Freestanding Emergency Departments – A Stakeholder Study

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Exploring the Feasibility of Freestanding Emergency Departments in Ware, Massachusetts

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Abstract

The main purpose of this project was to determine if a UMass Memorial Medical Center (UMMMC)-operated Freestanding Emergency Department (FED) would be feasible in Ware, Massachusetts. Ware and surrounding towns lack access to emergency medical care. Baystate Mary Lane Hospital in Ware made the decision to close its inpatient facility in September 2016, and is now referred to as Mary Lane Outpatient Center. The proposed closure of the emergency department after two years is of significant concern to the residents in the area. For this reason, the team analyzed the benefits and drawbacks of establishing a UMMMC-operated FED in Ware. Fundamental alternatives to traditional emergency departments, such as urgent care centers, retail clinics, and FEDs were explored. It was concluded that FEDs are the best alternative to provide emergency medical care analogous to that of full hospitals to the area of focus while reducing operating costs for UMMMC. The team interviewed Dr. Gregory Volturo, Chairman of Emergency Medicine at UMMMC, and Diane Nichols, Director of the North Brookfield Senior Center. A series of surveys were conducted with emergency department staff, EMTs, Ware paramedics and patients to gather their points of view and an understanding of the needs of the community. Overall, the results of the interviews and surveys suggest that a UMass Memorial Medical Center-operated FED is both financially feasible and would be welcomed by the residents of Ware and surrounding communities. The need to educate stakeholders was identified; therefore, educational flyers for emergency department staff, EMS professionals, and patients were generated. Adequate transport for patients that require hospitalization must be provided. In the case that Mary Lane Outpatient Center does close, the team also proposed a floor plan for a new FED facility, named Ware Outpatient Center, equipped with the necessary resources and services based on research and results.

Acknowledgements

The project group would like to acknowledge Dr. Gregory Volturo from UMass Memorial Medical Center, Professor Louis Roberts, Professor Robert Traver, Chief Thomas Coulombe and his paramedics from Ware Fire Department, Diane Nichols, Director of the North Brookfield Senior Center, and all of the survey participants for their key roles in the success of this project. First, we would like to thank Dr. Gregory Volturo, our project sponsor, for providing key resources and documents that influenced the success of this project. Dr. Volturo provided the team with multiple files and general knowledge that were crucial towards developing a focus point for the project. Furthermore, we thank Dr. Volturo for making time to meet with the project group and his continued support. We would also like to thank Professor Louis Roberts, our project advisor, for his continued support and guidance throughout the project. Moreover, the team would like to thank Professor Robert Traver for his guidance and preparation during ID2050 class. Professor Traver's help allowed the team to focus our research efforts and bring more structure into the project. The team would also like to thank Chief Thomas Coulombe from the Ware Fire Department for his help in distributing surveys to Ware Paramedics. Support from Chief Coulombe was instrumental as it allowed the team to gather the opinions of a major stakeholder group. The team would also like to thank the Director of the North Brookfield Senior Center, Diane Nichols, for her role in providing the team with invaluable views regarding the project. Diane helped the team distribute surveys to senior citizens who do not have access to online surveys. We would also like to thank her for taking the time to conduct a phone interview that helped the team assess the impact of our project on the senior population centered around Ware. Alas, the team would like to thank all of the participants around the world who contributed to the survey results. As major stakeholders, the peoples' opinions regarding this matter were of essential importance to the success of this project.

Disclaimer

This paper was written for an Interactive Qualifying Project (IQP) and serves as a requirement for the completion of a Bachelor's of Science degree from Worcester Polytechnic Institute (WPI). The authors of this paper are not experts on emergency departments, freestanding emergency departments, hospital designs and construction, emergency medical services, or survey analysis. This document and its contents do not represent the opinions of Dr. Gregory Volturo, UMass Memorial Medical Center, Baystate Health System, Berkshire Medical Center, or Worcester Polytechnic Institute.

The opinions and survey results stated in this report by each of the stakeholder groups represent a very small fraction of emergency department staff, EMS professionals, emergency department patients, the senior citizen population, UMass Memorial Medical Center management staff, and Ware Fire Department. The data shown in this document does not reflect the opinions of everyone in each respective stakeholder group. Rather, these opinions and survey results serve as a guide for the general opinions of the members of each stakeholder group.

The text depicts the importance of emergency care in rural areas and is not, by any means, aimed to influence or interfere with any politically sensitive situations currently in progress. Readers should interpret the text purely based on logic, humanitarian needs, and medical statistics.

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Frequently Used Terms

The writers of this IQP have created this glossary of frequently used terms and abbreviations in this project. It is meant to ease the understanding of certain terms that are regularly used in this document.

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1. **ALS** - Advanced Life Support - An ambulance staff with emergency medical technicians equipped with advanced diagnostic equipment.
2. **BLS** - Basic Life Support - An ambulance staff with emergency medical technicians equipped with basic diagnostic equipment.
3. **BHS** - Baystate Health System.
4. **BMC -** Berkshire Medical Center.
5. **BMLH** - Baystate Mary Lane Hospital.
6. **CHIA** - Center for Health Information Health and Analysis.
7. **ED** - Emergency Department- Inpatient facility open 24/7/365, broad scope of practice with a full range of diagnostic equipment prepared to handle all acuity levels.
8. **EMS** - Emergency Medical Services.
9. **EMT/AEMT/Paramedic** - Emergency Medical Technician - EMTs perform basic life sustaining functions, AEMT can administer certain medications and perform some advanced procedures. In MA Paramedics can administer approximately 40 medications and have access to advanced life sustaining equipment.
10. **FED** - Freestanding Emergency Department - Outpatient facility prepared to stabilize and transport critical patients, open 24/7/365, has a broad scope of practice with a full range of diagnostic equipment prepared to handle all acuity levels.
11. **Inpatient** - Patients that are admitted into the hospital for overnight stays.
12. **Medicaid** - State and federal program that provides health coverage for people with low incomes.
13. **Medicare** - Federal health insurance program for people who are 65 or older.
14. **Mutual Aid** - When a fire department from one town provides services in another town.
15. **NARH** - North Adams Regional Hospital.
16. **Observation Beds** - Beds within the ED used to observe patients for no longer than 24 hours.
17. **Outpatient** - Patients that are not admitted into the hospital. These patients do not require overnight stays - Patients are released in the same day.
18. **Scope of Practice** - The procedures a healthcare professional is trained, accredited, and licensed to perform under their professional licensure.
19. **SEF** - Satellite Emergency Facility - Alternative name for an FED.
20. **Trauma Center** - A Hospital prepared to treat and stabilize patients suffering from critical traumatic injuries.
21. **UCC** - Urgent Care Center - Outpatient facility with a limited scope of practice that primarily handles minor illnesses/injuries. Open 7am - 8pm.
22. **UMMMC**- UMass Memorial Medical Center
23. **WFD -** Ware Fire Department.

Chapter 1: Introduction

Access to Emergency Departments (EDs) is vital for any community. In September 2016, Baystate Mary Lane Hospital in Ware, MA stopped admitting patients and closed its inpatient services. The facility became an outpatient center affiliated with Baystate Wing Hospital. Now known as Mary Lane Outpatient Center, the facility offers emergency services, lab tests, and diagnostic imaging. The future of the facility in the upcoming years remains a mystery. Reports by Ware Town Hall indicate Baystate officials plan to close the outpatient center in the next two years. Efforts to interview and obtain data from Baystate officials to learn more about the future of Mary Lane were spurned.

Residents in Ware and the surrounding communities are at risk of losing more essential care. An aging population, complex health issues, and increasing demand for immediate care means patients are frequently seeking ED services. Rural residents would have no choice but to attend distant metropolitan EDs. This leads to potentially life-threatening long trips and contributes to ED overcrowding.

There are two major alternatives to EDs. Urgent Care Centers (UCCs) and Freestanding Emergency Departments are both a response to the shortage of emergency care and overwhelmed metropolitan EDs. UCCs provide care to low acuity cases, steering them away from the ED. However, UCCs have a limited scope of practice and inconvenient hours of operation. Thus, the gap between the level of care provided at a traditional ED compared to the level provided at a UCC is substantial. UCCs also reserve the right to turn away uninsured patients, further restricting patient access. Considering the limitations of UCCs, better alternatives to EDs are needed.

The second alternative is a Freestanding Emergency Department (FED). FEDs are a less-explored alternative to address shortages of emergency care in Massachusetts. An FED is a facility that is structurally separate and distant from a hospital and only provides emergency care. These facilities may operate independently or be associated with a parent hospital, in which case they are referred to as Satellite Emergency Facilities (SEFs). FEDs do not have an inpatient facility, and thus patients are not admitted overnight. Rather, patients are treated and discharged within the same day. FEDs are able to treat cases of moderate acuity. They also have the ability to stabilize life-threatening traumas, cardiac arrests, and many other emergent conditions. In cases where patient need is beyond an FED's scope of practice, the facility has the ability to transfer stabilized

patients to the nearest high-acuity hospital. Furthermore, FEDs are more affordable to build and maintain compared to full hospitals with an ED. The characteristics of FEDs make them a more suitable alternative to EDs as compared to UCCs.

Currently, there are only three emergency facilities in Massachusetts that operate similarly to an FED: Mary Lane Outpatient Center, North Adams Regional Hospital, and Harrington HealthCare. Of these, only Mary Lane Outpatient Center is proximal to Ware. The next closest EDs are UMMMC in Worcester and Baystate Wing Hospital in Palmer, each greater than 20 minutes away from Ware. If Mary Lane Outpatient Center is closed as planned, the lack of nearby emergency care will drive residents of Ware and surrounding communities to distant metropolitan EDs. According to healthcare professionals, when life-threatening situations arise, emergency care is required within a matter of minutes. A patient experiencing a life-threatening emergency would endure serious complications or even death due to the long transport time. The lack of timely emergency care is the primary motivation to establish an FED to serve Ware and surrounding communities. Furthermore, patients seeking urgent, non-immediate care would benefit from the convenience of a local FED. Our project report will detail the reasons why we believe Ware is the ideal location to establish an FED.

Our project was to determine the feasibility of implementing a permanent FED in Ware, MA. The business plan assessed factors such as building and equipment cost, available resources, and impact on the community to determine the benefits and limitations of the proposed plan. This was completed by conducting a series of interviews with our sponsor, Doctor Gregory Volturo, Chairman of Emergency Medicine at UMass Memorial Medical Center. The team also surveyed ED patients in rural communities, healthcare professionals (e.g. physicians, nurses, etc.) and Emergency Medical Services (EMS) staff. Based on survey responses, FED concept models were drafted and proposed to the project sponsor. A conclusion based on this data was made regarding the impact of an FED in Ware, MA.

Chapter 2: Literature Review

The purpose of this project is to explore the need for emergency healthcare services in central MA, consider potential locations, and compare and contrast different options to improve healthcare accessibility. To do so, the project will review Emergency Department (ED) services, examine Urgent Care Centers (UCCs), and retail clinics with a goal of comparing the levels of service and patient care provided by each. Furthermore, Freestanding Emergency Departments (FEDs) will be analyzed and a conclusion will be made regarding their suitability, both socially and financially. This literature review does not review the detailed workings of current emergency department operations; ED background information is included in Appendix A. This information is not the primary purpose of the literature review, but is background that may be useful to understand the theme of the project.

Emergency Departments provide care to patients experiencing a wide range of health issues. EDs are primarily found in areas where there is great demand, such as metropolitan cities. In many metropolitan areas, emergency care is provided by hospitals with abundant resources and the ability to handle any emergency that may arise. However, many rural communities lack access to substantial emergency care [1]. In Massachusetts, rural hospitals are at risk of closing due to decreased patient volumes, and therefore, profits.

2.1 Lack of Emergency Departments in Rural West Central Massachusetts

Lack of emergency care to Massachusetts rural areas remains an issue for approximately 800,000 residents [2]. Long trips to EDs can be inconvenient, frustrating, and potentially dangerous for patients. In cases of life-threatening emergencies in which every minute counts, rural residents are at a disadvantage [3]. Providing these residents with adequate access has been a topic of growing concern due to recent hospital closures.

Currently, Massachusetts has 69 emergency departments. Of these, 25 are located in the Greater Boston area. Ten are located in the Greater Worcester area [4]. Eight of these EDs are clustered in the eastern half of central MA. Emergency care is scarce for the 100,000 people living in west central Massachusetts [3].

2.1.1 Shortage of Emergency Facilities in West Central Massachusetts

There are two regions in Massachusetts where communities do not have adequate access to EDs. The region directly west of Worcester will be the focus of this literature review (see Figure 1). Residents of this region often look to Baystate Mary Lane Outpatient Center, located in Ware,

MA, for routine emergency care and other medical services. However, in recent years, the Baystate system has contemplated closing Baystate Mary Lane Outpatient Center, thus potentially leaving the region without adequate access to health services.

Baystate officials made the decision to close the inpatient facility at Mary Lane in 2016. The reason for the closure will be discussed in greater detail throughout this literature review. It is important to note throughout this paper, "Baystate Mary Lane Hospital" refers to the hospital pre-closure of inpatient services. "Baystate Mary Lane Outpatient Center" refers to the hospital post-closure of inpatient services.

