IMPROVING PATIENT FLOW IN THE UVA EMERGENCY DEPARTMENT: UNDERSTANDING EFFICENCY, THROUGHPUT, AND THE QUALITY OF THE PATIENT EXPERIENCE

UNDERSTANDING THE FACTORS INVOLVED WITH HURRICANE KATRINA AND THE EMERGENCY DEPARTMENT RELATED MEDICAL CARE

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

The sociotechnical challenge for the University of Virginia Emergency Department (ED) is servicing patients in a timely manner and increasing their satisfaction. To accomplish the goal of increasing patient satisfaction and decreasing wait time, the team will need to create a process for moving patients throughout the ED. The capstone team will create questionnaire-type software for smoother evaluations to relocate patients to a permeant hospital bed increasing the throughput of patients. The present relocation process is dependent on the number of available beds, and the bed allocation decisions require several medical staff members to convene, creating further wait time for the decision process to be finalized. Because the challenge of triaging, conducting preliminary assessment, of patients through the emergency department is sociotechnical, it requires attending to both the technical and social processes of patient satisfaction to fully have a successful ED. Due to both technical and social factors affecting daily operations within the ED, it is imperative to understand the process so that in extreme disasters, the ED operates at optimal efficiency. Each of the actors in an extreme disaster affects the public's health and the locality's quickest return to normalcy. Using actor-network theory to investigate how the Federal Emergency Management Agency (FEMA) and various other actors failed to appropriately prepare Houston's medical facilities after the devastating hit of Hurricane Katrina in August 2005. If the UVA ED only focuses on daily operations of triaging patients through flow, but does not address situations for natural disasters such as FEMA's failure in Hurricane Katrina, then it is perpetuating the key social factors that contributed to the tragedy in 2005. In what follows, there are two related research proposals: a technical project proposal for developing a new ascending system into the hospital and a science technology and society project proposal for examining the system failure from FEMA and various actors in Houston, Texas, during and after the hit of Hurricane Katrina.

STS Technical Proposal

It is essential to compare the practices at UVA with those of other hospitals to understand emergency departments. According to Griffey and Pines, "overcrowded refers to the state of an ED where there are insufficient resources- whether personnel, space, or other resources- to adequately meet patient demands" (Pines & Griffey, 2015, p. 24). The complication with emergency departments is the limitation of resources, especially because the number of beds and staff members is always confined to the space- regardless of the hospital. Strategies for reducing overcrowding have been known to come from four key points: executive leadership involvement, hospital-wide coordinated strategies, data-driven management, and performance accountability (Hoot et al., 2017). The key points are self-explanatory; for example, in a high-intensity environment, it is best to communicate clearly with appropriate leadership and guidelines so that people can get things done at the appropriate times. Conceptually, the best way to think of the flow of the ED is about input, throughput, and output (Richardson et al., 2003). The input is defined as the check-in and initial triage process; the throughput is the middle mediation to either discharge the patient within a few hours or the output of officially admitting the patient "upstairs" to a permanent hospital bed.

My capstone team and I conducted observation hours within the UVA ED hospital for collective a total of sixty-six hours. Through our observations and learnings from physicians, interns, technicians, and nurses we concluded that the current UVA approach for triaging patients is taking vitals in the waiting room and recording EKGs in under 5 minutes after arrival to the ED. Once one of the four triage rooms within the PIT (patient in triage) is open, a technician takes the patient from the waiting room into rooms 101-104. After the patient is in the PIT, a provider comes in to see the patient to get their initial assessment. The initial assessment is to

hear the patient's chief complaint and for the ED to find the best ways to assist the patient. After the PIT, the patient is transferred to a bed in their pod of equity for a third assessment to see if the patient should be admitted into the hospital. If the patient is still in need of care, then after the pod assignment, the attending will officially admit the patient into the hospital, or the patient will be discharged from care. The patient is also required to retell his or her story at least five times before being discharged or admitted due to the number of people the patient repeatedly sees. The redundancy of the process is necessary for learning on the physician's side and making sure the patient is receiving accurate care by advocating for him or herself.

To improve the flow, the capstone team began by conducting a systems analysis of the problem. The steps within a systems analysis are identification and quantification of systems goals, creation of alternative system design concepts, performance of design trades, selection and implementation of the design, verification of the designs success, assessment of how the design meets the goals. Since the capstone project is a two semester process the team has only accomplished the identification and quantification of systems goals, creation of alternative system design concepts within the systems analysis.

After several hours of observation and analysis of the problem the capstone team wants to limit "boarders." "Boarders" are patients who need to be admitted into the hospital, but there are no available beds, which is also known as overcrowding in the hospital. The physicians at the UVA ED call the rooms within the 700s "boarderland," the location where stable patients are sent in hopes that a permanent hospital bed becomes free for them. The statistics show that being delayed in hospital admission, being a boarded patient, has an increased mortality rate of 10.7%, while non-delayed patients have a mortality rate of 8.4% (Chalfin et al., 2007). The capstone team will create a software questionnaire, saving the attending decision time to confer whether

the patient actually needs to be admitted into the hospital. The questionnaire will have a multitude of questions and will be programmed with various generic situations for patients so that each patient can be categorized by equity, age, present stability, comorbidities, and history of previous injury. The data on the patient and decision-making software will help alleviate the time spent by physicians and create an admittance standard across the UVA Emergency Department. The data the capstone team is requesting from the UVA ED is patient satisfaction, bed utilization, registration time and waiting time for registration (at beginning of triage process), movement of patients before assigned a bed, and time waiting to be seen and time with/being seen by a PIT provider. Every patient within the ED is in a unique situation, and the doctors can only do their best with the resources they have been given; the purpose of this capstone is to assist the medical professionals in how to use their resources best.

