projects.

Hypothesis 4: *Larger hospitals are more likely to operate an FSED compared to smaller hospitals*

The ability of an organization to invest in external projects depends on the financial resources in excess of those required to maintain core functions. The hospitals with better operating margins will be better able to invest in FSEDs than hospitals with lower operating margins.

Hypothesis 5: *Hospitals with higher financial performance are more likely to operate an FSED compared to hospitals with lower financial performance*

System-affiliated hospitals have greater access to resources than hospitals with no system affiliation, so they are more likely to operate FSEDs. Hospitals join systems in order to gain access to capital, market information, management expertise, and wider geographical access (Fottler, Schermerhorn Jr, Wong, & Money, 1982). As such, system-affiliated hospitals have more resources to adopt innovative strategies. Goes et al. (1997) found that the likelihood of innovation adoption by system affiliated hospitals are 20 % higher than hospitals without system affiliation. The FSEDs operated by system-affiliated hospitals requires access to capital, market information, and management expertise to operate the new facility which will ultimately provide wider a geographical market share for the hospital.

Hypothesis 6: *System-affiliated hospitals are more likely to operate an FSED than hospitals with no system affiliation*

METHOD

Data

The data collection proceeded in two steps. First, those hospitals operating FSEDs between 2002 and 2011 were identified. The sample was identified using a combination of data sources: 1) American Hospital Association (AHA) Annual Survey data identifying whether or not hospital operates a FSED; 2) the National Emergency Department Inventory (NEDI)-USA dataset; and 3) internet searches for newly opened FSEDs (see Appendix B for search terms). All of these hospitals and potential FSEDs were contacted by phone to confirm the presence of a FSED (see Appendix B for details

about the telephonic survey). During this call, each confirmed FSED was asked a series of questions consistent with those used in a prior national study (Sullivan et al., 2012).

Second, the data obtained from the telephone interview was then merged with the three databases: 1) AHA Annual Survey (American Hospital Association, 2011), 2) Healthcare Cost Report Information System database from CMS (Centers for Medicare and Medicaid Services, 2011), and 3) the Area Resource File (ARF) (Area Health Resource File, 2002-2011). AHA data collect the organizational level of information from hospitals in the United States, and were used in this study to identify the market share and organizational variables. Medicare cost report consists of comprehensive annual cost report of Medicare Certified institutions. ARF provides county-level data on health resources and socioeconomic indicators affecting the health status. Population demographic and market factors were used from ARF. ARF and CMS database are publically available database, while AHA annual survey data was obtained via Lister Hill Center, University of Alabama at Birmingham.

The lack of information on the detailed state policy regulations on FSEDs may affect the comparison across the states. To minimize the bias, the sample was restricted to 14 states (AZ, CO, CT, FL, IL, MD, MI, NE, NJ, NY, OH, SC, TX, and VA) that had FSED in the start of the study period, that is, year 2002. Thus, the sample consisted of 1347 hospitals in 2002 and 1575 in 2011. The study protocol was approved by the University of Alabama at Birmingham's Institutional Review Board (IRB).

Table 1 includes definitions and data sources for all variables used in the analysis. The dependent variable, whether hospital operates an FSED, was a binary variable (1=yes; 0=no). . Hospitals were considered to operate an FSED if any of the following

conditions were met during the study period (2002-2011): 1) hospital owned FSED, 2) FSED was owned by hospital's system, or 3) there was contractual arrangement between hospital and FSED over patient transfers.

The independent variables included both market and organizational factors that were hypothesized to be associated with the hospital's decision to operate an FSED. Market variables included environmental munificence (hypothesis 1), dynamism (hypothesis 2) and complexity (hypothesis 3). Environmental munificence was measured by per capita income, rural versus urban location of the hospital, primary care physician per capita, percent of population 65 years and older, and percentage of population with health insurance. Environmental dynamism was measured by Medicare managed care penetration rate and unemployment rates. Environmental complexity was measured by market competition (Herfindahl-Hirschman Index [HHI]), and presence of other FSEDs in the market. HHI was computed as sum of the squared market shares for hospitals in a market based on Dartmouth's hospital service area codes and total facility inpatient days. The study used information on both autonomous and satellite FSEDs to compute the total other FSEDs present in the market. The autonomous FSEDs are affiliated with organizations other than hospitals. Typically autonomous FSEDs are owned by emergency physician groups. The presence of autonomous FSEDs may affect the decision to operate an FSED by the hospital.

Organizational variables were hospital size (hypothesis 4), as measured by total licensed and staffed beds in the facility; financial performance (hypothesis 5), as measured by total margin; and system affiliation (hypothesis 6), measured as 'yes' or 'no'. The control variables used in the analysis were ownership status (as measured by

for profit, not for profit or non-government federal hospitals), and hospital membership of Council of Teaching Hospital of the Association of American Medical Colleges (COTH).

Analysis

The descriptive analysis presents the organizational characteristics of hospitals operating FSEDs. The bivariate analysis compared the characteristics of hospitals with and without FSEDs operation. Multivariate logistic regression was used to calculate odds ratio and marginal effect for each predictor. Given a dichotomous dependent variable, the logistic regression analysis, with state and year fixed effects with standard errors clustered by hospital ID, was used. Results are reported both in odds ratios and marginal effects for multivariate logistic regression analysis. Marginal effects- present the estimated change in the probability of hospital operating FSEDs associated with the changes in independent variables.

RESULTS

The descriptive statistics for hospitals in states included in this study for baseline (year 2002) and final period of study (year 2011) are shown in Table 2. The number of hospitals operating satellite FSEDs increased from 34 (2.52%) in 2002 to 94 (5.96%) in 2011 for 14 states included in the study. The survey found total of 181 satellite FSEDs operating across the United States.

Table 3 presents the organizational and market characteristics of hospitals operating compared to those not operating FSEDs. Hospitals were more likely to operate

FSEDs in markets with higher per capita income (M.E.= 0.000001;*p*=0.001), lower population above age 65 years (M.E. = -0.003;*p*=0.001), higher population with health insurance (M.E. = 0.002;*p*=0.001), higher Medicare Advantage penetration rate (M.E. = 0.0007;*p*=0.001), higher unemployment rate (M.E. = 0.001;*p*=0.01), and higher competition (M.E. = -0.91;*p*=0.001). Hospitals operating an FSED were more likely to locate in urban areas compared to rural areas (M.E. = 0.09; *p*=0.001). Larger hospitals (M.E.= 0.00007; *p*=0.001), hospitals with higher total margin (M.E.= 0.1022; *p*=0.001), and system-affiliated hospitals (M.E. = 0.04; *p*=0.001) were more likely to operate FSEDs. Compared to for-profit hospitals, not-for-profit hospitals (M.E. = .03; *p*=0.001) were more likely to have an FSED, while non-federal government hospitals (M.E.= -0.06; *p*=0.001) were less like to have an FSED.

Table 4 shows the results of the logistic regression model used for this study. Based on the given outcomes, hypothesis 1 was partially supported. Hospitals operating FSEDs were more likely to locate in areas with higher per capita income (M.E.= 0.000001; *p*=0.03) and urban areas (M.E.= 0.06; *p*=0.01). Primary care provider per capita, population over 65 years, and percent population with health insurance were not significantly associated with hospitals operating FSEDs. Hypothesis 2 was not supported by these results in that both Medicare penetration rate and unemployment rate were not significantly related to hospitals operating FSEDs. Hypothesis 3 was partially supported. Market competition (M.E.= 0.005; p=0.74) was not significantly related to hospital operating an FSED. However, the presence of other FSEDs in the market increased the likelihood of hospital operating FSEDs (M.E.=0.008; p=0.001). Likelihood of operating an FSED by hospitals increased with the number of hospital beds (M.E.=0.0001;

p=0.001) and higher total margin (M.E.=0.08; *p*=0.02); therefore, hypotheses 4 and 5 were supported. Lastly, hospitals with system affiliation were more likely to operate FSED as compared to hospitals with no system affiliations (M.E.=0.025; *p*=0.02). Therefore, hypothesis 6 was fully supported. The control variables (e.g., ownership and teaching status) were not significantly associated with hospital operating FSEDs.

DISCUSSION

This paper studied the association of various organizational and market factors with hospitals operating FSEDs. The unregulated growth of FSEDs may lead to geographic disparities in emergency care. The analyses support the use of resource dependency theory as a means to justify the relationship between the market and organizational factors, and the hospital operating FSEDs. The resource dependency theory suggests that organizations formulate strategies to control the scarce resources in the market (Pfeffer & Salancik, 1978) and to improve organizational outcomes. The results found that market's munificence and complexity, as well as organizational size, financial performance, and system membership were significantly related to the hospital operating an FSED.

The abundance or scarcity of market resources can affect the operations of organizations (Castrogiovanni, 1991). This study confirms that market munificence is highly associated with the strategy of hospitals to operate FSEDs. Hospitals located in areas with higher per capita income were more likely to operate FSEDs. Similarly, hospitals that operate FSEDs tended to locate in urban areas. Previous studies have suggested that market munificence has a positive relationship with the use of a broader

range of strategies (Brittain & Freeman, 1981). Also, Meyer and Goes (1988) found that organizations are more likely to adopt innovative strategies when located in environments with abundant resources.

Based on resource dependence theory, the study found that environmental complexity was related to hospital operating FSEDs. The results provide partial support for the relationship between complex environment and hospital operating FSED. The analysis showed that the presence of other FSEDs in a certain market was associated with the hospital operating FSEDs. The presence of other FSEDs in market adds more complexity in hospital environment and more difficulty in acquiring patients. Therefore, the FSED operation may be a strategy to increase market share, and compete with other hospitals having an FSED in the market.

Organizational factors were significantly related to hospital operating FSEDs. Hospital's size, financial performance, and system membership provide the resources needed to operate an FSED. Hospital size and system membership are a proxy for organizational slack and capacity to acquire resources needed for initial investment in operating an FSED. Our findings are consistent with previous literature (Banaszak-Holl, Zinn, & Mor, 1996; Kazley & Ozcan, 2007; Kimberly & Evanisko, 1981), where organization size and system membership was positively related to innovative strategies other than FSEDs. Similarly, operating an FSED requires an ongoing financial commitment; therefore, the hospital should be performing financially well to undertake such strategic decisions. These findings are consistent with previous studies that found a significant relationship between organizational economic health and innovation adoption other than FSEDs (Damanpour, 1991; Damanpour & Schneider, 2006).