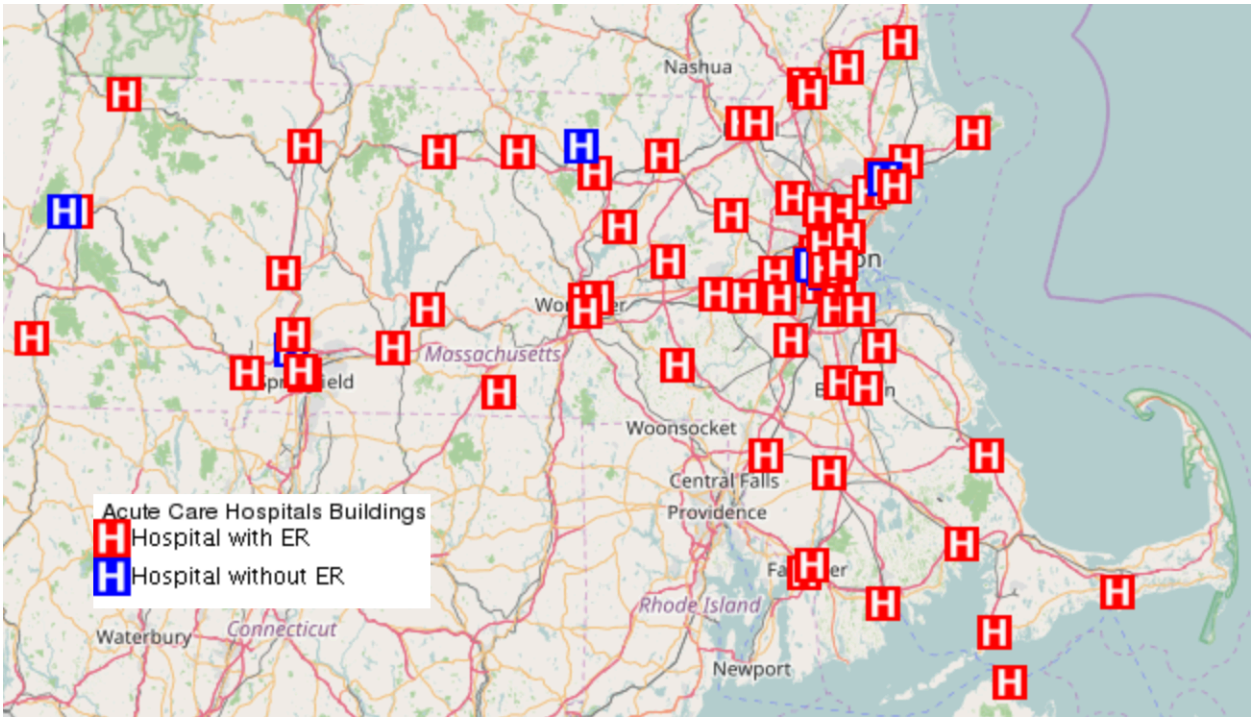

Figure 1: Map of Massachusetts Emergency Departments [5]

The closest high-acuity trauma center available to the west central MA community is UMass Medical Center in Worcester. Lack of EDs in west central MA poses risks not only to patients, but also presents significant issues and unnecessary stress for paramedics transporting high acuity patients. Implementing an FED in Ware would give paramedics a valuable resource for stabilizing severely injured patients [6]. Figure 2 below shows a close-up map of the region directly west of Worcester. As visible in Figure 1, this region does not contain adequately accessible emergency care for rural patients. This includes Ware, Tier 1 towns (directly contacting Ware) and Tier 2 towns, along with emergency department locations in that area.

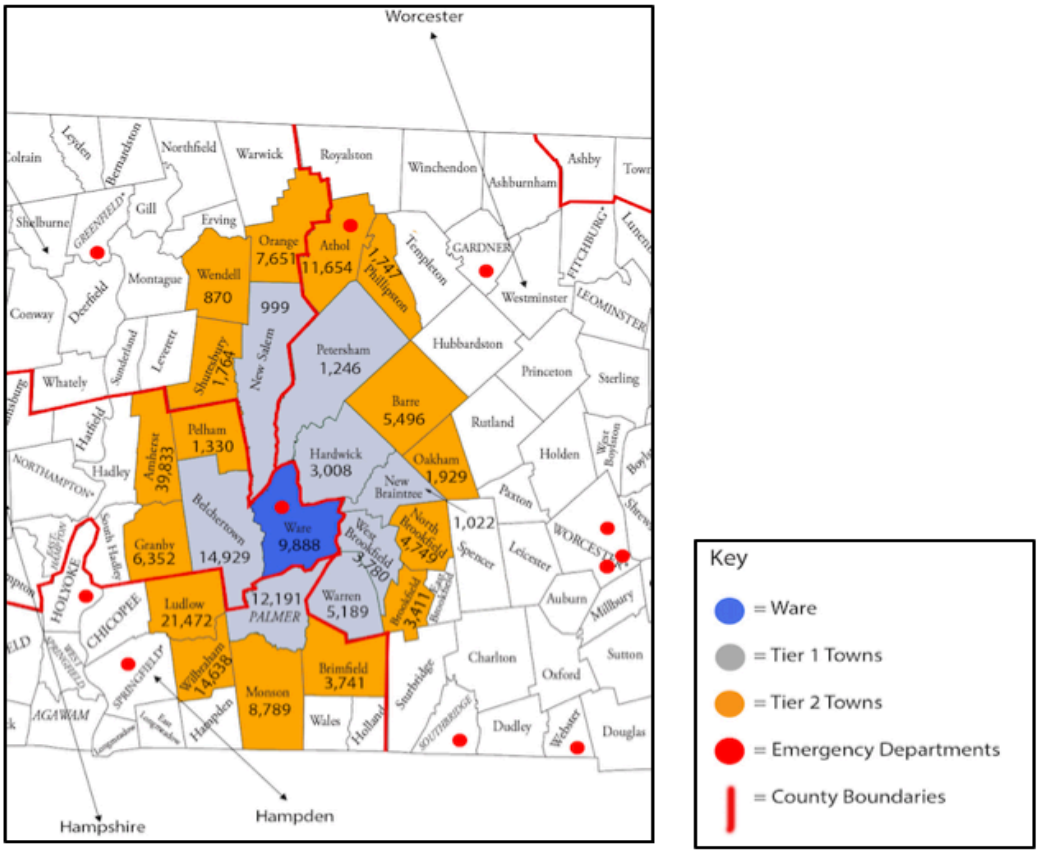

Figure 2: Ware, Tier 1 and Tier 2 Towns

2.1.2 Risks Associated with Inadequate Emergency Care Access for Rural Patients

Significant risks exist in a community with limited access to EDs. Many emergencies require immediate medical intervention [7]. Stroke, heart disease and respiratory distress are the leading causes of death among patients in MA [8]. Patients who experience these conditions must be stabilized and treated immediately. Often, rural patients who present to the ED with these symptoms do not immediately receive help because treatment is too far away [9]. Unfortunately, by the time these patients receive help, their health conditions may have deteriorated beyond recovery.

2.2 Providing Rural Areas with Emergency Care

Building new hospitals and employing urgent care centers are among the most popular options to increase medical care accessibility [10]. Retail clinics such as CVS/Pharmacy MinuteClinic are also being used to provide some access. Table 1 depicts some of the characteristics of these options. High startup costs associated with new hospitals and a gap in the scope of practice provided by UCCs and retail clinics limit their effectiveness [11]. Freestanding

emergency departments could provide suitable care to rural communities [12]. Unfortunately, to date, FEDs are the least explored alternative to current emergency care shortages in rural Massachusetts.

Table 1: Comparing Emergency Care Alternatives

	Emergency Departments	**Urgent Care Centers**	**Retail Clinics**	**Freestanding Emergency Departments**
Hours of Operation	24/7/365	~7am-8pm (M-F) (Hours and days may vary)	8am-7pm (M-F) 10am-5:30pm (Sat) 9am-5:30pm (Sun) (Based on Ware CVS/Pharmacy MinuteClinic Hours)	24/7/365
Scope of Practice	Broad	Limited	Very Limited	Broad
Equipment	Full range of diagnostic equipment (CT/MRI, Labs, X-Ray, etc.)	Basic diagnostic equipment	Basic diagnostic equipment, such as diabetes testing, flu and pregnancy screening, and send-out swap tests.	Full range of diagnostic equipment (CT/MRI, Labs, X-Ray, etc.)
Treatment levels	Handle all acuity levels	Handle minor illness/injuries	Handle very minor illness/injuries	Handle all acuity levels
Inpatient Services	Yes	No - Often refer critical patients to the ED, delaying patient care	No - These clinics are only meant for minor health issues	No – Stabilize and transport critical patients

2.2.1 Building New Emergency Departments

Building a new hospital is a plausible solution only if finances allow it. Lowell General Hospital in Lowell, MA finished a 6-story building, including a new 50-bed ED, in June of 2010 that cost $543 per square foot (sq.ft.) [13]. This price is relatively low compared to other expansions. Milford Regional Hospital in Milford, MA expanded their ED from 32 beds to 52. The ICU facility was also expanded. The expansion cost $692 per sq.ft. in 2014 [14]. Lahey Hospital and Medical Center in Burlington, MA paid $2,303 per sq.ft in their 33,000 sq.ft. expansion in the same year [15]. Milford Regional Hospital's cost is closer to the cost expected for a new emergency facility in Ware, due to the comparable financial status of the two regions. With such high price tags, the construction of a new, fully equipped hospital featuring an ED and inpatient facility is rarely an appealing option.

2.2.2 Urgent Care Centers and Retail Clinics

The primary goal for UCCs and retail clinics is to ease ED overcrowding. These facilities treat less acute patients in hopes of freeing up more space in the ED for emergency patients [16]. Most UCCs do not require appointments. However, their hours of operation are limited; a majority close in the late evening and do not operate on Sundays. UCCs are structurally separate from the ED and are operated by a hospital system, health care system, or a private corporation/group of physicians [17]. For example, ReadyMed is operated by Reliant Medical Group, Le and Chang Family Urgent Care Center is privately operated in Worcester, and Baystate Medical System operates several UCCs.

Retail clinics are found inside pharmacy chains such as CVS/Pharmacy and Walgreens. Retail clinics are extremely limited in their scope of practice. Their scope of practice usually includes simple screenings such as minor wound care, rapid flu and pregnancy testing, birth control care, and vaccinations [18]. These clinics are often small and do not have the equipment to handle urgent medical emergencies. In addition, their hours of operation are similar to those of a primary care doctor's office. A study conducted by the Massachusetts Medical Society in 2015 showed that 73% of ED visits take place after hours when primary care doctors, UCCs, and retail clinics are closed [17]. The study shows that there is an inundating demand for a 24/7/365 facility, especially in rural areas like Ware.

As indicated in Table 1, there is a large gap between the level of care provided by UCCs, retail clinics, and EDs. UCCs are in many ways very similar to family care physicians [17, 19]. This is due to the fact that UCCs utilize Nurse Practitioners and licensed practical nurses instead of emergency physicians and Registered Nurses. Nurse practitioners, like doctors, are able to make simple to moderate diagnoses. In a UCC setting, nurse practitioners lack the necessary equipment to safely treat patients with severe cases. The limited scope of practice provided by UCCs and retail clinics discourages patients from attending these facilities. Patients demand, and deserve, the highest quality of care, and thus prefer fully capable EDs.

In the area of focus depicted in Figure 3, only two UCCs and one Minute Clinic exist, located in Amherst, Belchertown and Palmer, respectively (see Figure 3).

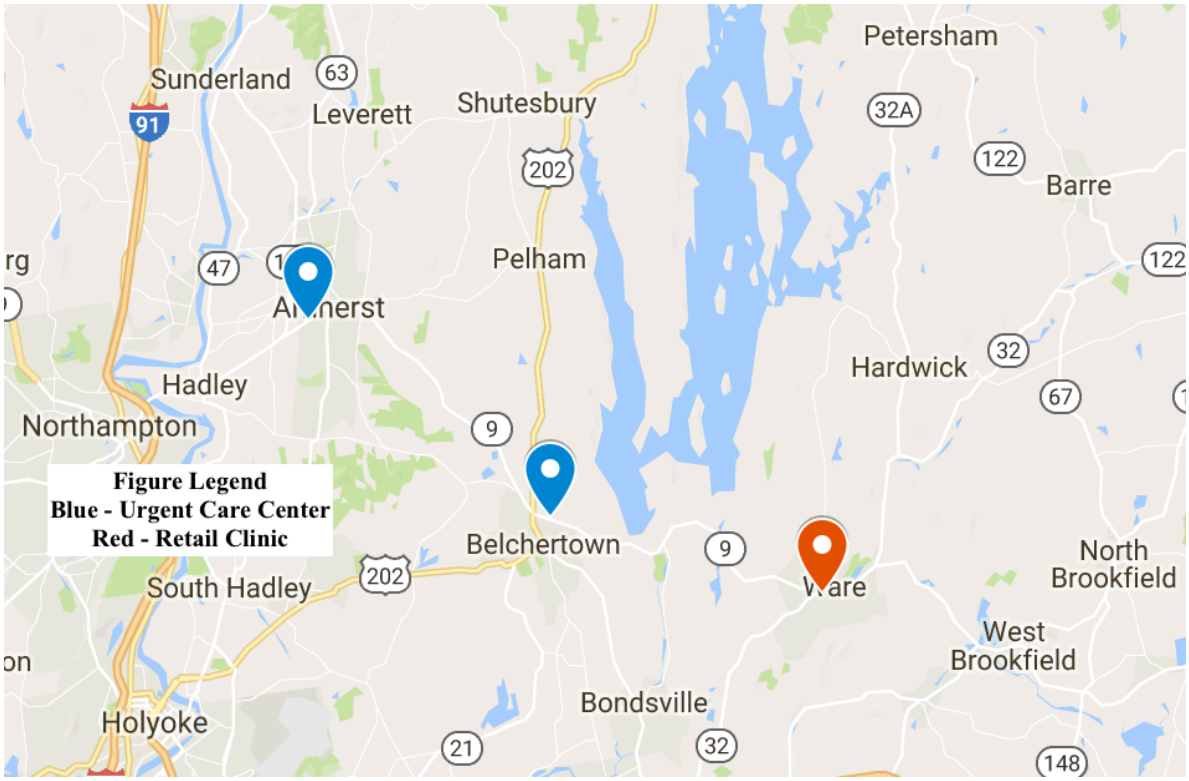

Figure 3. UCCs and Retail Clinic Serving Ware and Surrounding Communities

Establishing a UCC or retail clinic in Ware is expected to have minimal effect on providing patients with appropriate emergency care. These facilities do not have the scope of practice and the adequate equipment to properly treat the emergencies that commonly present to Baystate Mary Lane [20]. Some of the common chief complaints that present to Baystate Mary Lane are COPD, heart failure, and sepsis (infection of the blood) [20]. These conditions often require comprehensive interventions that are beyond the scope of practice of UCCs and retail clinics, requiring transportation to the nearest emergency department. This would add an unnecessary delay to a patient's medical care.

