Designing an Acute Care Inventory to Improve the Delivery of Acute Episodic Care

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Abstract

Acute care visits account for 354 million outpatient visits annually. While a robust acute care infrastructure exists in the US (i.e. emergency departments (ED), emergency medical services (EMS), urgent care centers, primary care offices, etc.), the system is difficult to navigate when urgent, episodic health services are required. Multiple stakeholders including patients, providers, and payers rely on this acute care infrastructure that currently functions without sufficient transparency of the capabilities and services that are offered. We outline and describe a conceptual model for an inventory of acute care resources that empowers patients, providers, payers, and others to be better consumers of acute care services.

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Introduction

Healthcare delivery in the US has been significantly shaped by factors including the aging of the population, the proportion of healthcare delivered in ambulatory (rather than inpatient) settings, and the emersion of patients as informed healthcare decision makers who demand transparency in costs and outcomes.[1] Both governmental and entrepreneurial efforts have embraced transparency in an effort to improve the quality, cost, and efficiency of healthcare. In the shift to a value based system, efforts have largely focused on cost and performance data in the realms of chronic disease management and scheduled care (e.g. procedures) given their substantial contribution to healthcare costs.[2]

Acute care visits account for 354 million of the 1.09 billion outpatient medical visits in the US each year. [3] When a patient has an acute episodic medical issue or an acute exacerbation of a chronic condition, there are a variety of options including seeing their primary care provider, calling 911, going to an ED or urgent care center, engaging a nurse triage line, or video chatting with a provider using a smartphone. While most acute care is still provided in doctor's offices, the last decade has seen substantial growth in the acute care marketplace. However, relatively little attention has been focused on helping patients to understand costs and outcomes within the acute care system so that they can better navigate their care. While some

health systems or insurers have developed nurse call lines to direct patients to the lowest cost safe level of care, and physicians and EMS providers within a region may have some insight into where best to seek care for specific conditions, the lack of publically available data to assist patients in making informed medical decisions limits the ability for market forces to function effectively. Our goal is to describe a conceptual model for an inventory of acute care resources that empowers patients, providers, payers, and others to be better consumers of acute care services. We outline the framework for creating an acute care inventory including defining the data elements, explaining the value proposition from the perspective of disparate stakeholders, exploring data collection and display options, and describing potential outcomes to measure the success of the inventory.

The patient perspective

Patients armed with data about the availability, timing, and quality of acute care services have the ability to make informed choices about their medical care. Substantial data is available to assess the quality of care at both the facility and provider level including iatrogenic infection rates, surgical complications, and mortality. In the acute care space, however, it is difficult to assess which care settings are able to meet specific acute care needs. [4] Listed are clinical examples that describe how increased transparency in acute care

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capabilities might better serve patients' needs.

- A patient speaks Chinese and is worried she is having an emergency. She would prefer to see a Chinese speaking physician or to have an in-person interpreter at the time of her evaluation.
- A patient needs to have an ultrasound to evaluate if she has a deep venous thrombosis and it is late in the evening. She would like to get to a facility that has 24/7 ultrasound capabilities.
- A mother is bringing her child who has asthma to the closest emergency department on vacation. She believes he will have to be admitted and prefers to go to a hospital with inpatient pediatric facilities rather than have to be transferred if admission is required.
- A woman was sexually assaulted and wants to be evaluated as soon as possible by a sexual assault specialist. She would like to avoid an ED copay but is unsure if the nearby urgent care center performs this service.
- A patient has a complicated medical history and prefers to go to an acute care facility that has access to her medical records.

- A patient fell and is having ankle pain and wants to know the difference in the co-pay and cost between an ED and an urgent care facility. She would rather pay more for definitive care in the ED than have to be transferred if an xray shows a fracture.

Data Elements

The concept of providing transparent acute care data is not new. Over the past decade, patients have grown accustomed to advertisements for ED wait times. [5] In addition, phone applications are available that have general inventory information about the location for EDs throughout the United States. Pines *et al.* recently developed a conceptual model of acute care based on literature, myriad stakeholder perspectives, and technical expert panels. Their acute care conceptual model was broken down into four main components including: (1) social and individual determinants of health; (2) care decision-making; (3) care delivery; and (4) outcomes. While all components are critical, we focus on both care decision-making and care delivery. Table 1 and 2 further describe care decision-making and care delivery and provides practical examples of each. [6]

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Table 1. Description of the Acute Care Inventory Domains, Inventory Categories, and Data Elements

Care Decision Making	Data Elements
Community Resources	Wait times Public transportation Directions
Individual Resources	Condition-specific knowledge Connections with providers Financial resources Health insurance Experience navigating the health system
Condition Specific Needs	Severity Specific service needs
Preferences	Convenience Anticipated needs Prior experiences of others (online reviews) Cost Patient experience
Care Delivery	
Episodic Settings	EMS/paramedicine Emergency department Specialized centers (orthopedic urgent care) Urgent care Retail clinic Federally Qualified Health Center Mobile health clinic Physician office (primary or specialty) Telemedicine