The analysis presented mixed finding for relationship between environmental complexity and hospitals operating FSEDs. The HHI presents overall market competition with rival hospitals while presence of other FSEDs in the market presents direct strategic competition. We found significant and positive relationship between operating FSEDs and presence of other FSEDs in the market, but no significant evidence for relationship with overall market competition. Population over 65 years of age was not significantly associated with operating an FSED, as hospitals may target more private payers instead of Medicare. Also, hospitals operate FSEDs irrespective of their ownership. The findings are consistent with literature that shows for profit and not for profit organizations formulate similar strategies (Reeves & Ford, 2004)

The study has several potential limitations. First, the study was limited to the states that had FSEDs during the entire period of the study (2002 to 2011). The current study did not control for the impact of different regulations on the operation of the FSEDs by the hospitals. The impact of the current regulations may provide important information to policy makers. Therefore, future study on the effect of different types of regulations on FSEDs should be conducted. Second, the secondary datasets used (AHA, ARF and CMS) were collected primarily for reporting purposes and not for research purposes; there is no mechanism for ensuring the accuracy of the datasets. Third, the sample was restricted to 14 states, which limits the generalization of the results to other states not included in the study. As the number of states with FSEDs has expanded in recent years, future research should examine how this may affect the contextual factors associated with FSEDs.

The rapid growth of FSEDs in the United States deserves future research to examine its potential impact on the current healthcare system and policy implications. This research needs to be extended to examine the implications of FSEDs for cost and quality. First, further research is needed examining the impact of FSEDs on overall healthcare costs, and how it affects the financial performance of hospitals operating them. Second, FSEDs transfer patients to hospitals that need more advanced care. Therefore, the question arises about the effect on the outcome of patients because of a delay in receiving advanced care. Future research is needed to compare the clinical outcomes of patients who are admitted to the hospital directly from home and those who are referred by FSEDs.

The current study shows that hospitals operating FSEDs are more likely to locate in higher socioeconomic and urban areas. Several states where FSEDS are already present are currently formulating policies to regulate them, while other states are in the process of deciding on regulatory controls. Our study findings may inform policy makers with respect to policies to regulate the demand and supply of emergency care provided outside the hospital. This may include incentives to increase access to currently underserved populations, especially in rural areas. This study is the first organizational level empirical study of FSEDs using data at the national level. The findings of this study can be used by hospitals to make informed decisions while formulating strategies for FSEDs.

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TABLE 1. Variables Used in Study

Construct	Measurement	Data Source
Dependent Variable		
Hospital operating FSEDs	If FSED respond that it is operated by a hospital, it is recorded as 'yes' or 'no'	Survey
Independent Variables		
Environmental Munificence		
Per capita income	Total personal income of the residents in given area divided by resident population in HSA (per $1000)	ARF
Urban location	'Rural' population is defined as complete rural population or urban population less than 2500 for this study, while all other urban and metro population is defined as 'urban' population.	ARF
Primary care physician per capita	Total number of non-federal primary care physician divided by resident population in HSA	ARF
Percent of population 65 year or older	Percentage of total resident population age 65 year or older	ARF
Percent of population with health insurance	Total percentage of resident population has health insurance	ARF
Environmental Dynamism		ARF
Medicare managed care penetration rate	The ratio of Medicare Advantage Plan enrollees over eligible Medicare individuals multiplied by 100	ARF
Unemployment rate	Unemployment Rate	ARF
Environmental Complexity		
Market competition (HHI)	Herfindahl-Hirschman Index = Sum of Squared Market Share	AHA
# of other FSED in the market	$\text{Market Share} = \frac{\text{Total Inpatient days for hospital}}{\text{Total Inpatient days in HSA}}$	Survey
Organizational Variables		
Bed size	Total number of hospital beds **(per 100 beds)**	AHA
Total Margin	Operating Margin =(total revenue-total expense)/(Total revenue)	MCR
System Affiliation	Whether hospital has system affiliated- 'yes' or 'no'	AHA

Control Variables

Ownership	For-profit versus not-for-profit versus non-federal-government hospitals	AHA
Teaching Institute	Member of Council of Teaching Hospital of the Association of American Medical Colleges (COTH)	AHA

Abbreviations: AHA- American Medical Association, ARF – Area Resource File, MCR- Medicare Cost Report, and FSED – Freestanding Emergency Department, HMO - Health Maintenance Organization, HSA- Hospital Service Area

TABLE 2. Descriptive Analysis of Variables

	Year 2002			**Year 2011**		
Variable	*N*	*Mean/ Percent*	*Std Dev*	*N*	*Mean/ Percent*	*Std Dev*
Hospital affiliation with FSED	1347	2.52%		1575	5.97%	
Per capita income (per $1000)	1331	29.61	9.53	1559	38.41	10.75
Urban	1347	80.10%		1575	76.25%	
Physician per capita	1347	23.95	12.94	1575	24.97	15.58
% population over age 65	1347	13.67	4.21	1575	14.68	4.40
% population with health insurance	1347	81.20	6.42	1575	81.02	6.48
Medicare advantage penetration	1347	8.32	10.79	1575	20.10	12.82
Unemployment rate	1356	5.92	2.03	1575	8.74	2.39
Market competition	1346	0.74	0.34	1575	0.71	0.35
Total FSEDs in the HSA	1347	0.08	0.35	1575	0.80	3.99
Hospital bed (per 100 beds)	1347	2.14	1.91	1575	2.01	2.22
Total margin	1347	0.023	0.11	1575	0.03	0.11
System membership	1347	50.63%		1575	59.43%	
Not-for-profit	1347	67.26%		1575	62.67%	
Non-federal government	1347	17.59%		1575	17.78%	
Teaching institution	1347	8.83%		1575	8.25%	

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area

TABLE 3. Bivariate Regression Analysis with Hospitals Operating Freestanding Emergency Departments as a Dependent Variable

Variables	Odds Ratio	Marginal Effect
Per capita income (per $1000)	1.03	0.0010**
Urban	12.10	0.0926**
Physician per capita	1.00	-0.0002
% population over age 65	0.92	-0.0031**
% population with health insurance	1.05	0.0019**
Medicare advantage penetration	1.02	0.0007**
Unemployment rate	1.04	0.0016**
Market competition	0.40	-0.0339**
Total FSEDs in the HSA	1.15	0.0051**
Hospital bed (per 100 beds)	1.22	0.0072**
Total margin	15.34	0.1022**
System membership	3.22	0.0435**
Not-for-profit	2.46	0.0336**
Non-federal government	0.19	-0.0617**
Teaching institution	1.75	0.0209**

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area. ** $p < 0.01$

TABLE 4. Regression Results with Hospital Affiliation with Freestanding Emergency Departments as a Dependent Variable

Variables	Odds Ratio	Marginal Effect
Per capita income (per $1000)	1.02	0.0010*
Urban	5.93	0.0628*
Physician per capita	1.00	-0.0001
% population over age 65	1.07	0.0024
% population with health insurance	1.00	0.0002
Medicare advantage penetration	0.99	-0.0004
Unemployment rate	0.93	-0.0025
Market competition	1.17	0.0054
Total FSEDs in the HSA	1.26	0.0081**
Hospital bed (per 100 beds)	1. 28	0.0087**
Total margin*	10.23	0.0821*
System membership	2.00	0.0245*
Not-for-profit	1.34	0.0102
Non-federal government	0.73	-0.0113
Teaching institution	0.48	-0.0257

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area. †$p < 0.10$, * $p < 0.05$, ** $p < 0.01$

RELATIONSHIP BETWEEN HOSPITAL OPERATING FREESTANDING EMERGENCY DEPARTMENT AND FINANCIAL PERFORMANCE

by

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ABSTRACT

Objective: This study analyzed the effect of starting an FSED operation by hospitals on their market share, and the role of market share as mediator between FSED operation and financial performance using the vertical integration with transaction cost model.

Data Sources: All acute care hospitals in the states with the presence of FSEDs at the beginning of study period (year 2002) from 2002 to 2011. Data on FSEDs collected by telephonic survey merged with American Hospital Association Annual Survey (AHA), CMS cost report, and Area Health Resource File (ARF).

Study Design: Total margin and operating margin are dependent variables, market share is independent variable, and hospital operating an FSED is primary independent variable Panel data were also used in this study with fixed effect regression was used in the study to control for the effect of time invariant factors. The standard errors were corrected for clustering at the hospital level.

Principal Findings: The results show that no significant association was found when financial performance was measured as total margin, while positive and significant relationship was found with hospitals start operating FSED. Also, this relationship is partially mediated by market share.

Conclusion: The findings from this study can be used by managers to make an informed decision about FSED strategy for their organizations. The policy makers may utilize the findings of this study to develop the policy regulations to improve the emergency health care access and regulate EDs to reduce the redundancy in health care system.

INTRODUCTION

Hospitals continue to face financial pressures given the turbulent health care market and payer's policies for cost containment (Fennell & Adams, 2011; Guo, 2009; Swayne, Duncan, & Ginter, 2012). As such, several competitive strategies have been utilized by hospitals to maintain or improve their financial performance. Recently, hospitals are using freestanding emergency departments (FSEDs) as a competitive strategy to gain market share and improve financial performance (Hill & Steelman, 2008; Sullivan et al., 2012). As defined by Sullivan et al. (2012), FSEDs provide emergency care but are not located on hospital campuses. There are two types of FSEDs: satellite and autonomous. Satellite FSEDs are owned and operated by hospitals or hospital systems. By contrast, autonomous FSEDs have no hospital or hospital system ownership; they are typically owned by physician groups or independent organizations.