2.2.3 Freestanding Emergency Departments

Freestanding Emergency Departments (FEDs) provide 24/7/365 outpatient emergency care services staffed by board-certified physicians and Registered Nurses (RNs). FEDs are structurally independent EDs. If affiliated with a parent hospital, they are referred to as Satellite Emergency Facilities (SEF) or Outpatient Centers [21]. FEDs are a relatively new concept that have not been widely explored in MA, but are now beginning to be considered as an alternative to traditional EDs. North Adams Regional Hospital was recently converted to an SEF, which is discussed in more detail in the next section. North Adams SEF will be used as a case study comparison for

Baystate Mary Lane Outpatient Center. Freestanding Emergency Departments will be covered in more depth in section 2.6.

2.3 North Adams Freestanding Emergency Room

North Adams Regional Hospital is a Satellite Emergency Facility (SEF) located in North Adams, MA. North Adams Regional Hospital closed in May of 2014 due to a declining number of patients and a lack of funds to keep the hospital financially afloat [22]. The closure put a massive strain on the community. North Adams and surrounding communities lost immediate access to emergency healthcare as a result. Furthermore, the hospital had been the town's largest employer, providing over 500 jobs to the surrounding community. The financial blow to many of the workers who were laid off deeply impacted many families [22]. Later that year, the hospital campus was purchased by Berkshire Medical Center (BMC) and the ED was reopened as an SEF.

2.3.1 Demographics of North Adams, MA

North Adams, MA, according to the U.S. Census, had a population of 13,263 in 2015. This makes it the smallest city in MA. Only 56.5% of the population was in the labor force as of 2010 to 2014, compared to the U.S. average of 62.8%. About 21% of the city's residents live below the poverty line compared to the 8.2% average of the entire state. The median income per household was $40,169 between 2011 and 2015 [23]. It can be inferred that a higher percentage of North Adams residents rely on federal (i.e. Medicare and Medicaid) insurance as opposed to private insurance (i.e. Blue Cross Blue Shield), which could lead to lower profit margins at their SEF.

2.3.2 Financial Situation of North Adams Satellite Emergency Facility

In the years leading up to the closure of North Adams Regional Hospital (NARH), the hospital and multiple outside sources were reporting varying revenue outcomes [24]. In 2008, the hospital reported a total profit of $4.3 million to CHIA [25]. The hospital reported three straight years of losses in 2009, 2010 and 2011, losing $3.1, $4.0 and $1.8 million, respectively. In 2012 and 2013, the hospital was able to make $5.1 and $2.5 million, respectively [26]. Data from September 2013 to May 2014 was not available. Table 2 summarizes the profits/losses from 2008 to 2013.

Table 2: Profits/Losses of North Adams Regional Hospital (in Millions)

	2008	2009	2010	2011	2012	2013
Profit/(loss)	$4.3	($3.1)	($4.0)	($1.8)	$5.1	$2.5

If we consider the overall total profit/loss during this time span, the hospital actually made about $3 million. However, due to the mixed results of the overall profits, the most financially feasible decision for the Berkshire Health System was to convert NARH to a Satellite Emergency Facility. After the conversion, the overall profits/losses of the SEF were combined with its parent hospital, Berkshire Medical Center [25]. As a result, the team was unable to decipher between the profit/losses of the SEF and the main campus.

2.3.3 Hospital Profile - North Adams Regional Hospital by the Numbers

Service Area

The main service area of North Adams Regional Hospital is North Adams and Williamstown. The recommended acceptable time from onset of symptoms for an acute health issue (e.g. heart attack, stroke, major bleeding, etc.) to the ED is 60 minutes. This is often referred to as the "golden hour". Patients travel as ED. Travel times become critically important when considering serious medical problems. Travel and wait times can significantly cut into the golden hour. The impact of prolonged transport times on patient care will be discussed in greater detail in section 2.5. Figure 4a depicts the concentration of patients from the top five towns serviced in 2013 that utilized North Adams Hospital before its conversion to an SEF. Figure 4b shows the concentration of patients that utilize Berkshire Medical Center.

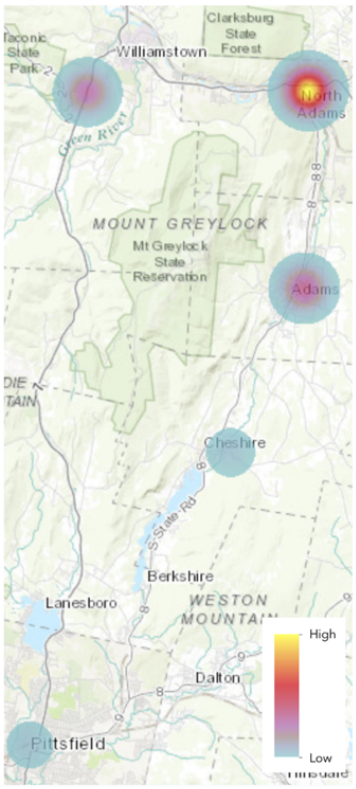

Figure 4a: North Adams Regional Hospital Patient Source Map

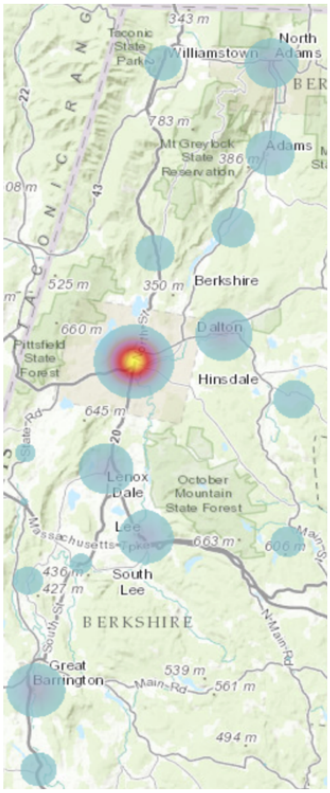

Figure 4b: Berkshire Medical Center Patient Source Map

While the town of Adams is serviced by Berkshire Medical Center, patients from the area opted to travel to North Adams Regional Hospital for emergency care. This is due to the shorter wait times seen at regional hospitals compared to trauma centers, such as Berkshire Medical Center. It is also important to note that residents closer to North Adams Regional Hospital still utilize Berkshire Medical Center. These patients generally have more complex medical problems that need the services offered at a high level trauma center.

Number of Visits

Prior to the closure of North Adams Regional Hospital, its ED was servicing approximately 20,000 patients yearly. BMC was seeing approximately 55,000 patients annually. After the closure of North Adams Regional Hospital (2014-2016), the new BMC (Berkshire Medical Center and North Adams Regional Hospital combined) continues to see roughly 45,000 patients annually as seen in Figure 5. The following graph was derived from hospital annual reports. Data for 2012 was unavailable.

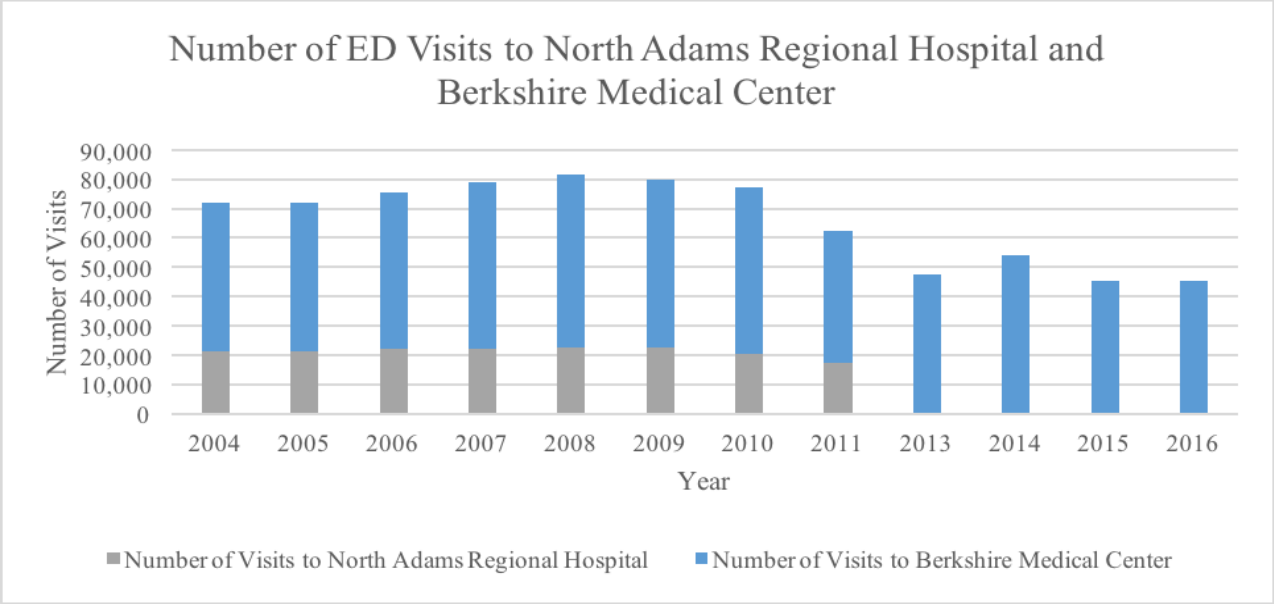

Figure 5: Number of ED Visits - North Adams Regional Hospital and BMC

Before the hospitals merged, they were seeing a total of approximately 70,000 patients yearly. After North Adams Regional Hospital became part of the Berkshire Medical System, the system as a whole services roughly 45,000 patients annually. The noticeable decrease in patients initiated the merge and the eventual conversion of North Adams Regional Hospital to an SEF. This allowed continued access to emergency care for the town of North Adams while making it financially feasible for BMC.

2.3.4 Services Provided by North Adams Satellite Emergency Facility

The new North Adams SEF provides a number of services and is open 24/7/365. The facility has two observation beds for patients who need to be monitored for several hours. North Adams SEF is able to perform blood tests and has imaging equipment such as CT, MRI, X-ray, and ultrasound [26]. The facility uses mammography for breast cancer and endoscopy for a number of diagnostic tests. The SEF can also provide a number of surgeries, including orthopedic, urologic, and OB/GYN. More serious injuries are transported to a nearby inpatient facility that will best serve the needs of the patient. The availability of these services means that the citizens of North Adams receive the care they need if they are seriously injured.

2.3.5 North Adams Regional Hospital as a Model for Ware, MA

North Adams SEF is one of the very few examples of an SEF in MA. The closing of BMLH is similar to the situation that North Adams Regional Hospital was in when it was forced to close. The reopening of North Adams as an SEF has been very successful, and this project looks to

translate this success to Ware. Initially, an FED in Ware will look to provide services comparable to the North Adams SEF.

2.4 Baystate Mary Lane Outpatient Emergency Facility

Baystate Mary Lane Outpatient Center is situated in Ware, MA. Ware has been home to Baystate Mary Lane Hospital since 1909 [26]. In the early months of 2016, hospital officials announced the closure of the 25 bed inpatient facility. Today, Mary Lane Hospital is an outpatient facility providing 24/7/365 access to emergency care. Since it was founded, Mary Lane Hospital has grown and adapted to the community's health needs. This includes renovations and implementation of many community programs. The hospital has also been a long time provider of primary care physicians and specialists for the residents of Ware and the surrounding communities, most notably Belchertown, West Brookfield and Spencer.

Mary Lane Outpatient Center is one of five hospitals under the Baystate Health System (BHS). Baystate Medical Center in Springfield, MA is the parent hospital in BHS. The hospital in Springfield offers a level 1 adult trauma center and a level 2 pediatric trauma center. BHS also includes Franklin Medical Center (Greenfield, MA), Noble Hospital (Westfield, MA), and Wing Hospital (Palmer, MA).

Mary Lane Outpatient Center is affiliated with Wing Hospital in Palmer, MA. Thus, all Mary Lane patients requiring hospital admission and high acuity procedures must be transported to Wing Hospital. In addition, hospital officials announced that emergency services will only remain in Ware for two more years while an expansion of Wing Hospital is taking place [25]. The plans to close the hospital and limit emergency care access sparked public interest regarding the uncertainty of emergency care in the region of interest.

2.4.1 Financial Situation of Mary Lane Hospital

The decision to suspend inpatient services at Mary Lane Hospital in 2016 and convert the facility into an Outpatient Center was driven by its financial status. In 2014, revenue distribution was 32% from inpatient services and 68% from outpatient services. Between 2010 and 2015, Mary Lane reported a loss of $2,763,000 [22]. Table 3 summarizes the changes in total revenue, operating surplus, and total surplus for six Fiscal Years (FY). Total revenue includes two components, operating and non-operating revenue. Operating revenue includes services directly utilized by the patient (i.e. the cost of stay) and non-operating revenue includes benefits such as funds from local and federal governments [27]. Operating surplus includes profit from the services

provided to patients. Total surplus is the overall profit of the facility. Table 3 shows data solely for Mary Lane Hospital.

Table 3: Financial Status of Mary Lane Hospital, FY2011 – 2015, in Millions of USD

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Operating Surplus (Loss)	($4)	($1.640)	($0.073)	($0.791)	($1.95)	($1.607)
Total Surplus (Loss)	($2.9)	($1.371)	$0.325	($0.559)	($1.451)	$0.293
Total Revenue Change	3.1%	-4.6%	1.1%	-2.2%	-5.5%	1.0%

Figure 6 compares the operating and total revenue changes for Mary Lane compared to other hospitals in the community hospital cohort.