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Table 2. Acute Care Inventory Data Elements and Examples

Data Element	Explanations
Directions	Where is the facility? How close is it to my location? How do I get there?
Wait Time	How long will I have to wait to be treated?
Financial Resources/Health Insurance	Do the facility provide information about the cost? Or information about how much I will pay based on my insurance provider?
Connections with Providers	What types of providers work at the hospital? (nurse practitioner, emergency physician, family physician, specialist)
Condition-specific knowledge (Hospital Designation)	Trauma center? Burn center? Stroke center? Pediatric facility? Cardiac catheterization lab?
Specific service needs (labs, imaging, etc.)	Imaging modalities at facility (i.e. ultrasound, CT, MRI)? Are this imaging services available 24/7?

Stakeholders

Although patients are clearly at the center of the effort to increase transparency in the acute care market, there are other key stakeholders. Physicians and nurses, emergency medical services (EMS), insurers, public health organizations, payers, emergency managers, and State and Federal Government could all benefit from a better understanding of the resources and capabilities of particular acute care facilities. Moreover, engaging key stakeholders is critical to defining and gathering the data required to create an acute care inventory that is based on their particular urgent episodic healthcare needs.

Patients

The engagement of patients as informed decision makers is only a small part of a broader societal move towards empowerment and consumerism. Although medicine has not kept pace with other industries (travel planning, banking), with respect to prioritizing the values and preferences of the consumer, significant recent efforts suggest that the healthcare industry may be catching up. The creation of the Patient Centered Outcomes Research

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Institute by the Affordable Care Act as well as the creation of public facing quality measurement initiatives (hospital compare, hospital star rating) are all emblematic of this broad initiative. [7,8] Consumer groups are critical in learning from potential patients about data elements that are of interest. While most consumer and advocacy groups focus on disease conditions (e.g. www.patientslikeme.com), acute exacerbations of chronic conditions is a crosscutting theme and an improved understanding of the acute care system would further empower patients. Just as peer reviews guide decision making in other consumer areas (restaurants, hotels), there is an opportunity for the wisdom of crowds to inform and healthcare seeking behavior. [9,10] The ED has changed from a place of last resort to a healthcare option that many patients prefer for episodic care and resources should be developed to engage these patients. [11]

EMS personnel

Emergency Medical Services in the United States are a patchwork of volunteer and employed providers with varying degrees of medical training (Firefighters, Emergency Medical Technicians, Paramedics). [12] Out of hospital care by EMS providers, including destination protocols, are very protocol driven. While many experienced EMS personnel understand their local emergency department and urgent care capabilities, the role of patient preference and the role of "alternative destinations" in EMS practice remain underdeveloped (in part because EMS providers are only reimbursed for transporting patients to EDs).

[13] While trauma or stroke center designation helps to create efficient protocols for life and limb threats, many decision points are more nuanced (continuity of care with existing care team, insurance network affiliations, preferences, etc,). The EMS community could both provide valuable insight into what data is needed to improve acute care delivery and EMS personnel would gain from a data tool that could assist in helping them better understand their regional health service capabilities (in-network hospitals, participation in health information exchange, etc).

Emergency Physicians

Sullivan *et al.* (2006) described the heterogeneous clinical setting and distribution of different types of EDs throughout the United States. The authors advocated for an improved classification scheme of EDs to clarify the type of care EDs manage given the variability of patient volume. [14] There have been a few attempts to further classify EDs beyond what the development of the trauma, stroke, and cardiac care designations. In the late 1990's, the Society for Academic Emergency Medicine (SAEM) attempted to create an ED classification scheme to distinguish EDs based on the level of care available but this movement did not gain traction in the emergency medicine community. [15] Washington State attempted to create different payments to EDs on the basis of emergency versus non-emergent discharge diagnoses as an attempt to classify the acuity of patient visits but the attempt was largely undercut by inherent

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limitations in being able to accurately identify non-emergent visits. [16] In 2010, a policy statement from the American College of Emergency Physicians (ACEP) endorsed the idea of regional emergency care planning and suggested that "an initial step toward de facto regionalization could be categorization of emergency facilities" [17] Recently, the focus of categorization has shifted to capabilities – an effort supported by the Emergency Care Coordination Center (ECCC) – the policy home for the emergency community within the federal government. [18] The ECCC has recently funded initiatives to develop and employ an improved capabilities framework for emergency medicine. One of the inherent challenges in creating a categorization or capabilities transparency is the potential impact on market shares for some stakeholders.