Between 2005 and 2009, the number of FSEDs increased by approximately 50% (American Hospital Association, 2011; T Paul, 2012; Williams & Pfeffer, 2009) The increase in the emergency care demand may lead to increase in the opening of FSEDs. According to National Hospital Ambulatory Medical Care Survey, there was a 32 % increase in demand for emergency medicine services from 1999 to 2009 (McCaig & Burt, 2001; National Center for Health Statistics, 2009; Pitts, Niska, Xu, & Burt, 2008a). The previous study shows that the higher number of patients seeking emergency care instead of primary care providers (Pitts, Carrier, Rich, & Kellermann, 2010; Richman, Clark, Sullivan, & Camargo, 2007), increase in number of uninsured patients (Garcia, Bernstein, Bush, & Statistics, 2010), and increase in the number of elderly patients (Roberts, McKay, & Shaffer, 2008) may be some of the reasons for increase in the demand of

emergency care. At the same time there was decrease in the EDs by approximately 5% in the United States (McCaig & Burt, 2001; National Center for Health Statistics, 2009; Pitts et al., 2008a). Both of the above factors may have contributed to overcrowding in EDs.

Satellite FSEDs may be used by hospitals or hospital systems as a vertical integration strategy to improve their financial performance. For example, FSEDs can lead to an increase referral to the hospitals, which may increase the hospital's market share (Hill & Steelman, 2008). An increase in inpatient market share, may ultimately lead to better financial performance. To date, however, there have been no published studies examining whether FSEDs are related to better financial performance for hospitals.

FSEDs are relatively new and fast growing in the U. S. health care delivery system. Their effects on various outcomes for hospitals need to be studied before hospitals use them on a wide scale. Based on economic efficiencies by vertical integration, we hypothesize that hospital ownership of satellite FSEDs increases hospital financial performance. In the current study, we will use longitudinal data for analyzing the relationship between hospitals operating FSEDs and their financial performance, and also will examine if this relationship is mediated by market share. Ultimately, this study will assist managers in understanding various factors affecting the impacts of FSEDs on hospital market share, profitability, and FSED-specific policy. Furthermore, this study may provide insights to policy makers on the potential impact of FSEDs on overall healthcare cost.

CONCEPTUAL FRAMEWORK

According to a previous study by Sullivan et al. (Sullivan et al., 2012), an FSED is defined as a facility that is (a) open to all types of emergencies, (b) not located within a hospital, (c) open to the general public, (d) open daily, and (e) open at least 156 of 168 hr per week including holidays. The 156-hour criterion was meant to allow for occasional facility closure during the middle of night (eg, between midnight and 5:59 am on Saturday and Sunday mornings) but the expectation is that vast majority of FSEDs are open for all 168 hours (ie, 24/7). Urgent care centers also play a role in providing immediate healthcare services, but there are differences between FSEDs and urgent care centers. The primary difference between FSEDs and urgent care centers is that FSEDs perform additional procedures such as defibrillation, intubation, and conscious sedation delivered by health care providers trained in emergency medicine. Also, most FSEDs are open 24 hours/day but, by definition, urgent care centers (UCC) are not. We also included the UCC that are open 24/7 hours and comply with the FSED definition for this study.

The relationship between strategy and financial performance is at the heart of the strategy literature. For survival, all non-governmental organizations must perform well financially Hospitals use various strategies to improve their financial performance. Traditionally, EDs were the primary means of admissions for hospitals. From 2006 to 2010, 12.9% of patients that visited EDs were admitted to the hospital (National Center for Health Statistics, 2008; Pitts, Niska, Xu, & Burt, 2008b). In comparison, FSEDs may enable hospitals to provide emergency services near patients' homes and admit to affiliated hospitals. The inpatient referral rate from FSEDs is 5%, which is less than

traditional EDs (Williams & Pfeffer, 2009). But these inpatient referrals may admit to competitor hospital in the absence of the FSEDS. Thus, hospitals may secure the flow of inpatient admissions from patients who visited the FSEDs operated by them. Therefore, increase in the inpatient referral may lead to better financial performance.

Organizations use vertical integration strategy to lower the production and the transaction costs and, in turn, increase their financial profits (Clement, 1987). Conrad and Dowling (1990) have described vertical integration for an acute care hospital as the acquisition of services, such as pre-acute, acute, and post-acute care, and integration of these services clinically and administratively with other services provided by the hospital. Hospitals' operating FSEDs represent the hospitals' strategies to increase the volume of inpatient admissions by providing healthcare services near patients' locations. FSEDs satisfy the four basic conditions of vertical integration as described by Clement (1987): production stage, breadth, degree, and form. FSEDs, similar to regular EDs, come before inpatient hospital services in the production stage of the hospital value chain (Clement, 1987). FSEDS offer the emergency care at parallel level ('breadth') of hospital's emergency and outpatient services. Therefore, they share the degree of vertical integration with the different sources of inpatient hospitalization. Lastly, the form of vertical integration may be ownership, in-network, part of system, or contractual virtual integration through contractual arrangements. Because EDs are a major source of inpatient admission, the operation of FSED by hospitals shows the backward vertical integration of the delivery system.

The backward vertical integration has been studied in healthcare mostly with physician employment (Lake, Devers, Brewster, & Casalino, 2003; Robinson, 1997;

Wheeler, Wickizer, & Shortell, 1986). The literature on vertical integration in hospitals shows that there is an increase in market share and improvement in the financial performance with the physician-hospital integration (Lake et al., 2003; Wheeler et al., 1986). Reducing transaction costs has been proposed as a major motive of vertical integration in health care (Conrad & Dowling, 1990; Mick & Conrad, 1988). Transaction costs are the direct and indirect costs when an organizational exchange occurs (Williamson, 1981). According to Williamson, when transaction costs are higher, then the organization moves away from market to hierarchies for improved efficiency. By operating an FSED, a hospital can reduce uncertainty in inpatient demand by maintaining or increasing the flow of patients who are admitted through FSEDs, while reducing competitive threats. Also, continuity of care within an organization may lead to savings in transaction costs.

In addition, patients tend to use more emergency services with increased proximity to EDs (Henneman et al., 2011; Ludwick, Fu, Warden, & Lowe, 2009). Thus, operating FSEDs in suburbs and other markets that lack emergency care may lead to higher utilization of services provided by FSEDs. This increase in FSEDs and emergency healthcare services can lead to an increase in inpatient utilization and higher inpatient revenues for the hospital operating them (Henneman et al., 2011; Ludwick, Fu, Warden, & Lowe, 2009).

FSEDs, originally may have been used to provide more access of emergency services to underserved areas (Andrews, 2011; Hill & Steelman, 2008) . However, hospital may also use FSEDs as a strategy to increase their profitability. The FSEDs have been portrayed as a ‘cash cow’ (Ostrom, 2011). Therefore, we hypothesize that

hospitals use FSEDs as a vertical integration strategy to increase their inpatient revenues and ultimately, their financial performance.

Hypothesis 1: *Hospitals that start operating an FSED will experience better financial performance compared to those that do not operate an FSED*

As mentioned earlier, FSEDs increase the access to, and use of, emergency care by their location in proximity to the patient's community. When establishing FSEDs, hospitals carefully select the location of communities, which are growing but have not grown enough to support a full range hospital with inpatient beds. Through this strategic placement, FSEDs may siphon the patients from such communities to their affiliated hospital or hospital system. This approach may keep potential patients from visiting competitors' hospitals or their EDs. As such, we hypothesize that

Hypothesis 2: *Hospitals that start operating an FSED will experience higher market share compared to those that do not operate an FSED*

Previous studies provide various reasons for market share as a predictor of financial performance. The causal relationship between market share and the financial performance has been a controversial issue, but most studies have found a correlation between the two factors (Bercovitz & Mitchell, 2007; Buzzell, Gale, & Sultan, 1975; Gale, 1972; Shepherd, 1972; Szymanski, Bharadwaj, & Varadarajan, 1993). Buzzell et al. (1975) explained the relationship between market share and financial performance by economies of scale, market power, and quality management. Organizations achieve financial profits by increasing market share, because of the economies of scale, and the increase in the market power (Gale, 1972; Shepherd, 1972). Hospitals with a higher market share will have higher number of inpatients, and this may lead to an increase in

their profitability based on economies of scale. Also in the U.S. healthcare system, given the increased in managed care concentration and variable negotiated reimbursement rates, a higher market share may increase the bargaining power with payers and provide higher reimbursements for services (Robinson, 2011). Thus, an increase in market share may lead to an increase in financial performance. Since starting an FSED is expected to increase market share, and increased market share is expected to be associated with better financial performance, we hypothesize that:

Hypothesis 3: *The relationship between hospitals that start operating an FSED and financial performance is mediated by market share*

METHOD

Data

The sample for this study consisted of U.S. acute care hospitals from 2002-2011 operating in 14 states where FSEDs were allowed to operate in 2002: AZ, CO, CT, FL, IL, MD, MI, NE, NJ, NY, OH, SC, TX, and VA. The FSED policies and regulations vary by state. Therefore, the sample was restricted to only states where FSEDs were present at the beginning of the study period in year 2002.

This study collected survey data on FSEDs, and merged these data with secondary data sets. The hospital sample for the survey was identified from the following sources: (a) hospitals identified as having an affiliation with FSEDs in the American Hospital Association (AHA) Annual survey data; 2) National Emergency Department Inventory (NEDI)-USA dataset that identifies FSEDs in survey conducted in 2007 (Sullivan et al., 2012); and 3) internet searches for newly opened FSEDs (see Appendix B). During this

call, each confirmed FSED was asked a series of questions consistent with those used in a prior national study (see Appendix B) (Sullivan et al., 2012).

Secondary data sources include: 1) American Hospital Association Annual Survey (American Hospital Association [AHA], 2011), 2) Healthcare Cost Report Information System database from Centers for Medicare & Medicaid Services (Centers for Medicare and Medicaid Services [CMS], 2011), and 3) Area Health Resource File (Area Health Resource File [ARF], 2012). AHA data were used for calculating market share and organizational characteristics (AHA, 2011). CMS data was used to obtain financial performance of hospitals (CMS, 2011). Annual cost reports were submitted by all Medicare-certified institutions in the United States to CMS. The CMS data consisted of utilization data, cost and charge data from the hospitals. Environmental factors, payer mix, demographic factors of population were extracted from the ARF. ARF is county level data on health resources and socioeconomic indicators affecting the health status (ARF, 2012). ARF and CMS database are publically available database, while AHA annual survey data was obtained via Lister Hill Center, University of Alabama at Birmingham.