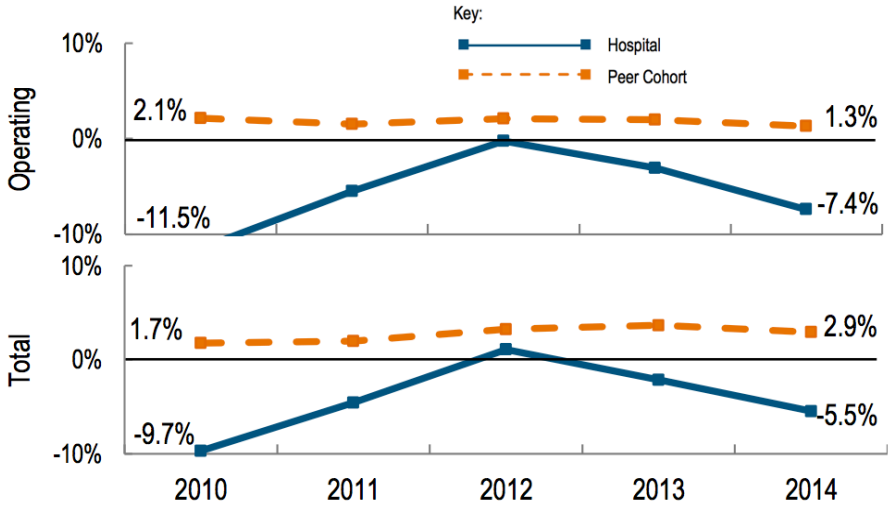

Figure 6: Operating and Total Revenue Changes

In the six-year period shown in Table 3, Mary Lane Hospital was losing an average of $943,800 annually. On a yearly basis, the hospital reported a significant decrease in its total revenue; however, 2012 and 2015 showed a slight increase in total revenue. In those two years, the increase was enough to yield a profit, yet not sufficient to offset the loss sustained in the five-year period. As a whole, BHS's total surplus in 2014 was $98 million. In the same year, Mary Lane was the only hospital in the system to report a loss.

The major contributing factor to the closure of inpatient services and the conversion is a significant decline in the number of inpatient discharges (or visits) between 2010 and 2014. The percent change in inpatient discharges from 2010 to 2014 for Mary Lane compared to other hospitals in the community hospital cohort is shown in Figure 7.

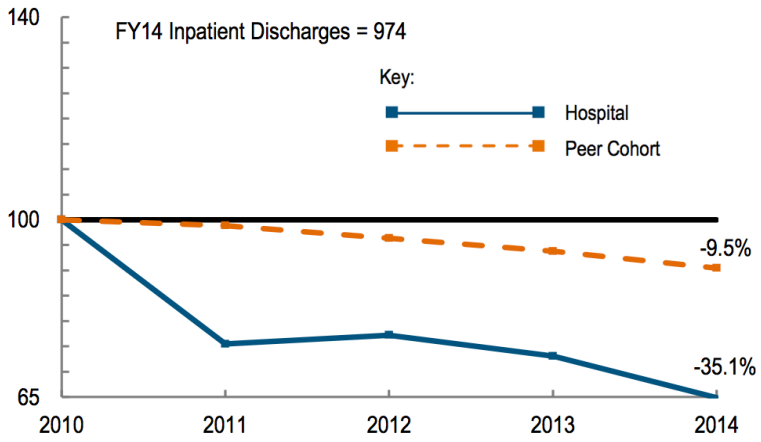

Figure 7: Inpatient Discharges Compared to Other Hospitals [28]

The hospital cohort saw an overall 9.5% decrease in inpatient discharges. However, Mary Lane showed a 35.1% decrease in inpatient discharges in a four-year period. This decrease significantly reduced the facility's profit. The extreme cut in the hospital's profit means that there is not enough money to cover overhead expenses, which include staff insurance, staffing, utility bills, equipment maintenance, and materials used by staff. Maintaining an inpatient ward capable of providing quality patient care requires a certain overhead that the hospital could no longer afford.

According to a report published by the Center for Health Information Health and Analysis (CHIA), Mary Lane spent an average of $10,721 per single admitted patient. However, the hospital was compensated approximately $7,936 per single admitted patient. This means that in 2014 alone, Mary Lane lost $2.7 million for its 974 admissions [20]. Figure 8 shows the net inpatient revenue of Mary Lane compared to other hospitals in the community hospital cohort.

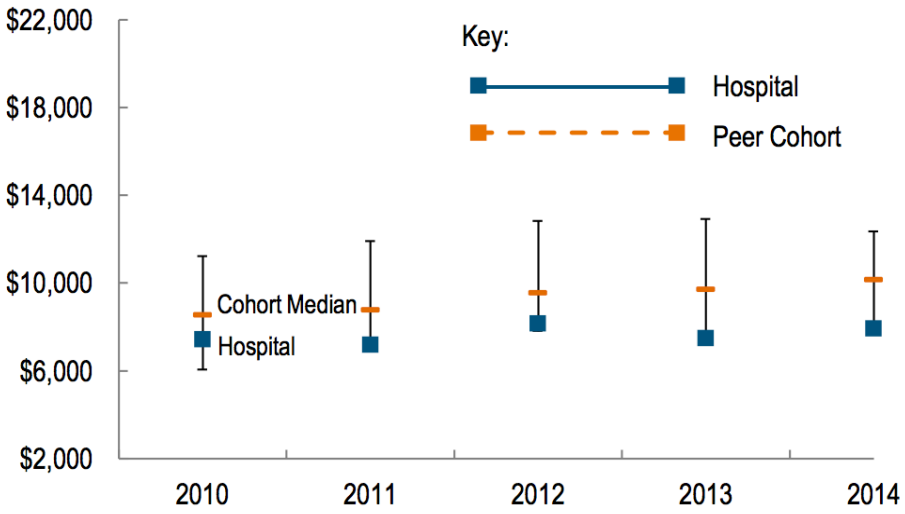

Figure 8: Inpatient Revenue Compared to Other Hospitals

In addition to the decrease in admitted patients and enduring large overhead costs, the hospital also faced penalties from the federal government. The penalties were a result of patient readmission to any hospital within 30 days of them being discharged from Mary Lane. Readmission within 30 days is considered a serious expenditure by the federal government. Figure 9 shows the readmission rate for Mary Lane from 2011 to 2013 compared with other hospitals in the same cohort. In 2016, a total of 2,597 hospitals across the nation were fined a total of $528 million, a $108 million increase from 2015 [28]. The fines issued are believed to be the amount the government paid to cover the readmissions in 2016.

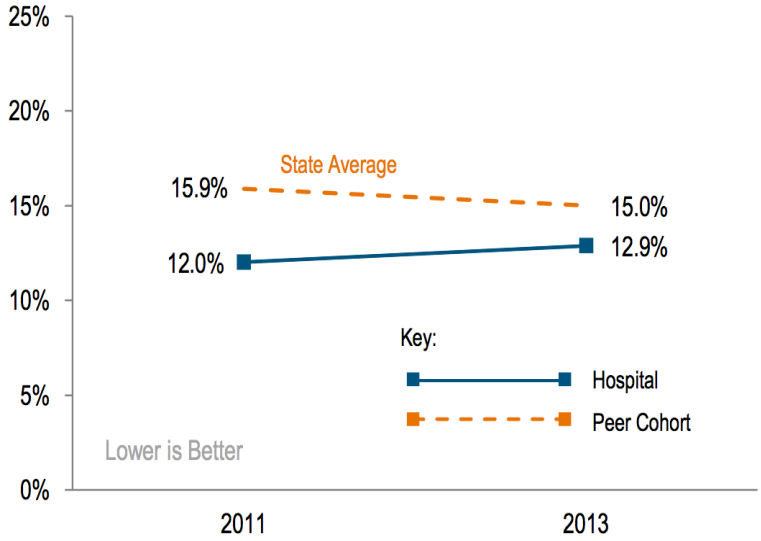

Figure 9: Readmission Rates for Mary Lane Hospital

While other community hospitals brought their readmission rates down by 0.9% in the two-year period, Mary Lane's readmission rate grew by the same percentage over the same time period. This means that in 2013, 142 of 1,097 (12.9%) patients were readmitted into other hospitals. In 2011, 135 of 1,123 (12%) were readmitted into another hospital. Although readmission of only 7 patients may not seem significant, the penalties endured are significant. In 2013, it is estimated that Mary Lane spent an average of $9,624 per admitted patient. This means that if these patients were readmitted into Mary Lane, the hospital would have paid $67,368 in fines to cover the cost of those patients. If these patients were not readmitted into Mary Lane, the hospital would have paid a fine depending on the overhead of the hospital to which these patients were admitted [29].

The net inpatient revenue of Mary Lane was consistently below other community hospitals from 2010 to 2014. The 2014 CHIA report suggests that this is due to the enormous expenditure per inpatient at Mary Lane, meaning the hospital spent more money on patient care than compensated by the patient's insurance. Lastly, it is important to note that the average cost per admitted patient does not include physician payment. This means that the hospital sustained further loss for each physician that was involved in patient care.

2.4.2 Average Income and Insurance Utilization of Ware and the Surrounding Towns

Ware, MA is a small community located in Hampshire County with approximately 9,888 people, according to the 2015 Census. The town is surrounded by eight Tier 1 towns and 16 Tier 2 towns (see Figure 2). Mary Lane Outpatient Center has attracted residents from many of the surrounding communities seeking medical care. Many patients travel to Ware to utilize the resources the hospital provides, such as the ED, primary care physicians, and diagnostic outpatient services, such as labs and imaging.

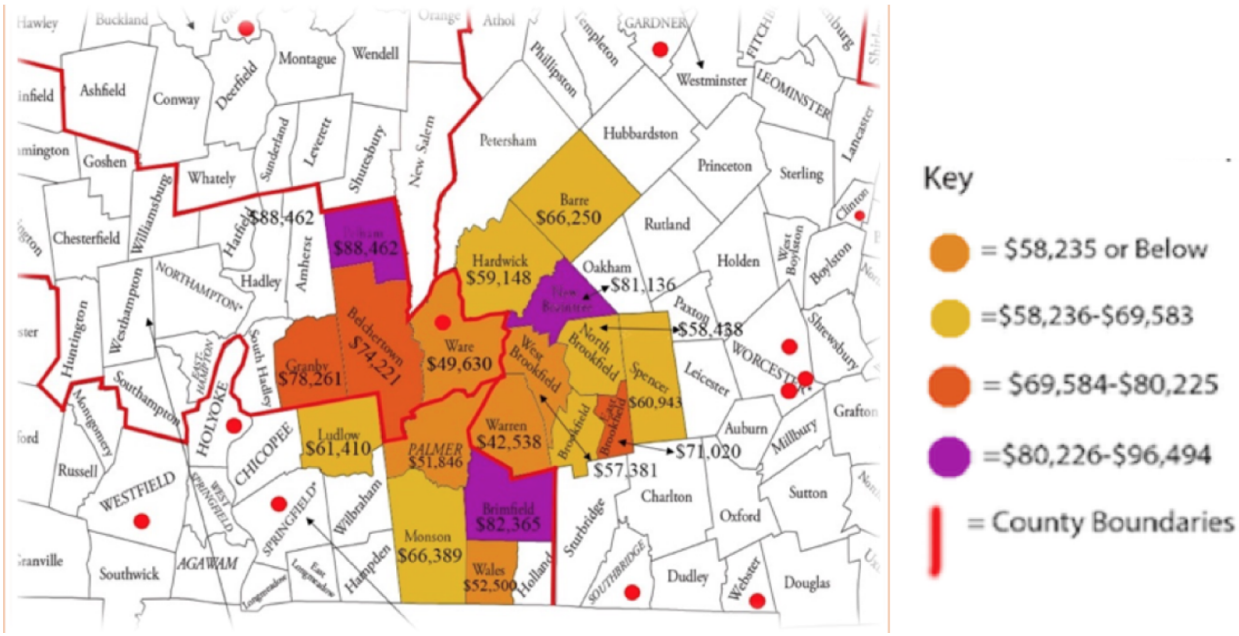

Figure 10: Average Income for Towns Serviced by Mary Lane Hospital

According to the US Census Bureau's American Community Survey conducted in 2015, Ware and the surrounding towns predominantly fall in the middle class, nearing the national middle class average of $50,000 (see Figure 10). 61.2% of the population in Ware is in the labor force as of 2016, with an unemployment rate of only 3% [30]. Thus, it is expected that the majority of the visitors to Mary Lane are covered by federal and private insurances. The average income in Ware is significantly higher than that of North Adams, suggesting that the economic success of an FED in Ware is highly plausible.

The 2015 Baystate Mary Lane Hospital Community Report was used to better assess the ratio of patients utilizing federal insurance versus private insurance in the ED [29]. The report was also used to determine the number of people over 65 years of age (see Figure 11) living in the towns that utilize Mary Lane.

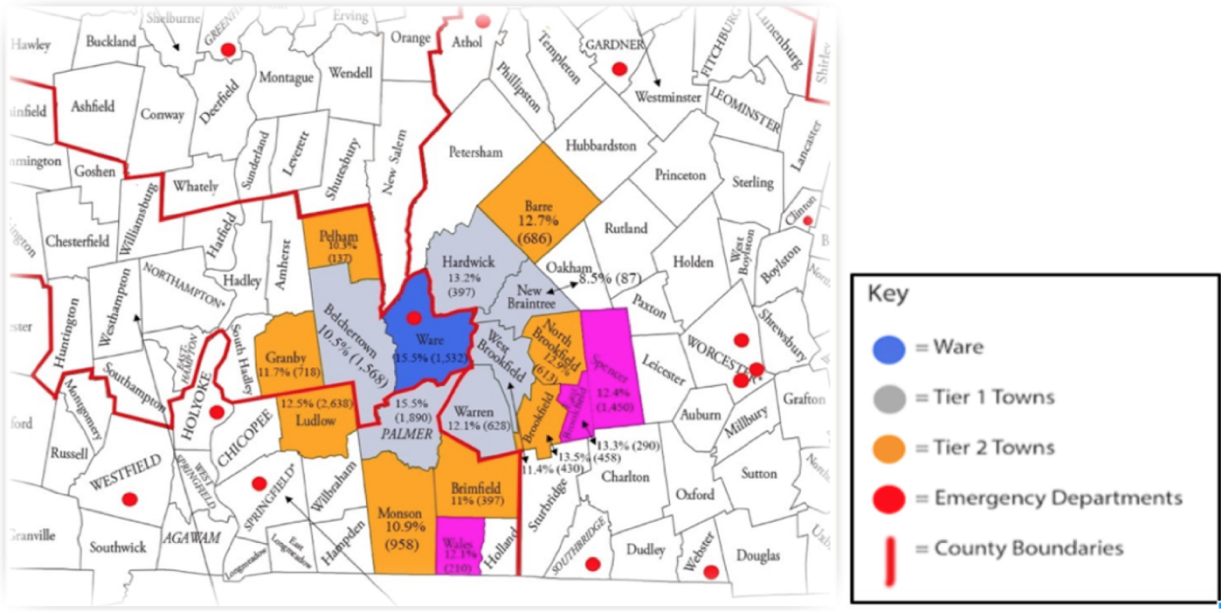

Figure 11: Population of Towns Serviced by Mary Lane Hospital Over 65 Years

The Community Report indicates that of the 13,103 patients that visited the ED in 2015, approximately 30.24% (3,962) of ED visitors pay with Medicaid while 61.71% (8,086) pay with private insurance. Overall, the utilization of government insurance in Ware is significantly less than that of the state, which is estimated to be 41% [31]. The utilization of private insurance, however, is slightly higher in Ware compared to the state, which is estimated to be 59% [31].