Clinical Referrals

While self-referrals make up the largest proportion of arrivals in the ED, primary care and specialty/sub-specialty referrals constitute an important, often overlooked, reason for ED visits. These referrals can occur due to a variety of factors including outpatient scheduling limitations, lack of outpatient diagnostic services, patients requiring hospitalization, and lack of timely communication with other providers. In 2012, the Centers for Disease Control published data noting that 20 percent of patients being discharged from the ED were referred by their PCP. [19] A separate report determined approximately one-fourth of patients arriving in their ED were referred by their primary care provider. [20]

Optimizing the location and timing of these referrals is vital for patient-centered care. For example, if a primary care physician referred a patient to the ED for an ultrasound to evaluate for a deep venous thrombosis it would be important to know the timing of when ultrasound resources are available in the ED. Some EDs only perform time-sensitive ultrasounds (i.e. testicular torsion, etc.) during off hours creating a potential mismatch between why a PCP is referring a patient to the ED and what the ED facility is able to offer.

Insurers

Of the $2.4 trillion spent in the U.S. on healthcare, care delivered in the ED accounts for a modest amount (less than two percent). However, the majority of inpatient admissions originate in the ED, and these downstream costs are an important reason to focus on the entry point into high cost settings. Inpatient medical care account for 31% of healthcare spending, and patients admitted through the ED represent all payers including (by percentage of admissions): Medicare (49.7), Medicaid (15.8), and Private (23.7). [21]

The Affordable Care Act (ACA) aimed to decrease ED utilization through a variety of mechanisms, but primarily through a focus on increasing healthcare coverage in an effort to increase healthcare access. [22] Since the passage of the affordable care act and Medicaid expansion efforts, a number of studies have demonstrated a surprising increase in ED use rather than the anticipated decrease. [23, 24] Although payers may have financial motives for

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understanding where appropriate care can be delivered most inexpensively, in many cases, patient and payer incentives may align. Urgent care visits and scheduled outpatient radiology studies are less expensive than emergency departments; if done correctly, they might be more convenient and thus preferred by patients. Both the public and private insurance market are critical stakeholders in helping consumers make informed choices about the acute care market landscape.

Federal/State Government

Developing an improved acute care infrastructure is critical to the both state and the Federal government for similar reasons. First, government serves a critical role in healthcare payment and delivery through Medicare, Medicaid, and federally qualified health centers (FQHCs). Second, developing an improved understanding of the acute care infrastructure is critical to disaster planning both regionally and nationally. Third, many States operate in certificate of need (CON) environments where decisions are made by agencies on whether additional health services are needed and should be allowed to operate in their region. Freestanding EDs, for example, have grown in number and controversy over their value in communities. CON decisions could be improved through a detailed understanding of what emergency services are available throughout a State. [25]

Data Collection and Display

Numerous public, private, or academic organizations could collect the acute care

inventory information. Understanding the value that different organizations have is critical to the initial and ongoing data collection process. For example, public organizations such as Departments of Health can serve as vital collectors. Some States give these Departments legislative authority to collect particular types of health information. Understanding how frequently the information could be re-collected and how to display this data are other key considerations. Building relationships with local emergency departments, hospitals, and specialty societies it critical regardless of the organization that performs that data collection.

While survey development and dissemination is a more typical straightforward approach to data collection alternative methods should be considered. Crowd sourcing, for instance, could prove effective at collating data from hospital web-sites, Yelp reviews, etc. Electronic data element repositories could be vital in organizing and comparing up to date data. Similar to the National EMS Information System (NEMSIS), which established an ongoing standardized national repository of current EMS data, this framework could be a long-term goal in advancing and improving the data collection process. [26]

There are a multitude of formats that could be used to display these data elements. Hospital web-sites have routinely been used to display their own information but geographic information system (GIS) mapping or phone applications represent alternative method of data display which could be preferable to certain stakeholders.

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Developing interfaces that complement the end-user (i.e. patient, clinician, etc.) would be valuable to optimize their utility.

Conclusion

The emergency care system has demonstrated value in improving outcomes for significant life and limb threats including major trauma, ST-segment elevation myocardial infarction (STEMI), and stroke. Improving urgent, episodic care across the clinical spectrum will require data transparency to empower stakeholder decision making with the potential impact of improving the acute care system through market driven forces. Ultimately, despite the acute care infrastructure (i.e. emergency departments, emergency medical services, etc.) being a vital component of any health care system there continues to be a large gap in understanding what exists and where to go when a particular health service is required. The conventional wisdom of simply telling patients to go to their closest ED for any particular acute care complaint makes it appear that all EDs can provide identical patient services – and that the ED is the only setting where acute care can take place. Creating a detailed inventory of the acute care infrastructure is important to multiple stakeholders and could advance care for patients across the U.S.

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