The final analytic sample consisted of 1,347 hospitals in 2002, which increased to 1575 in 2011. The study protocol was approved by the University of Alabama at Birmingham's Institutional Review Board (IRB).

Variables

The list of variables that were used for this research is presented in Table 1. The dependent variables consisted of financial performance (hypotheses 1 and 3) and market

share (hypothesis 2) measures. Financial performance measures included total margin and operating margin; the most commonly used measures in the healthcare literature (Pink et al., 2006; Pradhan, Weech-Maldonado, Harman, Laberge, & Hyer, 2013). Total margin measures the excess of total revenue over total expense divided by the total revenue (Gapenski, 1999). Operating margin was calculated as difference in patient revenue and patient expense divided by patient revenue. Operating margin focuses on profit earned by hospital from delivering services to patients only. It excludes non-operating revenues such as endowment and cost such as interest rate. Market share was defined as the percentage of a hospital's inpatient days relative to the total inpatient days from all hospitals in health services area (HSA).

The independent variable represents whether or not a hospital operates an FSED (1= yes; 0= no), which was defined in this paper as an FSED operated by the hospital, their system with the majority of patient referrals to the hospital, or any contractual agreement for receiving majority of patients from an FSED. Control variables consisted of market and organizational factors that may influence financial performance and market share (Erickson & Finkler, 1985; Goes & Zhan, 1995; Kaissi & Begun, 2008; Short, Palmer, & Ketchen Jr, 2002). Market factors included location of the hospital, per capita income, primary care physician per capita, percent of population over 65 years of age, percentage of population with health insurance, Medicare Advantage penetration rate, unemployment rates, and total autonomous and satellite FSEDs in the HSA. The autonomous FSEDs are affiliated with organizations other than hospitals. Typically autonomous FSEDs are owned by emergency physician groups. The presence of

autonomous FSEDs may affect the decision to operate an FSED by the hospital; therefore they are included as the control variable.

Organizational factors included hospital size, as measured by total licensed and staffed beds in the facility, system affiliation as 'yes' or 'no', ownership status as measured by for profit, not for profit or non-government federal hospitals, accreditation by Joint Commission on Accreditation of Health Organizations (JCAHO), and hospital membership of Council of Teaching Hospital of the Association of American Medical Colleges (COTH).

ANALYSIS

Panel data were used in this study to evaluate the effect of hospital starting an FSED on the subsequent year market share and financial performance. There is a delay between the year of operating an FSED and a shift in market share so a 1-year lag was used for studying effect of hospital operation of an FSED on market share and financial performance. Panel data were also used in this study with fixed effect regression was used in the study to control for the effect of time invariant factors. The standard errors were corrected for clustering at the hospital level.

The presence of FSEDs and financial performance were hypothesized to be mediated by market share. This study used the Baron and Kenny method (1986) to test the market share as mediator between financial performance and operation of an FSED by the hospital. Baron and Kenny (1986) suggested three conditions to establish mediation among financial performance (dependent variable), mediator (market share), and hospital operating an FSED (independent variable). They suggested four steps to test

for mediation. The first step consists of regressing financial performance on hospital operating an FSED. The second step is to use market share as dependent variable and hospital operating an FSED as a predictor variable in regression model. The third step focuses on regressing the financial performance on both market share and hospital operating an FSED. Lastly, the fourth step is to compare the coefficient of hospital operating an FSED in step 1 and step 3. There is complete mediation if the effect of FSED operation on financial performance is "0" in step 3, when market share is included in the model. But, if the effect is not "0" then partial mediation is predicted. The fixed effect multivariate regression model was used to analyze with Baron and Kenny method.

RESULTS

Table 2 presents the descriptive statistics of all variables used in the study for year 2002 and year 2011. The number of hospitals operating FSEDs increased from 2.52% in 2002 to 5.84% in 2011 in the 14 states included in the study. The average total margin decreased in 2011 as compared to year 2002, while operating margin had little variation. The average market share fell by 30% in year 2011 compared to year 2002.

Table 3 presents the bivariate regression analysis with total margin and operating margin as dependent variables. The total margin was significantly related to hospitals operating FSEDs, while not associated with market share of the hospital. The operating margin was significantly related to hospital operating an FSED and market share. Both total and operating margin were positively and significantly related to urban location, and total number of satellite FSEDs in the HSA area.

The results of Kenny and Baron's mediation regression analysis for total margin are presented in Table 4. The first regression model shows that hospitals start operating

an FSED was not associated with total margin of the hospital. The second step shows that hospitals start operating an FSED was significantly related to increased market share (b = 0.73, p = 0.005). The third step did not find a significant relationship between market share and hospital start operating an FSED, and total margin. Therefore, the hypotheses based on the total margin were not supported.

Table 5 presents the results of Kenny and Baron's mediation regression analysis for operating margin. The first step regression model shows that hospital operating an FSED was significantly and positively related to operating margin. The second step regression showed a significant and positive association between hospital operating an FSED and market share (b = 0.73, p = 0.005). The third step regression model showed both market share and hospital an FSED as significantly and positively associated with operating margin. The operating margin is 2.24% point more for the hospital start operating an FSED than with no FSED operation. An increase in market share of one unit increases the hospital operating margin by 5.27% point. There was small change in the FSED coefficient which suggests that market share partially mediated the relationship between FSED and operating margin. The percent population over 65 year age, percent population with health insurance, Medicare Advantage penetration, unemployment rate, total autonomous FSEDs in the market were positively and significantly associated with operating margin. The operating margin of a hospital increased by 0.01 percent point with one unit increase in bed size, while operating margin decrease by 4.20 percent point if hospital converted from for-profit to not-for-profit hospital. Therefore, the results provide support for all hypotheses in the study with measuring operating margin as financial performance.

DISCUSSION

Hospitals may increase their market share by either expanding market area through operating FSEDs in a new market or establishing FSED near their competitor hospital to gain current market area. Increasing market share may be a strategy to increase profitability of the hospital. The relationship between market share and financial performance is controversial. But it has been argued that higher market share does not necessarily translate into better financial performance (Prescott, Kohli, & Venkatraman, 1986; Szymanski et al., 1993; Wernerfelt, 1986). This study analyzed the relationship of starting an FSED operation by hospitals on their market share, and the role of market share as mediator between FSED operation and financial performance. The vertical integration with transaction cost model was used to hypothesize the mediation model for this study. The study found that mediation of market share between hospitals start operating FSEDs and their financial performance measured as operating margin.

The study provided mixed findings for the different hypotheses. Hospitals operating FSEDs was associated positively and significantly with market share. Based on operating margin, the results showed that higher market share transformed into better financial performance with hospital start operating an FSED. The findings of this study are consistent with the findings of previous studies that show backward vertical integration in the form of hospital integration with physician group increases the financial performances of the hospital (Bray, Carter, Dobson, Watt, & Shortell, 1994; Goes & Zhan, 1995; Wang, Wan, Clement, & Begun, 2001). Based on total margin, the study did not find any significant relationship between hospitals started operating FSEDs and increase in their financial performance.

The increase in market share and referred inpatient from affiliated FSED may lead to a decrease in costs as a result of economies of scale. Therefore, the impact of operating an FSED was found only on operating margin. Whereas, total margin measures overall hospital performance, which includes several factors that are not directly affected by increase in market share by operating an FSED, such as endowment and revenues from sources other than patient services. The vertical integration leads to increase in operating margin based on economies of scale. The increase in patient volume (market share) may be a factor leading to increase in operating margin as compared to total margin shows that the hospitals were achieving profit with increase in the efficiency and also focused on the business income rather than overall organizations' income (Gapenski & Pink, 2003).

The results shows that operating margin of hospitals were significantly related to several market factors, such as presence of population over age 65 year, increase in Medicare Advantage Plan enrollment, and percentage of population with health insurance. All these factors represent the munificence in the organizational environment. On the contrary, operating margin increases with unemployment rate. Also, large hospital, measured as total number of bed, had better operating margin then smaller hospitals. The change in hospital ownership from for-profit to not-for-profit was associated with lower operating margin is consistent with finding in previous studies that found that not-for-profit hospitals have lower operating margin than for-profit hospital (Sear, 1991; Watt et al., 1986).

The study has a few potential limitations. First, the study used secondary data sets (AHA, CMS, and ARF), which were not primarily collected for the purpose of

organizational level studies and there is no mechanism to support the accuracy of the data. Second, the concept of FSEDs is still evolving. Hospitals and entities are still experimenting with the type of payer they serve, services provide and market to operate FSEDs. Also, hospitals are experimenting how they can use FSED as a strategy to provide service or to gain market share. It may be too early to predict some of the negative effects of vertical integrations, such as an increase in bureaucratic inefficiencies, decrease in incentives for maintaining efficiency, and rise in managerial inefficiency (D'Aveni & Ilinitch, 1992; Mahoney, 1992). Therefore, follow up future studies should be performed when FSEDs become established entities in the health care sector. Third, the study does not analyze the impact of vertical integration over the quality and its link with financial performance. Future research is needed study this important relationship. Fourth, the sample was restricted to 14 states, which restricts the generalization of the results to the other states not included in the study. With the recent expansion of FSEDs into other states, future research should examine the implications of this growth for hospital financial performance

The findings from this study can be used by managers to make informed decisions about FSED strategy for their organizations. The Accountable Care Act mandates reimbursement for emergency care services. According to Public Health Service Act (PHS Act) section 2719A, all the insurance companies will have to reimburse for emergency care services utilized by the beneficiaries. Also, this regulation restricts the insurance companies to charge different out-of-pocket fee for in-network and out-of-network emergency departments. The mandatory reimbursement and health insurance coverage will decrease the indigent patients treated at emergency department, and expand

the demand for FSEDs. This may provide strategic opportunities for hospitals to improve their financial performance through FSEDs.

The policy makers may utilize the findings of this study to develop the policy regulations to improve access to emergency care and to regulate EDs to reduce the redundancy in health care system. This study is first empirical research analyzing the impact of FSEDS at the organizational level, and will provide a platform for researcher to build knowledge on this emerging concept in health care management research.