2.4.3 Hospital Profile: Mary Lane Hospital by the Numbers

Service Area

In the years leading up to the announcement of the closure of inpatient services, Mary Lane significantly expanded its service region. According to a 2015 Community Benefit Report, the hospital serves five towns from Hampden County, three from Hampshire County and nine from Worcester County [29]. Figure 12a outlines the 18 towns the hospital services, while Figure 12b depicts the concentration of patients from the top nine towns serviced in 2013.

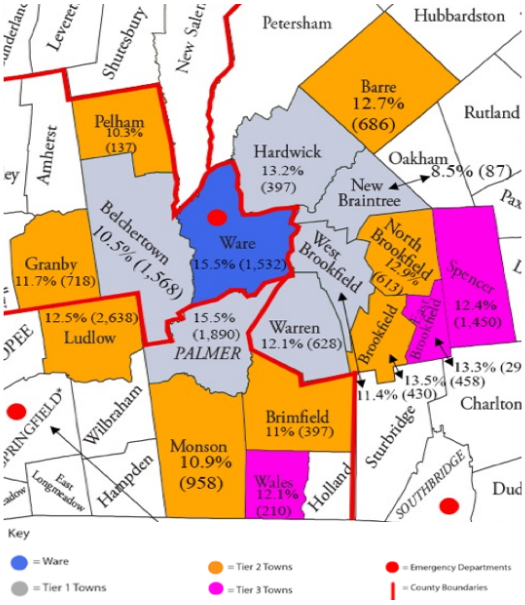

Figure 12a: Towns Serviced by Baystate Mary Lane Hospital

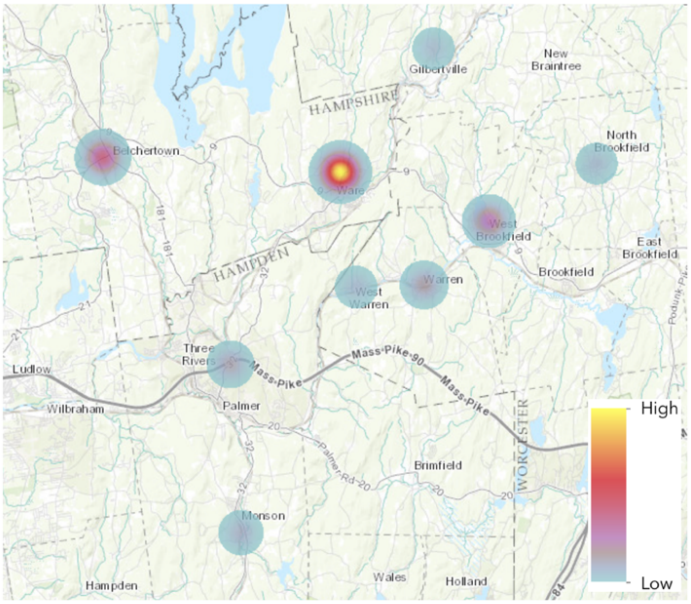

Figure 12b: Baystate Mary Lane Hospital Patient Source Map

The greatest number of patients originate from Ware, Belchertown, West Brookfield and Warren. However, patients as far out as Monson (15 miles, ~23 minutes) rely on Mary Lane for access to care due to the limited resources in the area.

Number of Emergency Department Visits

Table 4 details the number of patient visits to Mary Lane ED from counties mentioned and the town with the highest number of visits from each county in 2012. The primary service area of Mary Lane Hospital spans three counties and seventeen towns.

Table 4: Baystate Mary Lane Hospital Number of Patients by County and Town, 2012

	Number of Patient Visits to Mary Lane, 2012	Percent (%) of Total* Population to Visit Mary Lane
Hampden County	**47,399**	**39.9**
Ludlow	21,197	17.8
Hampshire County	**32,148**	**27.1**
Belchertown	14,941	12.6
Worcester County	**39,284**	**33.1**
Spencer	11,714	9.9

*Total number of patients includes frequent utilizers

Figure 13 shows the number of yearly ED visits from 2004 to 2016. The number of ED visits in Mary Lane remained relatively consistent from 2004 to 2010 with an average of 14,000 yearly visits. Data for 2012 is unavailable.

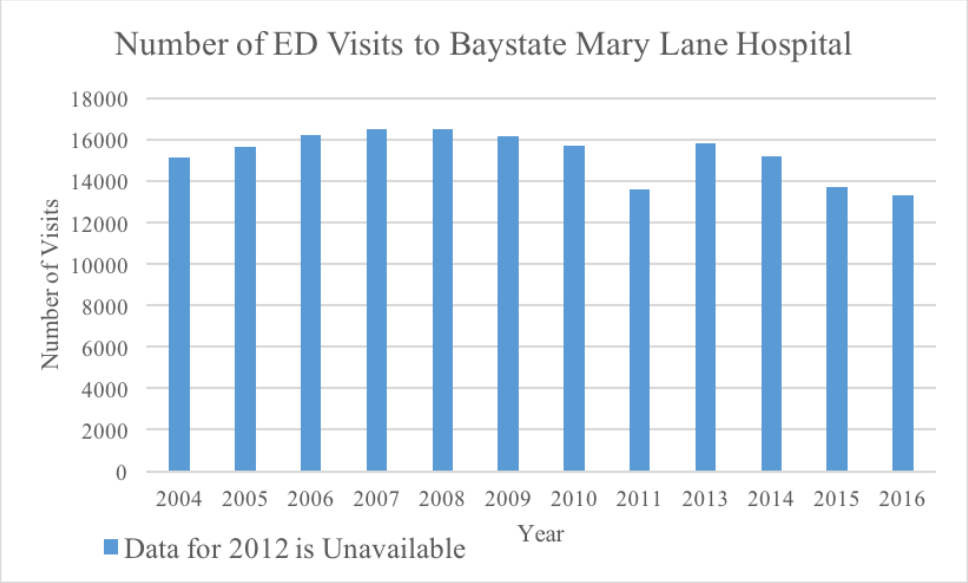

Figure 13: Baystate Mary Lane Hospital - Number of ED Visits

As seen in Figure 13, the number of ED visits has been steadily declining from 2013 - 2016. However, there remains a significant number of patients that utilize emergency services at Mary Lane.

2.4.4 Community Utilization of Mary Lane Outpatient Center

Despite Mary Lane's financial status, the hospital provides a considerable amount of services such as emergency and outpatient services. Table 5 summarizes the annual (2015 and 2016) number of ED visits, laboratory tests (blood tests), radiology procedures, CT scans, observation patients, inpatient discharges, deliveries, and physical therapy visits. These services are crucial to the wellbeing of community members in Ware and surrounding towns.

Table 5: Number of Patients Serviced by Mary Lane Baystate Outpatient Center

	Fiscal Year 2015	Fiscal Year 2016	% Change
Emergency Department Visits	13,690	13,304	- 2.8
Laboratory Tests	190,462	136,240	- 28.5
Radiology Procedures	18,264	16,535	- 9.5
CT Scans	2,723	2,805	+ 3.0
Observation Patients	1,271	1,324	+ 4.2
Inpatient Discharges	954	740	- 22.4
Deliveries	488	491	+ 0.6
Physical Therapy Visits	6,994	7,251	+ 3.7

As seen in Table 5, a significant amount of laboratory tests are performed at Mary Lane Outpatient Center, over 190,000 in 2015 and over 136,000 in 2016. The drastic decrease (-28.5%) in laboratory testing may be attributed to the abrupt closure of the inpatient facility in September of 2016. Over the past year, over 16,500 radiology procedures were performed. Furthermore, about 14,000 physical therapy visits took place both years combined. Considering the rural population of this region of MA, the amount of laboratory testing and radiology procedures performed are vital services provided to these residents and losing them would have a significant negative effect on the community. Such simple and quick procedures would be no longer available to the community, forcing patients to travel longer distances to have these procedures done. This includes senior residents and young children, which together make up over 45% of the population in Ware and Tier 1 towns.

The emergency department at Mary Lane sees patients with a variety of emergencies. The types of cases that present to Mary Lane Outpatient Center include abdomen and pelvis pain, respiratory and chest symptoms (e.g. heart failure, pneumonia, etc.), back pain, general symptoms (e.g. fatigue, headaches, generalized pain, etc.), sprains and strains (i.e. orthopedic emergencies), cellulitis (bacterial skin infection), head and neck pain, drug abuse symptoms, general injury (e.g. cuts, bruises, etc.), and digestive system symptoms [32]. Publications by Mary Lane, CHIA, and other agencies do not outline the specific number or percentages of patients that present with these symptoms to the ED.

In addition to providing access to emergency care, Mary Lane provides a number of other services to the community. These services include a cancer clinic, access to primary care physicians, rehabilitation center, surgical services, and radiology. Alongside clinical services, the hospital is heavily involved in community programs such as Cardiopulmonary Resuscitation (CPR) classes, Salvation Army involvement, and heart and stroke prevention programs. These programs are diverse and represent a multitude of differing entities in the community.

The services that Mary Lane provides are particularly beneficial to the senior population of Ware. Senior residents are frequent utilizers of the services provided by Mary Lane. The proximity of Mary Lane Outpatient Facility provides a short and safe drive to the care residents need. One major concern of many senior residents is the lack of inpatient services from by Mary Lane. Since its closure of the inpatient department, senior residents who require hospitalization

must utilize Wing hospital in Palmer or UMass Memorial Medical Center in Worcester. Both of these locations require significant travel from their home town, something that most senior residents are uncomfortable with doing, exacerbating an already difficult situation.

2.5 Impact of Closing a Community Hospital and Delaying Patient Care

Not only do local emergency departments provide health services to thousands of residents, but they also provide employment for hundreds. The closure of the North Adams Regional Hospital inpatient facility resulted in the termination of 530 full- and part-time positions [22]. The closure of Baystate Mary Lane Hospital's inpatient facility has led to 28 terminated positions so far [22]. However, due to the uncertain future of the facility, many more jobs could be at stake.

Emergency department closures also increase travel time for those who seek medical care. When an ED closes, a patient has to travel an additional 30 minutes on average in order to receive the necessary care [33]. Specifically for Ware and surrounding towns, a patient would have to travel an average of 15 miles (which is equivalent to approximately 30-35 minutes) in order to arrive at the nearest emergency department. Studies by the University of California, as well emergency care specialists, reveal that increasing distance and travel time to the ED can be catastrophic for patients with serious life-threatening conditions such as a heart attack [34]. In particular, the travel time can be catastrophic to the geriatric community as their health needs need to be addressed quicker than any other age group [34]. The increased travel time, triage time, and waiting time go well above the golden hour thus increasing the chances of a serious injury to the patient.

2.5.1 Impact of Hospital Closure on Nearby Hospitals

A study done by University of California, San Francisco and Harvard Medical School surveyed the impact of ED closure on nearby hospitals. The case study looked at all hospital closures across California from 1996 - 2009. The team was able to explicitly conclude that patients admitted at a hospital near a recently closed ED have 5% higher odds of mortality [35]. The results of this study mean that hospitals near Mary Lane could suffer the same consequences. Therefore, the closure of Mary Lane does not only decrease access to emergency care, but also puts patients at nearby hospitals at risk.

2.6 Freestanding Emergency Departments

Freestanding emergency departments are structurally independent EDs that are not physically associated with a hospital. FEDs can be operationally affiliated with a parent hospital,

in which case they are referred to as Satellite Emergency Facility (SEF) or outpatient facility. FEDs can also be a privately owned and operated. Just like traditional emergency rooms, FEDs are staffed by board certified emergency physicians and registered nurses 24/7/365 [21]. This project will assess the feasibility of a hospital-run FED following MA regulations.

FEDs do not provide inpatient services or operating rooms. Should a patient need to be admitted, the FED will transfer them to a higher-level trauma hospital. *Without an inpatient department, these FEDs are cheaper to build, maintain and staff than full hospitals.*

FEDs take on many roles in the community. FEDs provide a number of outpatient services, including laboratory work, imaging, and mammography services. It is not uncommon for these facilities to also employ family physicians to serve the community. FEDs can also provide same-day surgery for minor surgical procedures. These services increase community access and allow patients to receive prompt care for a wide range of health issues.

2.6.1 Freestanding Emergency Departments in Rural Communities

FEDs are built to provide rural areas with access to ambulatory hospital services. In states like Texas, FEDs are located in areas readily accessible to patients who would otherwise need to travel long distances to reach an ED [36]. FEDs also decrease the patient load on traditional emergency departments. This project will determine how effective an FED implementation will be at increasing access to rural areas.

2.6.2 Location

The location of an FED affects its success. Typically, FEDs are built within 10-20 miles of a parent hospital [36]. Baystate Mary Lane Outpatient Center is the ideal location for an FED, as it fulfills this traditional arrangement and can greatly benefit Ware and surrounding towns. However, construction of a brand new FED in Ware is also a possibility due to the politically sensitive political situation at Mary Lane Outpatient Center.

Life-threatening cases from far away towns have higher risks of fatality. Patients from towns like Warren, Belchertown and West Brookfield are forced to attend Worcester EDs in order to receive emergency care. The establishment of an FED in Ware would provide quality convenient and timely care for thousands of patients.

2.6.3 Benefits and Challenges

FEDs increase access to care and can satisfy a growing demand for emergency services. In areas west of the Greater Worcester County, an FED can serve a convenient care role for local

residents. Its vast scope of practice can potentially provide the community with quality emergency care without the long drives. An FED would serve as a stabilization center for high acuity patients [37]. Patient wait times and length of service could significantly decrease compared to traditional EDs.

By establishing an FED in Ware, overcrowding at metropolitan EDs can potentially benefit. A study published in the Journal of Emergency Medicine explores the effects of two FEDs on the parent ED. The implementation of the FEDs resulted in a 7.5% decrease in patient volume at the main ED [38]. Over a three-year period, the collective system experienced a 45% increase in monthly patients. A major result of the study included that FED implementation led to a decrease in the number of admitted patients [38].