STS Project Proposal

Hurricane Katrina which hit the Gulf Coast on August 29, 2005, was one of the costliest and deadliest natural disasters in US history, killing 1,836 people (Alson et al., 2009). The medical facilities were overcrowded, and the personnel were exhausted, which leads to question why was did the Federal Emergency Management Agency (FEMA) fail to properly prep Houston's medical facilities. Authors analyze the literature of press releases explaining the meltdown of FEMA's communication. The press releases prior to, during, and after Hurricane Katrina by the Federal Emergency Management Agency (FEMA) put into light all of the resources and supplies that were sent to Houston and New Orleans; however, in reality, the support from FEMA was not as adequate as described. Eleven days after Hurricane Katrina hit landfall and FEMA failed to supply adequate support for the damaged areas, especially Houston and New Orleans, the director of FEMA, Michael Brown, was removed from the relief effort

(Murphree et al., 2009). Brown later defended himself for the problems with FEMA after Hurricane Katrina by blaming state and local authorities for not supplying enough support after the hurricane to help relieve the public (Murphree et al., 2009). FEMA could have played a larger role in helping the emergency personnel within Houston, but unfortunately, their performance was insufficient.

FEMA still attempts to send relief after presenting natural disasters such as Hurricane Helene, that hit Florida and severely damaged North Carolina on September 26, 2024. So far, FEMA has spent $1.4 billion dollars in relief and sent over five thousand employees to help recover from the disaster (Yaffa, 2024). The frequency of natural disasters increases every year due to global warming, and FEMA needs to provide adequate assistance to the American people.

Although FEMA played a major role in the system failure for Houston, there were other actors within the network for Hurricane Katrina's medical emergencies such as local involvement. On the local level, evacuees were bused from their local areas in Houston to Texas Trauma Service Area-Q, then sent to temporary housing in either San Antonio, Dallas, or George R. Brown Convention Center (Alson et al., 2009). The importance of the evacuees being sent to the Texas Services Area-Q means that the hospital saw thousands of patients within a short period- a prime example of overcrowding. The three main hospitals that were taking patients were Harris County Hospital and Astrodome/Reliant Center Complex with Katrina Clinic. Each of the different hospitals played a vital role in distributing people for triage equity so that the greatest number of lives could be saved by the physicians. It was estimated that two weeks after the closing of the Astrodome/Reliant Center Complex, the Katrina Clinic had seen 11,000 patients and 27,000 Hurricane Katrina evacuees (Gavagan et al., 2006). The number of patients the community supported is vital in recognizing their impact during the tragic time.

Furthermore, authors tend to analyze the Houston's local government, medical professionals, FEMA, and volunteers' involvement with Hurricane Katrina as separate actors for the failure of efficiently saving American lives. However, I argue that it was the lack of adequate connection between the various actors that led to the system failure. Cressman describes actor-network theory as opening the "black box" of science and technology by tracing the complex relationships that exist between governments, technologies, knowledge, texts, money, and people (Cressman, 2009, p. 3). Michel Callon, Bruno Latour, John Law believe the idea that network builders construct heterogeneous networks comprised of human and non-human actors to solve a problem or accomplish a goal (Callon, 1986). Triaging people during a natural disaster is a complex and stressful system that the healthcare team changes based on the environment. The primary focus after a natural disaster is to triage people based on the largest number of lives saved, in other words, the most efficient and effective use of a physician's time. FEMA is the network builder for Hurricane Katrina because they have the authority of the federal government. I argue that FEMA failed to triage people efficiently and effectively with various actors in their network of the local Houston government, volunteers and physicians. I will research the overlap of the press releases nationally and locally before, during, and after Hurricane Katrina. I will also look into the implications of the volunteers and physicians experience at Trauma Service Area-Q and Astrodome/Reliant Center Complex.

Conclusion

The triage process within the UVA hospital needs constant improvement regardless of external factors. The software-questionnaire within the UVA ED to admit people into the 700's preventing more patients from becoming "boarders," helps improve efficiency, patient satisfaction, and bed utilization. A better understanding of FEMA's and various other actors'

failure in preparing medical facilities in Houston, Texas, with Hurricane Katrina in 2005 achieves necessary insight into pitfalls during natural disasters. The comprehension of Hurricane Katrina's misfortunes helps UVA ED serve patients more efficiently and to a higher satisfaction rate in a natural disaster. The insights from the tragedy in Houston should help identify more actors within the UVA ED, stating that the network is larger than initially perceived based on actor-network theory. Accounting for various actors from FEMA's failure at Hurricane Katrina and the software questionnaire to improve throughput should accomplish the main sociotechnical challenge of increasing patient satisfaction and decreasing wait time.

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