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TABLE 1. Variables Used in Study

Variables	Measurement	Data Source
Dependent Variable		
Total margin	Total Margin = (total revenue-total expense)*100/(Total revenue)	MCR
Operating margin	Operating Margin = (Patient revenue-Patient expense)*100/(Patient revenue)	MCR
Mediator Variable		
Market share	Market Share = (Inpatient days for the hospital)/(Total inpatient days for all hospitals in HSA)	AHA
Independent Variable		
Hospital operating an FSED	If FSED respond that it is operated by a hospital, it is recorded as 'yes' or 'no'	Survey
Control Variables		
Urban location	'Rural' population is defined as complete rural population or urban population less than 2500 for this study, while all other urban and metro population is defined as 'urban' population.	ARF
Per capita income	Total personal income of the residents in given area divided by resident population in HSA (per $1000)	ARF
Primary care physician per capita	Total number of non-federal primary care physician divided by resident population in HSA	ARF
Percent of population 65 year or older	Percentage of total resident population age 65 year or older	ARF
Percent of population with health insurance	Total percentage of resident population has health insurance	ARF
		ARF
Medicare managed care penetration rate	The ratio of Medicare Advantage Plan enrollees over eligible Medicare individuals multiplied by 100	ARF
Unemployment rate	Unemployment Rate	ARF

# of other satellite FSED in the market		Survey
# of autonomous FSED in the market		Survey
Hospital beds	Total number of hospital beds	AHA
System affiliation	Whether hospital has system affiliated- 'yes' or 'no'	AHA
Ownership	For Profit Versus not for profit and non-federal government hospitals	AHA
Accreditation by JCAHO	Accreditation by Joint Commission on Accreditation of Health Care Organizations	
Teaching Institute	Member of Council of Teaching Hospital of the Association of American Medical Colleges (COTH)	AHA

Abbreviations: AHA- American Medical Association, ARF – Area Resource File, FSED – Freestanding Emergency Department, HMO - Health Maintenance Organization, HSA- Hospital Service Area, JCAHO- Joint Commission on Accreditation of Health Organizations, and MCR- Medicare Cost Report,

TABLE 2. Descriptive Analysis of Variables

	Year 2002			**Year 2011**		
Variable	*N*	*Mean/ Percent*	*Std Dev*	*N*	*Mean/ Percent*	*Std Dev*
Total margin	1347	0.02	0.11	1575	0.03	0.11
Operating margin	1347	-0.03	0.17	1575	-0.03	0.19
Market share	1347	10.17	0.11	1575	7.36	0.07
Hospital operating an FSED	1347	2.52%		1575	5.84	
Urban location	1347	80.10%		1575	76.25%	
Per capita income (per $1000)	1331	29.61	9.53	1559	38.40	10.75
Physician per capita	1347	23.95	12.94	1575	24.97	15.58
% population over age 65	1347	13.67	4.21	1575	14.68	4.40
% population with health insurance	1347	81.20	6.42	1575	81.02	6.48
Medicare Advantage penetration	1347	8.32	10.79	1575	20.10	12.82
Unemployment rate	1347	5.92	2.03	1575	8.74	2.39
Market competition	1346	0.74	0.34	1575	0.71	0.35
Total satellite FSEDs in the HSA	1347	0.08	0.35	1575	0.41	1.45
Total autonomous FSEDs in the HSA	1347	0.002	0.05	1575	0.39	2.65
Hospital beds (per 100 beds)	1347	2.14	1.91	1575	2.01	2.22
System membership	1347	50.63%		1575	59.43%	
Not-for-profit	1347	67.26%		1575	62.67%	
Non-federal government	1347	17.59%		1575	17.78%	
Accreditation by JCAHO	1347	88.05%		1575	73.27%	
Teaching institution	1347	8.83%		1575	8.25%	

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area, JCAHO- Joint Commission on Accreditation of Health Organizations

TABLE 3. Bivariate Regression Analysis with Total Margin and Operating Margin as Dependent Variables

	Total Margin	**Operating Margin**
Variables	**Coefficient**	**Coefficient**
Market share	0.01	0.08**
Hospital operating an FSED	2.92**	6.62**
Urban location	1.0**	8.15**
Per capita income	-0.01	0.04*
Physician per capita	0.04**	<0.01
% population over age 65	-0.04	-0.17**
% population with health insurance	-0.06**	0.37**
Medicare Advantage penetration	-0.02*	0.10**
Unemployment rate	-0.12**	0.11*
Market competition	0.54*	0.11*
Total satellite FSEDs in the HSA	0.60**	1.06**
Total autonomous FSEDs in the HSA	0.05	0.39**
Hospital beds	0.24**	0.46**
System membership	1.46**	7.88**
Not-for-profit	-0.54**	4.97**
Non-federal government	-0.87**	-15.19**
Accreditation by JCAHO	1.09**	9.66**
Teaching institution	-1.07**	-5.37**

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area, JCAHO- Joint Commission on Accreditation of Health Organizations. *p<.05, ** p < 0.001

TABLE 4. Regression Results with Total Margin as Main Dependent Variable and Market Share as Mediator Variable

	Model 1	**Model 2**	**Model 3**
	Total Margin	**Market Share**	**Total Margin**
Variables	**Coefficient**	**Coefficient**	**Coefficient**
Hospital operating an FSED	0.02	0.73**	-0.01
Market share	-	-	0.04
Urban location	-5.93**	-2.43*	-5.83**
Per capita income	-0.03	-0.00	-0.03
Physician per capita	< 0.01	0.02	< 0.01
% population over age 65	0.08	-0.27*	0.09
% population with health insurance	0.09	-0.06†	0.09
Medicare Advantage penetration	-0.01	0.02	-0.01
Unemployment rate	-0.02	0.04	-0.12
Total satellite FSEDs in the HSA	0.01	-0.11	0.01
Total autonomous FSEDs in the HSA	0.10	0.12*	0.1
Hospital beds	.33	0.01**	0.29
System membership	-0.63	0.07	-0.64
Not-for-profit	-2.89*	-0.09	-2.88
Non-federal government	-2.09	0.28	-2.09
Accreditation by JCAHO	-0.47	-0.09	-0.46
Teaching institution	0.23	1.50	0.17

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area, JCAHO- Joint Commission on Accreditation of Health Organizations.

†$p < 0.10$, * $p < 0.05$, ** $p < 0.001$

TABLE 5. Regression Results with Operating Margin as Dependent Variable and Market Share as Mediator Variable

	Model 1	**Model 2**	**Model 3**
	Operating Margin	**Market Share**	**Operating Margin**
Variables	**Coefficient**	**Coefficient**	**Coefficient**
Hospital operating an FSED	2.28*	0.73**	2.24*
Market share	-	-	5.27†
Urban location	-0.50	-2.43*	-0.37
Per capita income	-0.00	-0.00	-0.00
Physician per capita	0.02	0.02	0.02
% population over age 65	0.38†	-0.27*	0.40*
% population with health insurance	0.20*	-0.06†	0.20*
Medicare Advantage penetration	0.06*	0.02	0.06*
Unemployment rate	0.32*	0.04	0.32*
Total satellite FSEDs in the HSA	-0.56	-0.11	-0.56
Total autonomous FSEDs in the HSA	0.40†	0.12*	0.40†
Hospital beds	0.01*	0.01**	0.01*
System membership	1.10	0.07	1.10
Not-for-profit	-4.20*	-0.09	-4.20*
Non-federal government	-3.30	0.28	-3.32
Accreditation by JCAHO	0.23	-0.09	0.24
Teaching institution	-0.79	1.50	-0.87

Abbreviations: FSED- Freestanding Emergency Department, HSA- Hospital Services Area, JCAHO- Joint Commission on Accreditation of Health Organizations. †$p < 0.10$, * $p < 0.05$, ** $p < 0.001$

RELATIONSHIP BETWEEN THE PRESENCE OF FREESTANDING EMERGENCY DEPARTMENTS AND VARIATION IN MARKET MEDICARE COSTS

by

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ABSTRACT

Objective: This paper explored the relationship between an increase in the number of Freestanding Emergency Departments (FSEDs) and total annual Medicare cost per person.

Data Sources: The study uses longitudinal panel data at county level for seven years from 2003-2009. The study includes all the acute care hospitals in the United States. . Data on FSEDs collected by telephonic survey merged with American Hospital Association Annual Survey (AHA), Centers for Medicare & Medicaid Services (CMS) cost report, and Area Health Resource File (ARF).

Study Design: The total annual Medicare cost per person is dependent variable and number of FSEDs in the county is primary dependent variable. Fixed effects multivariate regression model is used to evaluate the effect of the presence of FSED at the county level on Medicare expenditure. The standard errors corrected for clustering at the county level.

Principal Findings: During the study period the annual Medicare cost per person has increased by 40.52%. The results support the hypothesis that increase in the FSEDs in a market is positively and significantly associated with total annual Medicare cost per person ($\beta = 76.54$, $p = 0.022$).

Conclusion: The FSEDs may cause increase in the healthcare cost in the United States. The policy makers and third party payers may regulate the reimbursement to these facilities based on the acuity of conditions instead of paying all FSEDs at the same rate.

INTRODUCTION

Freestanding Emergency Departments (FSEDs) increased by approximately 50% between the year 2005 and 2009 (American Hospital Association [AHA], 2011; T Paul, 2012; Williams & Pfeffer, 2009). An FSED is defined as, a healthcare facility providing emergency services, not located within hospital campuses, and open to the general public at least 156 hours out of 168 hours per week, including holidays (Sullivan et al., 2012). Changes in Medicare reimbursement policy after 2004, and an increase in demand for emergency care may have contributed to the proliferation of FSEDs (Williams & Pfeffer, 2009). FSEDs provide services near patient homes and usually have much lower waiting times compared to traditional hospital emergency departments (EDs). Proponents of FSEDs assert that their facilities may improve access to emergency care by reducing the burden of overcrowding in traditional EDs, FSED services may decrease the burden on traditional EDs. Therefore, FSEDs may decrease healthcare cost by providing care at lower reimbursement level compared to traditional EDs. However, previous studies on emergency care access and expenditure indicate that the higher access may lead to higher utilization of healthcare services, which may lead to an increase in overall healthcare cost instead of a decrease (Henneman et al., 2011; Ludwick, Fu, Warden, & Lowe, 2009). Based on these findings it is possible that FSEDS may increase healthcare expenditures due to overutilization of emergency care.