Despite the benefits, the establishment of an FED may also have negative outcomes financially. Towns located in west central MA have a lower household income relative to the rest of MA [39]. Due to the lower average income, residents are more likely to have insurance with lower reimbursement rates [40]. An FED established in Ware may not produce significant revenue. In order to determine the financial feasibility of this FED, a business plan will be assembled.

The public's lack of knowledge is the main challenge facing FEDs. The general public is unaware of what services are offered at an FED. Public outreach programs and advertising are both easy ways to inform the public. Another challenge FEDs present is patient transportation. FEDs must have agreements with local hospitals and Emergency Medical Services (EMS) agencies to transport patients who require higher level care. This adds an extra cost to the patient's bill, a downfall compared to traditional full hospitals.

2.7 Feasibility of a Freestanding Emergency Department in Ware

FEDs have been implemented in many states and their feasibility is very well established in other areas. However, the utilization of FEDs in rural Massachusetts is a novel approach to increase access to emergency care for these patients. For this reason, a business plan proposal will be conducted to determine the feasibility of an FED in Ware. The business plan will perform the cost-benefit analysis as well as provide a plausible financial template for the establishment of an FED. The feasibility study will determine the potential impact of the facility on Ware and surrounding towns.

2.7.1 Business Plan

The business plan will serve as a detailed plan regarding the implementation of an FED in Ware. The plan will explore all aspects of the facility. This includes location, facilities, services, ownership, and a brief overview of finance. The proposed plan will be delivered in the results section. It will also be used to make a determination regarding the financial feasibility of an FED in Ware, MA.

Chapter 3. Methodology

3.1 Identifying Stakeholders

Baystate Mary Lane Hospital has been a vital component of a healthy community for Ware and surrounding towns. The proposed closure of the recently converted Mary Lane Outpatient Facility would drive its patients toward metropolitan emergency departments, such as UMMMC in Worcester, Baystate Medical Center in Springfield, and Baystate Wing Hospital in Palmer. This methodology section will outline the techniques utilized for gathering relevant data and information used to determine the feasibility of an FED in Ware. Also, a *business plan* was implemented to analyze the financial practicality of an FED in Ware.

Developing a business plan requires knowledge of the stakeholders involved. Stakeholders were identified by studying who will be affected if Mary Lane closes entirely. The stakeholders for this project were identified and classified into three categories: *governance, providers and users* (Figure 14).

UMMMC management and local and state officials fall under the governance category. EMS services from Ware and surrounding towns, as well as emergency department staff, are among the providers. Finally, patients from Ware and surrounding towns fall under the *users* category designation. All three categories of stakeholders are essential to the establishment and success of a freestanding emergency department in Ware.

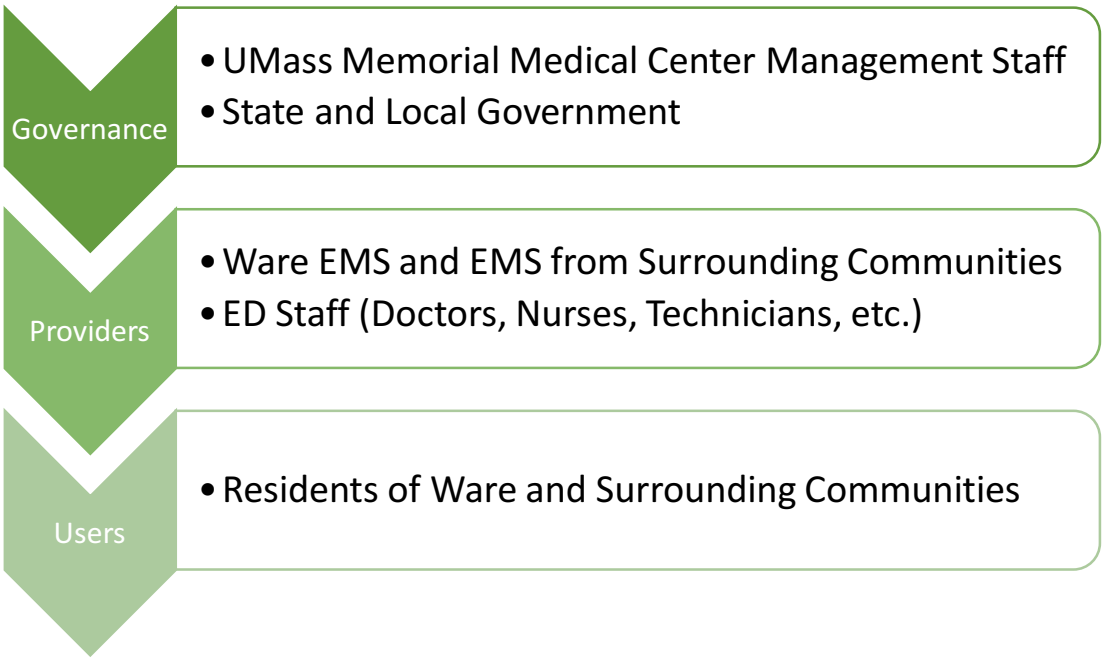

Figure 14: Identifying Stakeholders

3.2 Techniques for Gathering Relevant Information

In order to collect all the data needed to formulate the business plan, several qualitative research methods were applied. These included interviews, surveys, unobtrusive measures, ethnography, and case studies (see Figure 15).

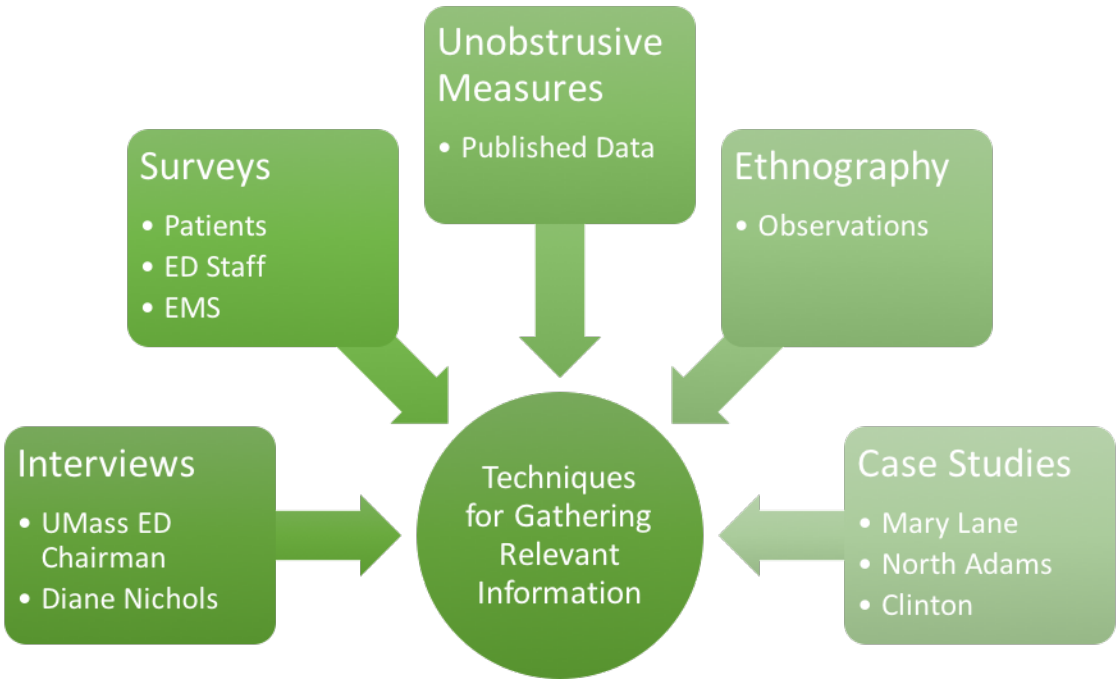

Figure 15: Research Methods for Gathering Relevant Information

3.2.1 Ethics

All of the research ethics that are relevant to this study were observed appropriately. All communication was properly documented according to Worcester Polytechnic Institute's (WPI) Institutional Review Board's (IRB) code of ethics. Interviewees and other project participants were quoted only with permission. In addition, our surveys were anonymously conducted and no personal patient information was obtained.

3.2.2 Interviews

In order to evaluate how the project's stakeholders perceive the idea of establishing an FED in west central MA, Dr. Volturo, the Chairman of Emergency Medicine of UMass Memorial Medical Center, was interviewed. Initially, the team conducted a phone interview with Dr. Volturo. The second interview was conducted on October 28, 2016 at Clinton Hospital. The final interview was conducted on March 27, 2017 at WPI. These interviews were conducted in an unstructured format [41]. Question about major topics regarding the project were asked, but the interview was conducted in an unofficial manner. Access to emergency care, patient flux, ED capability, and

level of care were amongst the topics discussed during the interview with Dr. Volturo. General specifications and requirements to operate and maintain an FED were also recorded. In addition, plausible locations for an FED in west central MA were considered. Finally, major components of a business plan, such as market analysis, financial outline, and demand for the services, were laid out in order to help determine the feasibility of an FED.

These interviews conducted with Dr. Volturo yielded essential information regarding patient access, feasibility of an FED in Ware, and daily operation of an ED. The major conclusions gathered from the interview are outlined in the results section. These interviews also allowed us to gauge the opinion of a key member of the UMMMC management team. However, conducting an interview with just one member of the management team does not reflect the opinion of the entire management personnel, which is a notable limitation to these interviews.

The distribution of the surveys through Facebook prompted, the director of North Brookfield Senior Center, Diana Nichols, to contact the team regarding distributing the surveys to senior patients who did not have access to the online survey. Paper copies of the survey were filled out by the Senior Center and 29 surveys were mailed back to the group for analysis. The team also conducted an unstructured phone interview with Diane Nichols on March 20, 2017. During the interview, Diane expressed the concerns of the senior population regarding the closing of Baystate Mary Lane Hospital inpatient facility and the future of health services in Ware and surrounding communities. Patient surveys are available in Appendix B, and EMS and ED Staff surveys are available in Appendix C. Notes of the phone interview with Diane Nichols are included in Appendix D. The results of the surveys are portrayed and discussed in the Results section.

3.2.3 Surveys

The initial plan was to survey ED patients and staff on their ED experiences. Due to HIPAA restrictions, the team was unable to personally survey patients and staff in the hospital setting. Instead, the team posted three surveys targeting these stakeholders on Facebook groups. The surveys included questions regarding the expected wait time in EDs, overall patient and staff satisfaction, as well as general opinion of nurses and paramedics/EMTs regarding FEDs. Furthermore, the Ware Fire Department was contacted and Chief Thomas Coulombe kindly agreed to distribute a survey specifically designed for Ware EMS to his members.

The Chief initially agreed to post a survey made specifically for Ware patients on the department's Facebook page. However, the Chief faced political pressure from Baystate officials.

In an email correspondence on Wednesday, February 22, 2017, the Chief wrote, "There was political pressure from Baystate about posting the survey" (Chief Thomas Coulombe email correspondence, February 2017). As a result, the Ware patient survey was not posted on the department's Facebook page.

The team also attempted to interview Doctor Niels Rathlev, Chair of the Emergency Department at Baystate Medical System. The team's request for an interview and information regarding the future of Mary Lane was denied through email. Dr. Rathlev wrote, "We will unfortunately not be able to participate to a very sensitive political environment" (Dr. O'Neill email correspondence, November 2016).

Distributing the surveys on Facebook allowed the team to reach a very large audience. However, our surveys were not directly aimed at Ware patients and the staff of Mary Lane Hospital due to political pressure and HIPAA restrictions. Surveys posted on other pages reached two Ware residents; their opinions do not reflect the opinion of the whole town. Such a limitation means that we could not obtain the general opinions of patients and ED staff that are most affected by this project. The distributed surveys serve as a great template. However, the opinions of local staff and patients might differ from those surveyed.

3.2.4 Unobtrusive Measures

Unobtrusive measures were important for determining the viability of an FED in Ware. Unobtrusive measures are data that can be obtained from annual hospital performance reports, data sheets provided by our sponsor, and reports published by the Center of Health Information and Analysis (CHIA). Collection and analysis of data aided in formulating conclusions regarding FED feasibility [41]. Data such as average patient wait times, patient chief complaints, patient discharge times, ED staffing, services provided, and number of admitted patients helped determine the need for an FED. The data obtained strongly supported the conclusions regarding this project, which are outlined in the conclusions and recommendations section. Despite being logistically relevant to the project, a limitation of using these publications is missing or yet-to-be published data. The team worked with data ranging from 2008 to 2015. This means that recent hospital revenue data was not yet available to the public and therefore or the team.

3.2.5 Ethnography

Ethnography is the observation of people in their natural environment [41]. The team toured Clinton Hospital's ED in order to understand how an ED operates. By observing the

working environment and dynamics of Clinton Hospital, our group gained a general understanding of the triage process, treatment, and discharge system. Understanding how an ED operates was vital to our project. With this study, we intended to avoid introducing any changes that would disrupt and hinder this work system. Any viable FED model must maintain this professional working environment and dynamic.

Due to HIPAA limitations, our team was not able to observe these processes in action, which led to only a limited understanding of the processes, and therefore limited conclusions we can make. Furthermore, the hospital staff knew that the team was observing them, which may have provoked the observer effect. The observer effect is when an individual changes their normal behavior in response to being watched. As a result, this may have altered their explanations of normal operating procedures.

3.2.6 Case Studies

Case studies were used to systematically investigate a set of events or scenarios. Case studies provide a deep understanding for people, organizations, phenomena, processes, etc. [41]. By using case studies, our team developed a better understanding of how EDs operate and what was necessary to make the FED successful. The downfall of case studies includes lack of personal experience. Without actually experiencing the events, we cannot get a personal, well-rounded understanding of what is happening with each case.

Clinton Hospital

Clinton Hospital is a full hospital with an ED in Clinton, MA. Our sponsor mentioned that Clinton Hospital will likely transition into an FED in the near future. For that reason, we investigated potential changes the hospital would need to undergo to become an effective FED. We also considered these changes in our own FED concepts.

North Adams Hospital

North Adams Regional Hospital was converted to an FED in 2014. North Adams served as a template of an FED already operating in MA. Its evaluation was essential to developing strategies for a successful FED in Ware.

UMass Memorial Medical Center (UMMMC)

UMass Memorial Medical Center is the sponsor for this project. If an FED is established in Ware, cooperation between the FED, UMMMC and Wing Hospital in Palmer will be necessary.

The group evaluated how UMMMC ED operates. Through obtained information and basic standards, functions and supplies required to run a full-time ED were determined.

3.3 Business Plan

A business plan was constructed to explore the financial viability of the FED. Several templates for the business plan were assessed and the template that follows was determined to be best suited for this project. Components of this business plan include an executive summary, company summary, services, market analysis summary, management summary, and a financial plan.

3.3.1 Executive Summary

The executive summary included a list of the major objectives for the FED. The long-term mission of the facility is described and a brief plan to carry out such a mission was put forth. Major aspects that would contribute to the success of the FED were also discussed.

3.3.2 Company Summary

The two possibilities for the location of an FED are described. The primary option for the FED is the construction of a brand new facility located in Ware. Converting the existing Mary Lane Outpatient Center is a secondary option. Baystate Mary Lane Outpatient Facility could potentially participate in a conversion to an FED, utilizing an already-existing facility. Due to the sensitive political nature of Mary Lane Hospital, the second option is less likely (Dr. O'Neill email correspondence, November 2016). In both cases, UMMMC would be the owner and operator of the facility. Table12 in Conclusions and Recommendations, Chapter 5 summarizes start-up costs.

3.3.3 Services

This section of the business plan discussed the services that will be offered at the FED. These services include cardiac, stroke and trauma care, imaging and lab, and care for general medical emergencies. This section explained in depth the scope of practice of the facility and the type of emergencies that can be seen and treated. It also serves as a guide for EMS personnel, which allows them to choose the right facility depending on the patient's condition.

3.3.4 Market Analysis Summary

A market analysis summary presents potential patient volume and competition that the facility could be faced with. A strategy depicting the competitive edge that can be imployed by the facility is provided. Accessibility and potential community programs provided by the FED are also proposed.

3.3.5 Management Summary

The management summary presents the staffing needs to safely and efficiently operate the FED. A breakdown of physician, nursing, technical support, facilities support, and administrative staff is presented in the results section. Alongside this breakdown, a projected financial commitment necessary to maintain the proper number of required staff follows.

3.3.6 Financial Plan

The last section of the business plan presented the financial strategy for the facility. Financial feasibility was determined by analyzing the cost of an adequate size building, the cost of the professional teams, the cost of the permits, and the cost of resources needed to equip the FED. These resources included cost of equipment, clinical staff such as doctors and nurses, and administrative staff. First, the team utilized American College of Emergency Physicians' (ACEP's) emergency department planning and resource guidelines to establish administrative needs, staffing needs, facility, equipment and supplies (ACEP, 2014). This document helped the team define the needs of the facility in order to accurately project costs and profit.

The team then utilized a case study conducted by the North Carolina Rural Health Research Program (NCRHRP) to estimate a preliminary cost for the FED (Williams, 2015). The case study presented a model for a low, medium and high volume FED and established some general characteristics. These characteristics included size, number of beds, yearly visit capacity, staffing needs, and total operating cost. Accompanying the case study, NCRHRP constructed a computational worksheet that calculates initial building costs, equipment costs, and staffing costs. This worksheet assessed the cost based on the FED's size and location, thus allowing the team to evaluate cost specifically for Massachusetts. Lastly, the worksheet calculated the expected revenue and operational costs for the first five years following the establishment of the FED. Together, these elements determined the financial viability of the FED and whether or not the facility was financially feasible for UMMMC.

3.4 Deliverables

The conclusion of this project is an evaluation that demonstrates the feasibility of the FED. The report also determined the financial feasibility by proposing a business plan for the FED. The results of this project include, but are not limited to, general patient satisfaction with emergency care, the level of need in rural areas, possible locations for the FED, rough estimates of the size,

cost and capabilities of the FED, educational flyers for major stakeholders, and several FED designs. Overall, this report determined how beneficial an FED will be in a rural setting.

Chapter 4. Data and Analysis

4.1 Identifying Stakeholders and Their Needs

By studying the three emergency departments mentioned in the literature review and assessing staff and patient opinions and needs through surveys, the team was able to properly identify key stakeholders that are crucial to the success of an FED in Ware. The stakeholders identified were ED staff (physicians, nurses, etc.), ambulance services (EMS) from Ware and surrounding communities, residents of Ware and surrounding communities, local and state officials, and UMMMC management staff. Relevant data analysis of surveys conducted, hospital concept models and a business plan outline for a potential FED in Ware are the main deliverables of this project.

Data sheets provided by the project sponsor allowed the team to evaluate the needs of the communities impacted by this project. These data sheets include the number of patients that utilized a variety of different services at Mary Lane Outpatient Center. These services include but are not limited to ED visits, number of patients placed in 24-hour observation rooms, deliveries, lab tests, radiology procedures, and physical therapy visits (see Table 5). By evaluating the number of patients that utilize these services, several FED concept models were drafted and presented to the project sponsor.

4.1.1 Evaluating the Opinions of Hospital Staff

A vital component of studying the feasibility of establishing an FED was determined to be the evaluation of the opinions of hospital staff at UMMMC and Mary Lane. Due to HIPAA restrictions, it was not possible to interview/survey hospital staff from local hospitals. Table 6 shows the results of a survey conducted through a Facebook page dedicated solely to ED staff from all over the United States. By using this Facebook page, the team avoided breaking any HIPAA regulations because no personal identifying information such as the participant's name or place of employment were collected. The staff were asked about their current working conditions, ED overcrowding, their familiarity with FEDs, whether or not they believe FEDs can provide access to rural areas, prolonged scene of injury/illness to hospital times (transport time), and finally given a chance to express their opinions regarding FEDs and the level of care they believe can be provided by them. The specific questions asked are listed below, and the results are summarized in Table 6. Each question corresponds to its respective number on the table. A total of 180 participants took the survey. It is important to note that those who answered “no” to Question 6

did not necessarily answer "no" to Question 7. Participants were given the ACEP description of FEDs if they were not familiar with them.

List of Questions for Hospital Staff Survey

1. I often treat patients who can be treated at their Primary Care Physician or Urgent Care Center
2. Emergency departments today have become overcrowded
3. Increased transport time for rural patients puts them at a greater risk than any other patient group
4. Increased patient load decreases the overall quality of care provided to patients, particularly those of lower acuity
5. Overcrowding sometimes negatively affects my performance in the workplace
6. Are you familiar with the concept of a Freestanding Emergency Department (FED)? If not, please read the description of FEDs provided below
7. Freestanding emergency departments can potentially decrease the risk of death for rural high-acuity patients (e.g. major trauma, cardiac arrest, etc.)

Table 6: Emergency Department Staff Survey Results

Participants Overview	**Percent Participant (%)**				
Role	ED Nurse 96.1	ED Tech 1.7	ED Physician 1.7	ICU Nurse 0.6	
Hospital Level	Level 1 Center 5	Level 2 Center 28.9	Level 3 Center 22.8	Level 4 Center 9.4	None 33.9
Hospital Environment	Community Hospital 64.2	Teaching Hospital 26.8	Non-Teaching Hospital 6.7	Other 2.2	
Hospital Location	Rural 33.5	Urban 25.1	Suburban 37.4	Large City 3.9	
Nursing-Specific Questions (#)	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1	4.4	0	1.1	18.9	75.6
2	4.4	0	4.4	27.2	63.9
3	3.9	5	27.8	38.4	24.4
4	0.6	5.6	5	43.3	45.6
5	0.6	6.7	3.9	43.3	45.6
FED-Specific Questions	**Yes**	**No**			
6	81.7	18.3			
	Strongly Disagree (%)	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
7	0	1.1	16.1	65.6	17.2

The emergency department staff survey yielded insightful results and patterns. The survey also allowed the team to evaluate the concerns of staff regarding patient care procedures at the FED. 94.5% of our participants agree or strongly agree that their patients could be treated at their primary care physician or urgent care center. However, as previously seen, the number of yearly ED visits is significant and the need for emergency services in Ware and surrounding communities is evident. Although the majority of these patients can be treated by their primary care doctors, patients continue to utilize EDs. Thus, if Mary Lane Outpatient Center is to close, patients will seek care at already overcrowded metropolitan EDs. The establishment of an FED in Ware can provide access to less acute patients who currently utilize EDs, thereby reducing overcrowding in metropolitan EDs.

ED staff were also asked about the establishment of FEDs in rural communities and their effectiveness in providing care to rural patients. 62.8% of the participants agree or strongly agree that increased transport times put critical rural patients at greater risk than any other patient group (Question 3). Surprisingly, the 62.8% of participants that agree or strongly agree with Question 3 were predominantly from large city trauma centers while the majority of the rural staff said they disagree or strongly disagree with Question 3. The team believes that this is due to the fact that rural nurses do not experience the consequences of long transport time since their hospital is already located in a rural setting. Meanwhile, large city hospital nurses experience the consequences of prolonged transport times for rural patients. This demonstrated the need for a facility that can at least stabilize and prepare to transport a critical rural patient to an acute care facility. Lastly, 82.8% of the participants agree or strongly agree that since an FED's scope of practice is exactly analogous to that of full EDs, they can help provide care to rural patients. Additionally, they can stabilize critical patients for a safer transport to a trauma center.

FED-hospital affiliation was amongst the most important concerns for ED staff. Many participants stated that FEDs are more effective when linked to a fully equipped, trauma designated/verified hospital. Many also stated that without a hospital affiliation, FEDs may put patients in danger by delaying transfer of care to an acute care facility. Several participants suggested that FEDs must have affiliations with a children's hospital. For this reason, it is imperative that the proposed FED be linked to UMMMC to provide acute care for adults and pediatric patients alike.

Open-ended questions allowed staff to voice their opinions regarding FED limitations, the kinds of services they would like to see incorporated, or their general opinions of FEDs. The team noticed general concerns that were widely observed amongst participants. Many of the surveyed nurses stressed the need for the creation of educational materials to educate patients about proper ED usage and FED capabilities (i.e., which medical emergencies can be handled at the ED, FED, urgent care, or a primary care physician). Many nurses also expressed concerns about payment and insurance reimbursements at an FED.

Many staff expressed great concern over private entities or personnel operating FEDs. When FEDs are owned and operated by a private entity, they are not required to accept Medicare and Medicaid patients. As a result, these private FEDs can turn away patients (like urgent care centers) if they cannot pay. In this situation, FEDs are not effective, as a predominate portion of the Ware population is on Medicare. However, the proposed FED will be part of UMMMC; therefore, it is mandated to accept Medicare/Medicaid patients and those who cannot pay per its contract with the Center of Medicare and Medicaid Services (CMS). Insurances accepted will be highlighted on patient educational materials to help guide patients.

A unique outcome of this survey was allowing the team to analyze the staff's knowledge of FEDs and their operation. While many comments addressed patient educational materials, those that answered "no" to Question 6 (see Table 6) did not address the issue of staff educational materials regarding FED operations. 81.7% of our participants said they are familiar with FEDs. Further analysis of individual surveys suggests that staff may have some misconceptions regarding FEDs. These misconceptions mainly appear when differentiating between FEDs and urgent care centers, insurance reimbursements, and transfer agreements with high acuity hospitals. For this reason, the team proposed the creation of educational materials for staff to address any of these misconceptions.

After analyzing the results of the initial emergency department staff survey, the team attempted to duplicate these results for validation. By getting a larger participant pool, the team hoped to minimize the effects of outliers and biased opinions. Another ED staff page on Facebook was the target audience and the survey was posted on that page. The survey posted to the second page was identical to the initial survey. A total of 114 participants took the survey. The results of the second ED staff survey are shown in Table 7. The numbers in Table 7 correspond to the same questions as the previous ED staff survey.

Table 7: Emergency Department Staff - Second Survey Results

Participants Overview	**Percent Participant (%)**				
Role	ED Nurse 89.5	ED Tech 7	ED Physician 0.9	ICU Nurse 0.9	Paramedic 1.8
Hospital Level	Level 1 Center 16.8	Level 2 Center 21.2	Level 3 Center 8.8	Level 4 Center 11.5	None 41.6
Hospital Environment	Community Hospital 43	Teaching Hospital 36	Non-Teaching Hospital 16.7	Other 4.4	
Hospital Location	Rural 22.8	Urban 39.5	Suburban 27.2	Large City 10.5	
Nursing-Specific Questions (#)	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1	11.4	0.9	0.9	26.3	60.5
2	10.5	0.9	2.6	21.1	64.9
3	0	4.4	21.1	57.9	16.7
4	0.9	1.8	2.6	38.6	56.1
5	0	6.1	5.3	41.2	47.4
FED-Specific Questions	**Yes**	**No**			
6	71.9	38.1			
	Strongly Disagree (%)	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
7	0	7.1	15.9	57.5	19.5

As the team had hoped, the results of the second survey were consistent with the first. Over 70% of the participants agreed or strongly agreed with each of the Statements 1-5 and 7. Like the previous survey, participants had the opportunity to express opinions and general thoughts regarding FEDs. Generally, participants agreed that timely service, quick stabilization of patients, and easy access were some positive aspects of FEDs. One of the participants commented that if staffed correctly and affiliated with a parent hospital, FEDs have great potential to provide quick and quality care to rural patients, as well as decrease overcrowding in metropolitan EDs. One of the participants stated: “I think if placed appropriately they can relieve some of the burden of traditional ED's. If staffed appropriately they can provide excellent, timely care.” The importance of location was emphasized multiple times, as it can greatly affect the success of the facility. Ware, MA is the ideal location for an FED in west central MA as it is situated between three major hospitals - Wing Hospital in Palmer, Baystate Medical Center in Springfield and UMMMC in

Worcester. *Establishing the FED in Ware means patients across 17 towns in the current Mary Lane service area will have significantly reduced travel time to receive the care they need.*

Some of the concerns expressed in the survey include the need to transfer critical patients to parent hospitals and the type of insurances accepted at these facilities. Private FEDs have the right to require payment upfront if the patient cannot pay or if their insurance refuses to cover the services provided. Meanwhile, FEDs associated with parent hospitals generally follow the insurance policies of that hospital. In a middle-class dominated region like west central MA, acceptance of medical insurance, especially Medicare and Medicaid, as a form of payment is important to the success of the FED. The proposed FED will be affiliated with UMMMC; therefore, the facility will accept Medicare, Medicaid, and all major private insurances.