Medicare patients constituted 17% of ED visits in year 2007 (Niska, Bhuiya, & Xu, 2010). The services provided by EDs has reimbursed by Medicare from 2004 as a dedicated emergency departments, which may be located outside hospital campus (Williams & Pfeffer, 2009). Therefore, Centers for Medicare & Medicaid Services

(CMS) is affected by the impact of FSEDs on the emergency care cost. To date, there have been no previous studies examining how FSEDs may affect Medicare costs. This study will use multivariate regression analysis to study the relationship between the presence of FSEDs in the market and local variation in the Medicare cost. States with FSEDs are in the process of forming regulations for these facilities, while many states are in the process of either approving their first FSED or deciding whether to allow FSEDs in their state. This study will provide information to policy makers regarding the impact of FSED on the Medicare cost and this may help them to formulate informed policies to regulate the reimbursement and utilization of FSEDs.

EMERGENCY CARE AND FSEDS

EDs have a unique role in the healthcare system because they provide 24 hour services without prior appointment. The demand for emergency care services is on a sharp incline. According to National Hospital Ambulatory Medical Care Survey, there was a 32% increase in demand for emergency medicine services from 1999 to 2009 (McCaig & Burt, 2001; National Center for Health Statistics, 2009; Pitts, Niska, Xu, & Burt, 2008). The previous study shows that the higher number of patients seeking emergency care instead of primary care providers (Pitts, Carrier, Rich, & Kellermann, 2010; Richman, Clark, Sullivan, & Camargo, 2007), increase in number of uninsured patients (Garcia, Bernstein, Bush, & Statistics, 2010), and increase in the number of elderly patients (Roberts, McKay, & Shaffer, 2008) may be some of the reasons for increase in the demand of emergency care. At the same time there was decrease in the EDs by approximately 5% in the United States (McCaig & Burt, 2001; National Center

for Health Statistics, 2009; Pitts et al., 2008). Both of the above factors may have contributed to overcrowding in EDs. This mismatch between the supply and demand for emergency care may increase with the Patient Protection and Affordable Care Act. For example, in the case of universal healthcare reform in Massachusetts, insurance coverage was increased, but the access to healthcare was limited because of physician shortage. As a result, it is possible that the use of emergency care may increase to accommodate the greater number of people with insurance, which exceeded the availability of primary care providers (Boyle & Kirkpatrick, 2012).

In 2007, 10% of ED visits were found as non-urgent visit in report published by CDC (Garcia et al., 2010). The CDC report defined non-urgent conditions as patient who can be managed within 2-24 hours. The non-urgent patient needs could have been addressed outside of the traditional EDs (McCaig & Burt, 2001; National Center for Health Statistics, 2009; Pitts et al., 2008). Therefore, these visits may be treated at FSEDs. Further, previous studies have shown that costly emergency care is used for a considerable proportion of non-emergent services all over the world. However, the misuse of emergency healthcare is preventable (Afilalo et al., 2004; Bezzina, Smith, Cromwell, & Eagar, 2005; Billings, Parikh, & Mijanovich, 2000; Coleman, Irons, & Nicholl, 2001; Guttman, Zimmerman, & Nelson, 2003). Factors leading to the misuse of emergency care include the lack of after-hour care for non-emergent conditions, the perceived lack of appropriately available services at the urgent care centers, a perceived lack of availability for timely appointments for primary care services, and the lack of health insurance coverage (Coleman et al., 2001; Guttman et al., 2003). Thus, the FSEDs

may actually help alleviate emergency care demand by diverting patients with lower acuity conditions away from traditional EDs, and provide timely emergency care access.

According to a previous study by Sullivan et al. (2012), an FSED is defined as a facility that is (a) open to all types of emergencies, (b) not located within a hospital, (c) open to the general public, (d) open daily, and (e) open at least 156 of 168 hr per week including holidays. The 156-hour criterion was meant to allow for occasional facility closure during the middle of night (eg, between midnight and 5:59 am on Saturday and Sunday mornings) but the expectation is that vast majority of FSEDs are open for all 168 hours (ie, 24/7). Urgent care centers (UCC) provide immediate healthcare services without an appointment, but UCC and FSEDs differ. The primary difference between FSEDs and urgent care centers is that FSEDs perform additional procedures such as defibrillation, intubation, and conscious sedation delivered by health care providers trained in emergency medicine. Unlike FSEDs, UCC are not open 24 hours/day. We included the UCC that are open 24/7 hours and comply with the FSED definition for this study.

There are two types of FSEDs based on their ownership. First, satellite FSEDs, are owned by hospitals and refer their patients to hospitals for inpatient care. Second, autonomous FSEDs are not owned by any organization affiliated with hospitals, but instead, are owned by physician groups or independent investors. Ninety-one percent of all FSEDs are hospital-owned (Sullivan et al. 2012). FSEDs proponents assert that these facilities will increase access to emergency care for populations that are currently lacking these services. However, these facilities are usually located in urban and higher income suburban areas. Thus, this suggests that hospitals open FSEDs to increase market share

by locating these facilities in growing suburbs. Therefore, FSEDs may only abate demand for emergency care in selected locations.

Hospitals operating FSEDs may increase their market share by getting inpatient referrals from patients visiting FSEDs. The cost of operating FSEDs is much less than operating a fully functional hospital, which may not be supported by a growing community. Therefore, operating FSEDs appear to be a viable option for these communities by hospitals or other organizations. A case study of a growing suburban area showed that the FSED decreased the patient load in a nearby traditional ED, but the overall visits, including visits of FSED and traditional EDs increased (Simon, Griffin, & Jouriles, 2012). This phenomenon can be explained by the findings of previous studies which have shown that increased access to emergency care can increase utilization (Henneman et al., 2011; Ludwick, Fu, Warden, & Lowe, 2009). Also, patients with lower acuity conditions tend to defer traveling, to seek emergency care; therefore, operating FSEDs near patient homes may lead to an increase in the utilization of emergency care services for lower acuity conditions (Simon et al., 2012). In effect, FSEDs may lead to an increase in healthcare expenditure.

Besides less travel time, FSEDs also provide more patient-oriented care by offering lower waiting times and better waiting areas as compared to traditional EDs. Patients with lower emergency conditions may have to wait longer in traditional EDs as triaging leads to waiting time based on patient's acuity level. As such, patients may utilize FSEDs for avoidable non-urgent conditions when waiting time is less (Berger, 2011).

The increase in the use of FSEDs for non-emergent services may lead to an increase in the Medicare costs. A previous exploratory study found that non-emergent conditions treated in EDs led to an increase in healthcare cost because of higher charges for non-emergent services as compared to healthcare settings outside the ED (Baker & Baker, 1994). Indeed, FSEDs attract a higher percentage of non-emergent patients (Williams & Pfeffer, 2009). Approximately one-fifth emergency visits are utilized by Medicare patients in 2007 (Niska et al., 2010). Therefore, given less waiting time and higher use of non-emergency services, FSEDs may increase Medicare costs.

Hypothesis: *Markets with freestanding emergency departments will have higher Medicare costs than markets that do not have freestanding emergency departments*

METHOD

Data

The unit of analysis is U.S. County. The study uses longitudinal panel data for 7 years from 2003-2009. The study includes 3,134 counties in fifty states and Washington DC. The data used for this study was obtained from different sources. There was primary data collection on FSEDs. The remaining data were obtained from secondary datasets.

Current information about FSEDs is not available; the last available national database is for year 2007 (Sullivan et al., 2012). Therefore, primary data collection by telephonic interviews of hospitals and FSEDs was conducted to collect information on the latter. The hospital sample for the survey was identified from the following sources: (a) hospitals identified as having an affiliation with FSEDs in the American Hospital Association (AHA) Annual survey data; 2) National Emergency Department Inventory

(NEDI)-USA dataset that identifies FSEDs in the survey conducted in 2007 (Sullivan et al., 2012); and 3) internet searches for newly opened FSEDs (see Appendix B). During this call, each confirmed FSED was asked a series of questions consistent with those used in a prior national study (see Appendix B) (Sullivan et al., 2012).

The FSEDs identified in a previous study (from National Emergency Department Inventory database) were contacted for this study's survey (Sullivan et al., 2012). Also, those hospitals who responded "yes" to the question for their ownership of FSED in the American Hospital Association (AHA) Annual Survey were contacted for telephonic survey. Secondary data sets include Dartmouth Atlas, AHA database AHA, and the Area Health Resource File (ARF). Dartmouth Atlas was used for Medicare reimbursement information (Dartmouth Atlas, 2011) . Dartmouth Atlas used Medicare data to report the variation in healthcare cost across the country. Market competition and other market level organizational factors were calculated from AHA data (American Hospital Association, 2011). Demographic factors and physician concentration in the county were calculated from ARF (Area Health Resource File, 2012). ARF is publically available database, while AHA annual survey data was obtained via Lister Hill Center, University of Alabama at Birmingham. The study protocol was approved by the University of Alabama at Birmingham's Institutional Review Board (IRB).

Variable

The list of variables that are used for this research is presented in Table 1. Medicare population plays a significant role in the United States healthcare system. Medicare reimbursement per person was obtained from Dartmouth Atlas. The Dartmouth

Atlas reports Medicare reimbursement per person for all services (inpatient and outpatient) that is calculated from the Continuous Medicare History Sample from CMS. The data consists of 20% sample of Medicare enrollees in fee-for-service plans (excludes all patients enrolled in health maintenance organizations), and contains annual reimbursements for their Medicare Parts A and B. The dependent variable, total Medicare reimbursement per enrollee is adjusted for price, age, sex, and race. The Medicare reimbursement rate varies based on the region. Therefore the price adjustment accounts for the regional variation in reimbursement rates. The total Medicare reimbursement per enrollee is adjusted for consumer price index inflation rates (BLS, 2014) for the analysis in the study.

The independent variable was obtained from the study survey and recorded as the number of FSEDs in the county. The control variables included market factors at the county level: hospital competition, per capita income, the number of primary care physicians per capita, percent of population 65 years or older, percent of population with health insurance, Medicare managed care penetration rate, and unemployment rate. Higher market competition may lead hospitals to use higher technology for providing healthcare services. The advanced services provided by hospitals may lead to an increase in the total Medicare cost per person (Devers, Brewster, & Casalino, 2003). Higher per capita income, percent of population 65 years or older, percent population with health insurance, Medicare managed care penetration rate, and unemployment rate constitutes the market variables and all of them may affect the efficiency of healthcare services provided by the hospitals.

Using AHA data, hospital competition in the county was measured by using the Herfindahl-Hirschman Index (HHI). HHI is calculated as the sum of the squared market shares for the hospitals in a county. An increase in the number of physicians present in an area may lead to lower demand of emergency healthcare services (Grumbach, Keane, & Bindman, 1993; Richman et al., 2007). Therefore, primary physician per capita was used from ARF data. The per capita income, percent of population 65 years or older in the county, and Medicare managed care penetration in the county were obtained from ARF.

The organizational levels obtained from AHA data are: total hospital beds in county, percent of system affiliated hospital, percent of non-profit-hospital, and percent of non- Federal government hospitals.

Analysis

Panel data was used in this study to evaluate the effect of the presence of FSED at the county level on Medicare expenditure. Fixed effects multivariate regression model is used with standard errors corrected for clustering at the county level. Fixed effects regression was used in the study to control for the effect of time invariant factors at the county level that may affect Medicare costs. The results were interpreted as highly significant if the P-value was <0.001, significant if the *p*-value was between 0.001 and 0.05, and marginally significant if the P-value was between 0.05 and 0.10.

RESULTS

Descriptive statistics for all counties in the United States for baseline (year 2003) and final period of study (year 2009) are shown in Table 2. The total annual Medicare

cost (inflation adjusted) has increased by 20.56% during the study period. The number of counties with FSEDs increased from 1.18% in 2003 to 2.45% in 2009. Medicare managed care penetration rate increased by 328% and unemployment rate increased by 45%.

Table 3 presents the bivariate analysis of total Medicare cost per person with each of the variables used in the study. Except for the percentage of system affiliated hospitals, all variables were significantly related to total Medicare cost per person.

The results of the multivariate regression with fixed effects are presented in Table 4. The regression results show that number of FSEDs present in the market was positively and significantly related to total annual Medicare cost per person. The total annual Medicare cost per person increased by $42.91 for every additional FSED operating in a county. Increased market competition (β = -328.84, *P* = 0.03) was significantly related to higher total annual Medicare cost. An increase in the percent of population older than age 65 years (β = -43.06, *P* = 0.07) was negatively and marginally significantly associated with an increase in the Medicare cost while positively and marginally significant to percent of system affiliated hospital (β = 0.68, *P* = 0.07). An increase in the number of not-for-profit hospitals (β = -1.57, *P* = 0.09) and non-federal government hospitals (β = -2.33, *P* = 0.06) compared to for-profit hospital were associated with a decrease in the total annual Medicare cost. All other variables were not significantly associated with the total annual Medicare cost.

DISCUSSION

This paper explored the relationship, at the county level, between an increase in the number of FSEDs and total annual Medicare cost per person. The presence of FSEDs

in the county may lead to an increase in the utilization of emergency care and, therefore, higher Medicare costs. Furthermore, FSEDs may attract more non-emergent and non-urgent patients compared to traditional EDs, and this may lead to a further increase in total Medicare costs. The study results show that there is a positive and significant association between an increase in the number of the FSEDs and the total Medicare cost per person in the county.

A previous study shows that emergency care utilization increases with the patient's proximity to the facility. Previous studies have found that an increase in access leads to increase in the utilization of emergency care. FSEDs are mostly utilized for non-emergent conditions and they are closer to patient homes. Together, these factors may lead to higher utilization of FSEDs for non-emergent conditions which may lead to an increase in healthcare costs (Baker & Baker, 1994; Cunningham & May, 2003).

An increase in the market competition in the county is significantly and positively associated with the Medicare cost. An increase in competition may lead hospitals to provide more advanced technological services, and may lead to increase in the services provided. Therefore, the higher competition is related to increase in total annual Medicare cost. An increase in percent of population over 65 years of age is associated with decreases in the Medicare cost. The increase in the system-affiliated hospitals compared to independent hospitals was found to be related to increase in the Medicare cost. The system-affiliated hospitals have higher resources to invest in advanced technology. Thus, increase in the technology leads to delivery of more advanced healthcare services which leads to an increase in the reimbursement to the hospitals. Also, an increase in percentage of non-profit and non-federal government hospitals compared to for-profit hospitals is

associated with lower Medicare cost in the county. The possible explanation for above finding is that for-profit hospitals tend to provide profit making services as compared to not-for-profit hospital and non-federal government hospitals which may increase the costlier services provided to Medicare patient (Horwitz, 2005). We did not find any significant relationship between the other control variables and Medicare cost.

The Medicare patients usually have better access to care (Tang, Stein, Hsia, Maselli, & Gonzales, 2010). Therefore, there is possibility that the relationship between presence of FSEDs and with higher healthcare cost will be more in non-Medicare patients as compared to Medicare patients we find in this study.

There are a few potential limitations with this study. First, the variables are measured at the county level. Most of the time, the counties separate the market areas of hospitals, but sometimes patients living on the border of two or more counties may utilize the services located in the other counties. This limitation is not unique to this study as county level variables have commonly been used in healthcare literature to define market area. Also, the FSEDs are growing entities in the healthcare system in the United States. A follow up study examining the impact of FSEDs on cost should be done as FSEDs become established entities in healthcare in the United States.

In summary, we conclude that FSEDs are associated with an increase in Medicare costs. Emergency medicine outside the traditional ED may increase access to both emergency and urgent healthcare, and this may be associated with higher healthcare cost. Policy makers and third-party payers may want to regulate the reimbursement to these facilities based on the acuity of conditions instead of paying all FSEDs at the same rate. . For example, policies may be implemented to a) Reimburse FSEDs based on the acuity

of patients, with lower reimbursement or no facility fees for lower acuity conditions; b) Require the co-location of SEDs with UCCs to provide coordinated care. This would facilitate the triage of patients, so that lower acuity patients can be treated at UCCs, while patients needing emergency care would be treated at FSEDs.

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TABLE 1. Variables Used in Study

Variables	Measurement	Data Source
Dependent Variable		
Medicare reimbursement per enrollee	Total annual Medicare cost per person adjusted for price, age, sex and race	Dartmouth Atlas
Independent Variable		
Number of FSEDs per county	Total number of FSEDs present in a county	Survey
Control Variables		
Market competition	HHI = Sum of Squared Market Share Market share = (Total inpatient days for hospital)/(Total Inpatient days in County)	AHA
Per capita income in County	Total personal income of the residents in given area divided by resident population in given area (per $1000)	ARF
Primary care physician per capita	Total number of non-Federal primary care physician divided by resident population in given area	ARF
Percent of population 65 year or older	Percentage of total resident population age 65 year or older	ARF
Percent of population with health insurance	Total percentage of resident population has health insurance	ARF
Medicare managed care penetration	The ratio of Medicare Advantage Plan enrollees over eligible Medicare individuals multiplied by 100	ARF
Unemployment rate		ARF
Total hospital beds	Sum of hospital beds in county (per 100 beds)	AHA
Percent of system affiliated hospital	Percent of system affiliated hospitals in county	AHA
Percent of non-profit-hospital	Percent of non-profit-hospital in county	AHA
Percent of non-federal government hospitals	Percent of non-federal government hospitals in county	AHA

Abbreviations: AHA – American Medical Association, ARF – Area Resource File, FSED – Freestanding Emergency Department, HHI – Herfindahl-Hirschman Index

TABLE 2. Descriptive Analysis of Variables

	Year 2003			Year 2009		
Variable	*n*	*Mean/ Percent*	*Std Dev*	*n*	*Mean/ Percent*	*Std Dev*
Total Medicare Cost Per Person (inflation adjusted)	3131	7565.26	1471.07	3126	9121.41	1885.75
% Counties with FSEDs	3130	1.18%		3134	2.45%	
Market Competition	2457	0.84	0.26	2485	0.84	0.25
Per capita income (per $1000)	3130	24.73	6.24	3134	33.02	8.58
Primary care physician per capita	3130	22.89	69.87	3134	23.73	71.55
Percent of population 65 year or older	3130	14.79	4.13	3134	15.64	4.22
Percent of population with health insurance	3130	81.79	6.08	3134	81.75	5.70
Medicare managed care penetration rate	3130	3.56	7.85	3134	15.30	11.19
Unemployment rate	3130	6.19	2.78	3134	8.99	3.21
Total hospital beds (per 100 beds)	3130	2.39	7.25	3134	2.43	7.69
Percent of system affiliated hospital	2457	53.90	46.19	2486	47.95	45.76
Percent of non-profit-hospital	2457	56.57	46.49	2486	55.91	46.50
Percent of non-federal government hospitals	2457	32.44	44.70	2486	31.07	44.13

Abbreviations: FSED- Freestanding Emergency Department

TABLE 3. Bivariate Regression Analysis with Total Medicare Cost Per Person as Dependent Variables

	Total Medicare Cost Per Person
Variables	**Coefficient**
Number of FSEDs in the market	393.98**
Market Competition	-199.40**
Per capita income (per $1000)	-8.27**
Primary care physician per capita	0.71**
Percent of population 65 year or older	-33.9**
Percent of population with health insurance	-41.73**
Medicare managed care penetration rate	8.83**
Unemployment rate	114.76**
Total hospital beds (per 100 beds)	16.03**
Percent of system affiliated hospital	0.11
Percent of non-profit-hospital	-6.22**
Percent of non-federal government hospitals	1.70**

Abbreviations: FSED- Freestanding Emergency Department.
*p<.05, ** p < 0.001

TABLE 4. Regression Results with Total Medicare Cost Per Person Dependent Variable

	Total Medicare Cost Per Person
Variables	**Coefficient**
Number of FSEDs in the market	42.91*
Market Competition	-328.84*
Per capita income (per $1000)	-8.1
Primary care physician per capita	-1.47
Percent of population 65 year or older	-43.06†
Percent of population with health insurance	-5.57
Medicare managed care penetration rate	3.37
Unemployment rate	6.84
Total hospital beds (per 100 beds)	6.88
Percent of system affiliated hospital	0.68†
Percent of non-profit-hospital	-1.57†
Percent of non-federal government hospitals	-2.33†

Abbreviations: FSED- Freestanding Emergency Department.
†$p < 0.10$, * $p < 0.05$, ** $p < 0.001$

DISCUSSION AND CONCLUSIONS

This research analyzed the antecedents of hospitals operating FSEDs, the relationship of hospital operating an FSED and financial performance, and the association between presence of FSEDs in the market and the Medicare cost. The research examined the FSEDs from an organizational and policy perspective in the United States. The following major research questions were answered in this study:

1) What are the market and organizational factors associated with the hospitals operating a FSED?
2) Do hospitals operating an FSED experience better financial performance? Is this relationship mediated by market share?
3) Is the presence of FSEDs in the market associated with the higher Medicare costs?

Why are these research questions important?

FSEDs are growing at a fast pace in a few geographical regions of the United States. This study comes at a time when many states are on the verge of formulating regulations on FSEDs. With this paper, we aim to provide information to policy makers for formulating FSED regulations. They may use the findings of this study in designing regulations that may incentivize operating of FSEDs in areas where they are most needed.

The examination of the first research question shows that hospitals operating FSEDs are more likely to locate in higher socioeconomic and urban areas. The main

findings of this study can be concluded as: 1) Environmental munificence was positively and significantly related with the hospitals operating an FSED; 2) Hospital decision to operate an FSED was positively associated with the presence of other FSEDs in the market; and 3) Large and system affiliated hospitals, and those with better financial performance were more likely to operate an FSED.

Exploration of second research question shows that hospitals operating an FSED are associated with better financial performance. The analysis shows that the relation was partially mediated by the market share. Also, the operation of an FSED is associated with higher market share.

The analysis for third research question shows that the numbers of FSEDs present in the county was positively and significantly associated with an increase in total Medicare cost per person. The increase in Medicare cost was also positively and significantly associated with the market competition.

The findings of the study were presented following three papers: Contextual Factors Associated with Hospitals' Decision to Operate Freestanding Emergency Departments; Relationship between Hospital Operating Freestanding Emergency Department and Financial Performance; The Relationship between the Presence of Freestanding Emergency Department and Medicare Cost in the Market". These papers addressed the research questions presented in this study.

The study has several strategic and policy implications in the U.S. healthcare system. First, the study provides the information to hospital managers to formulate organizational strategies on related to FSEDs. The results from this study for financial performance and factors related to operating FSEDs should be related cautiously for

states other than those included in the study. The managers can use results from this study as a starting point to analyze the market competition from any FSED present in the market. Also, managers can perform market and organizational analysis to predict how well the FSED fit with their hospital goals and market conditions. Second, the results shows that organizational slack resources such as hospital's size, financial performance, and system membership are significantly related to hospital operating FSEDs. Therefore, managers of small, independent hospitals may enter in a system or collaborate with other hospitals to get resources for opening of FSEDs. Third, the presence of FSEDs is associated with an increase in Medicare costs. The effect may be higher for non-Medicare population and may be associated with higher overall healthcare cost. Policymakers should incentivize healthcare organization to provide coordinated emergency and urgent care with FSEDs and UCCs. Potential policies to consider are those to reimburse FSEDs based on the acuity of conditions, or not reimbursing facility fees for lower acuity conditions. Also, another policy may be promotion of operation of both FSEDs and UCCs at the same facility, with patient triaged based on acuity.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator:	PATIDAR, NITISH
Co-Investigator(s):	
Protocol Number:	**E130327002**
Protocol Title:	*Organizational and Market Factors of Hospitals Affiliated with Freestanding Emergency Departments in the United States*

The above project was reviewed on 5/6/13. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This project qualifies as an exemption as defined in 45CF46.101, paragraph 2,4.

This project received EXEMPT review.

IRB Approval Date: 5/6/13

Date IRB Approval Issued: 5/6/13

Cari Oliver
Assistant Director, Office of the
Institutional Review Board for Human
Use (IRB)

Investigators please note:

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

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APPENDIX B

SURVEY PROTOCOL

Survey Protocol

Following protocol was used in selecting survey participants. Our recruitment list for survey was derived from four sources:

1. A directory of FSEDs in 2007 collected by Dr. Carlos A. Camargo, Professor of Medicine and Epidemiology at Harvard Medical School and Massachusetts General Hospital (MGH), as part of his study published in the Journal of Emergency Medicine (Sullivan et al. J Emerg Med 2012). Dr. Camargo is a dissertation committee member and has agreed to share the FSED list with this project PI.
2. A list of hospitals identified as having an FSED in the AHA annual survey.
3. Internet searches for newly opened FSEDs. Following search terms used with combination of state name.
   "freestanding emergency departments", "standalone emergency departments", "emergency department opened", "freestanding emergency", "urgent care center 24/7 hour", "urgent care center round the clock".
4. Other FSEDs identified during the phone interviews

If a site was contacted in year 2007, there may be a name or direct phone number for the person with the information needed. We checked if there is any direct contact information for a specific person at the hospital or corporation.

If we were calling an ED and there was no direct contact information, used the phone number listed in publically available sources such as AHA or website information. For satellite EDs, we asked the operator to transfer to Hospital Administration. If we were calling a corporation that oversees autonomous EDs, we asked to speak to someone in Administration.

We called each FSED and asked for the participation of the manager in the phone survey. If we were calling a satellite ED, we asked to speak with a manager that can provide operational information on the FSED. Some titles of individuals we spoke to include the following:

1. HA (Hospital Administration)
2. DON (Director of Nursing)
3. Finance/Accounting, specifically the Controller. Often the Controller is the person who runs annual reports, keeps track of overall hospital statistics
4. PR/Marketing
5. ED Administration
6. ED Nurse Manager or Supervisor
7. Medical Records/Health Information Management/Health Information Services

Individuals holding these titles had years of experience, and this had eliminated the risk of interviewing individuals less than 19 years of age.

Once we were connected, followed the attached scripts based on the type of ED (satellite or autonomous). The research collected only organizational level data. No individual level data will be collected.

Survey for Satellite FSEDs

1. A FSED is a facility that sees all types of emergencies, is not located within a hospital, is available to the public, and is open at least 156 (of 168) hours per week, including holidays. Freestanding EDs can be characterized as a satellite ED or autonomous ED. Satellite EDs are facilities run by a parent hospital or health system. Is your hospital affiliated with a freestanding ED?
    a. Yes → move to question 2
    b. No → Do you have an urgent care center or another center that provides emergency services outside of the hospital?
        i. Yes → move to question 2
        ii. No → end call

2. Is this facility physically separate (i.e. different building, different address) from its parent hospital?
    a. Yes→
    What's the name and address of the facility? (no matter what, get the name)
    → move to question 3

    _____

    _____

    b. No → move to question 4

3. Does your facility have any inpatient beds?
    a. Yes → end call
    b. No → move to question 4

4. Is this facility open 24/7/365?
    a. Yes → move to question 6
    b. No → move to question 5

5. Is this facility open at least 156 (of 168) hours per week?
    a. Yes → move to question 6
    b. No → end call

6. What month and year did the FSED open?

   _____

7. Do you accept Medicare patients at your FSED facility?
   a. Yes
   b. No

If yes, approximately what percent are Medicare patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

8. Do you accept Medicaid patients at your FSED facility?
   a. Yes
   b. No

If yes, approximately what percent are Medicaid patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

9. Do you accept privately insured patients at your FSED facility?
   a. Yes
   b. No

If yes, approximately what percent are privately insured patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

10. What was the annual visit volume in 2011?

11. What was the annual visit volume in 2012?

12. Where are your patients transferred if inpatient care is needed (parent hospital, nearest hospital, other)?

13. Do you know of any other freestanding EDs in your area? If yes, what are their names?

Survey for Autonomous FSEDs

1. A FSED is a facility that sees all types of emergencies is not located within a hospital, is available to the public, and is open at least 156 (of 168) h per week, including holidays. Freestanding EDs can be characterized as a satellite ED or autonomous ED. Satellite EDs are facilities run by a parent hospital or health system. In contrast, "autonomous" EDs have no hospital affiliation and are typically owned by private groups of physicians. Is your organization a FSED?

    a. Yes → move to question 2
    b. No →Thank the respondent and end call

2. Is [each/this] facility affiliated with a hospital?
    a. No→
    What are the name and addresses of each/this facility? (no matter what, get the name) → move to question 3

    _____

    _____

    b. Yes → end call

3. Does your facility have any inpatient beds?
    a. Yes → end call
    b. No → move to question 4

4. Is this facility open 24/7/365?
    a. Yes → move to question 6
    b. No → move to question 5

5. Is this facility open at least 156 (of 168) hours per week?
    a. Yes → move to question 6
    b. No → end call

6. What month and year did the FSED open?
    _____

7. Do you accept Medicare patients at your FSED facility?
    a. Yes
    b. No

If yes, approximately what percent are Medicare patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

8. Do you accept Medicaid patients at your FSED facility?
    a. Yes
    b. No

If yes, approximately what percent are Medicaid patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

9. Do you accept privately insured patients at your FSED facility?
    a. Yes
    b. No

If yes, approximately what percent are privately insured patients 1-10%, 11-20%, 21%-30%, 31%-40, 41%-50%, 51%-60%, 61%-70%, 71%-80%, 81%-90, or 91%-100%?

10. What was the annual visit volume in 2011?

11. What was the annual visit volume in 2012?

12. Where are your patients transferred if inpatient care is needed (parent hospital, nearest hospital, other)?

13. Do you know of any other freestanding EDs in your area? If yes, what are their names?