A potential unexpected outcome revealed by this survey is the possibility of reducing metropolitan ED overcrowding by utilizing FEDs in rural communities. ED overcrowding was an issue known to the team from the beginning, but its impact on staff was not known. *After reviewing the results of the survey, reducing metropolitan ED utilization became a secondary benefit of FED establishment in Ware.* Questions 2, 4, and 5 were used to assess how ED staff feel about how overcrowding affects their work environment. 91.1% of the participants feel that EDs today are overcrowded. 88.9% believe that overcrowding decreased the level of care given to patients, especially those of low acuity. Finally, 88.9% believe that overcrowding negatively affects their performance.

4.1.2 Evaluating the Opinions of Emergency Medical Services

In addition to the Emergency Room staff survey, the team conducted a survey focused only on Emergency Medical Services (EMS) professionals (i.e. EMTs and Paramedics). Like the previous one, this survey focused on specific questions and statements, including an open-ended question at the end where participants could express further opinions or concern regarding FEDs or the project. The questions asked in the survey are listed below and referred to in the results in Table 8 with their respective number. A total of 80 individuals took the survey.

List of Questions for Emergency Medical Services Survey

1. I often transport patients who can be treated at their PCP or Urgent Care Center.
2. At handoff, the staff (either doctors or nurses) seem busy.
3. Emergency departments today have become overcrowded.
4. I often wish I had a nearby trauma center to stabilize my critical patient before transporting to a high acuity hospital.
5. Increased transport time for rural patients puts them at a greater risk than any other patient group.
6. Are you familiar with the concept of a Freestanding Emergency Department (FED)?
7. Freestanding emergency departments can potentially decrease the risk of death for rural high-acuity patients (e.g. major trauma, cardiac arrest, etc.).
8. A freestanding emergency department can provide quick, quality care for rural patients.

Table 8: EMS Survey Results - EMTs/Paramedics

Participants Overview	**Percent Participant (%)**				
Role	EMT 20.5	AEMT 3.6	Paramedic 69.9	Other 6	
Service Location	USA 89.2	Germany 2.4	Canada 2.4	India 1.2	Other 4.8
Service Type	Strictly 911 43.4	911 & Transport 50.6	Strictly Transport 0	Specialty Transport 1.2	Other 4.8
EMS Location	Rural 59	Urban 7.2	Suburban 13.3	Large City 16.9	Other 3.6
EMS Service Base	Private Company 41.5	Fire Department 25.6	Hospital Based 17.1	Other 15.9	
EMS-Specific Questions (#)	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1	6.5	6.5	10.4	37.7	40.3
2	1.3	13.8	17.5	37.5	32.5
3	2.4	2.4	18.3	25.7	51.2
4	23.2	7.3	26.8	24.4	22
5	3.6	4.8	21.7	45.8	27.7
FED-Specific Questions (#)	**Yes**	**No**			
6	41.5	58.5			
	Strongly Disagree (%)	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
7	3.6	4.8	21.7	43.4	30.1
8	7.3	6.1	24.4	47.6	18.3

The results of the EMS survey were quite consistent with the results from the ED staff surveys. The claim that patients often utilize emergency departments for conditions that could be treated by their primary care physician or an Urgent Care Center was supported again, with 78% of the participants agreeing or strongly agreeing with Statement 1. Likewise, 70% of the participants agreed that during handoff, ED staff seem busy and 76.9% agreed that EDs have become overcrowded. These results support the idea of a Freestanding Emergency Department from an EMS point of view. Establishing an FED could potentially drive rural patients of low acuity away from metropolitan EDs, decreasing the workload on ED staff.

Approximately 50% of the participants agreed that having a trauma center nearby to stabilize a patient would be beneficial to the patient, while 73.5% agreed that long transportation times put rural patients at a greater risk compared to other patient groups. Despite the fact that not all participants work in rural areas, the results still favor the establishment of a trauma-designated FED in rural areas. In case of emergencies, rural patients have to travel significantly longer than any other patient group to receive essential medical care.

Establishing an FED would cut down transport times significantly, preventing a patient's condition from worsening, as well as providing the quick and adequate medical care every patient deserves. In fact, 73.5% of EMS participants agreed that FEDs can potentially decrease the risk of death for rural high-acuity patients, and 65.9% agreed that FEDs can provide quick, quality care to rural patients. These results are analogous to the previous survey, further supporting the establishment of an FED in rural areas as beneficial for the community and its people.

Once again, the team aspired to survey a greater number of EMS professionals for further validation. A larger participant pool meant the team could minimize the effects of outliers and biased opinions. Unlike the previous EMS survey, the new survey was posted on a page only for Massachusetts EMTs and paramedics. This allowed the team to determine the impact of FEDs specifically on Massachusetts EMS professionals. A total of 90 participants took the survey. The results of the second EMS survey are shown in Table 9. The numbers in Table 9 correspond to the same questions as the previous EMS survey.

Table 9: Massachusetts EMS Professionals - Second Survey Results

Participants Overview	**Percent Participant (%)**				
Role	EMT 70	AEMT 1.1	Paramedic 28.9		
Service Type	Strictly 911 25.6	911 & Transport 72.2	Strictly Transport 2.2		
EMS Location	Rural 5.6	Urban 13.3	Suburban 36.7	Large City 5.6	Other 38.9
EMS Service Base	Private Company 73.3	Fire Department 20	Hospital Based 0	Other 6.7	
EMS-Specific Questions (#)	**Strongly Disagree (%)**	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
1	1.1	1.1	45.6	32.2	20
2	0	2.2	5.6	36.7	55.6
3	0	0	7.8	21.1	71.1
4	2.2	6.7	58.4	28.1	4.5
5	1.1	7.8	3.3	38.9	48.9
FED-Specific Questions (#)	**Yes**	**No**			
6	55.6	44.4			
	Strongly Disagree (%)	**Disagree (%)**	**Neutral (%)**	**Agree (%)**	**Strongly Agree (%)**
7	0	2.2	8.9	40	48.9
8	0	1.1	5.6	42.2	51.1

The first noticeable difference from the previous EMS survey is that 70% of participants are EMTs, 1.1% are AEMTs, and 28.9% were paramedics. The previous EMS survey had a larger number of paramedics and a smaller number of EMTs. However, these differences did not affect the survey results. On the contrary, similar conclusions can be reached from the MA EMS survey. The survey showed that MA EMS professionals largely agree that FEDs are a great alternative for rural patients.

4.1.3 Evaluating the Opinion of Ware EMS

The Ware Fire Department (WFD) is responsible for providing fire and emergency medical services for the ~10,000 residents of Ware. In addition to servicing Ware, WFD provides emergency medical services to neighboring towns (termed mutual aid). Figure 16 shows the number of medical calls handled by the department in 2014 and 2015. Basic Life Support (BLS) calls are emergencies that are not serious and do not require many resources or personnel with higher level training. Advanced Life Support (ALS) calls are emergencies that are serious and

require many resources and personnel with higher level training. Intercept calls are mutual aid calls to other towns where Ware Paramedics provided medical services to support neighboring towns. Overall the total number of calls in 2014 and 2015 were 1594 and 1741, respectively.

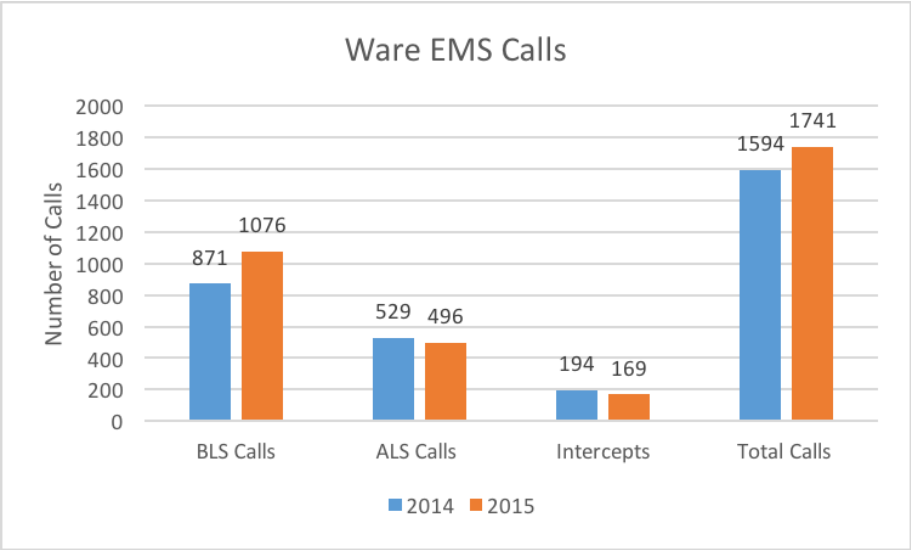

Figure 16: Ware EMS - Total Number of Calls

Given the high call volume handled by WFD and its 16 paramedics, a successful FED must take into account the opinions of the paramedics. For this reason, the team designed a survey specifically for Ware paramedics. The survey was shared with WFD Chief Thomas Coulombe and he distributed the survey via email to his paramedics. The survey received 14 responses from a total of 16 paramedics. Table 10 shows the results of the survey. Participants were given the ACEP description of FEDs if they were not familiar with them.

List of Questions for Ware Emergency Medical Services Survey

1. Increased patient load decreases the overall quality of care provided to patients, particularly those of lower acuity.
2. Ware paramedics often need to transport patients requiring admission from Mary Lane Outpatient Center to higher acuity facilities.
3. The closure of Mary Lane Hospital inpatient department increased Ware EMS workload.
4. The closure of Mary Lane Hospital inpatient department negatively impacts my performance.
5. The conversion of Mary Lane Hospital to an Outpatient Center is beneficial for Ware and the surrounding communities.
6. Increased transport time for rural patients puts them at a greater risk than any other patient group.
7. The conversion of Mary Lane Hospital (MLH) to an outpatient center has forced Ware EMS to bypass MLH for a trauma center.

8. How often do your patients report seeing another practitioner (PCP, Urgent Care, another ED, etc.) for the same problem you are transporting them to the hospital for?
9. Are you familiar with the concept of a Freestanding Emergency Department?
10. A freestanding emergency department can provide quick, quality care for rural patients.
11. Freestanding emergency departments can potentially decrease the risk of death for rural high-acuity patients (e.g. major trauma, cardiac arrest, etc.).

Table 10: Ware EMS Survey Results

	Percent Participant (%)				
EMS-Specific Questions (#)	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	0	14.3	42.9	28.6	14.3
2	0	7.1	14.3	64.3	14.3
3	7.1	0	7.1	35.7	50.0
4	14.3	35.7	35.7	14.3	0
5	64.3	28.6	0	7.1	0
6	0	7.1	14.3	57.1	21.4
	Yes	**No**	**No, MLH always had to be bypassed, even before conversion**		
7	14.3	21.4	64.3		
	Always	**Often**	**Sometimes**	**Rarely**	**Never**
8	0	21.4	64.3	14.3	0
FED-Specific Questions	**Yes**	**No**			
9	35.7	64.3			
	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
10	0	0	35.7	50.0	14.3
11	0	0	57.1	35.7	7.1

The survey revealed that post-closure of Mary Lane inpatient facility, the workload on Ware EMS increased. 78.6% and 85.7% of participants either agreed or strongly agreed with Statements 2 and 3, respectively. However, although many of the participants believe that their workload increased, 50% disagree or strongly disagree that the increased workload negatively affects their job performance (Statement 4). Furthermore, the paramedics believe that the conversion was not beneficial for Ware and surrounding communities with 92.9% of participants disagreeing or strongly disagreeing with Statement 5.

The survey also assessed the paramedics' knowledge of FEDs and their opinions of an FED in Ware. Only 35.7% of our participants were familiar with the concept of an FED while the

remainder (64.3%) was not. The lack of familiarity with FEDs within the department stressed the need for EMS education materials. Educational materials will help provide a clear outline of which patients can be treated at an FED and which require a full hospital. Participants were given the ACEP definition of an FED and then were asked to answer Statements 10 and 11. Although many Ware paramedics are not familiar with the concept of an FED, 64.3% and 42.8% agree or strongly agree with Statements 10 and 11, respectively. While 64.3% of participants believe that an FED can provide appropriate care to rural patients (Statement 10), only 42.8% believe an FED is effective in severe medical emergencies (Statement 11).

Paramedics were also given a chance to express their opinions in an open-ended format. The paramedics expressed concerns regarding transporting patients, increased patient expenses, and overcrowding at neighboring EDs. The biggest concern expressed by many paramedics is pulling Ware EMS ambulances out of service for transfers from Mary Lane Outpatient Center to a hospital where the patient can be admitted. By pulling an ambulance out of service to do a transfer, there are fewer resources available to the residents of Ware and surrounding communities. This can cause a potentially dangerous situation which is the main concern for many of our participants. *For this reason, any feasible FED model in Ware must have the capability to appropriately transfer patients without creating pressure for Ware EMS.*

Reducing stress on Ware EMS can be established through various methods. The first is contracting an ambulance transport company to handle transfers. This requires contract agreements that could cost the FED much more than it can afford. The second is for the FED to buy and operate a transfer ambulance. This option adds to the initial startup cost of the FED but could save money in the long run. The financial feasibility of both options will be explored in the business plan.

4.2 Analyzing Patient Opinions from Communities Demographically Similar to Ware

Perhaps the most important aspect of the team's research was targeting communities from areas that were of similar financial, geographic, and demographic status as Ware. Tier 1 and 2 towns, such as Palmer, Belchertown, Warren, North Brookfield, and Brimfield were asked to participate in surveys specifically made for them. Towns geographically distinct from Ware but financially and medically in similar situations, such as North Adams (and surrounding towns) and Clinton (and surrounding towns) were also targeted. By looking at areas in similar situations as Ware, the team was able to compare the success of the FED in North Adams to the potential success of an FED in Ware. Furthermore, by looking at Clinton Hospital, the team analyzed the

hospital's potential to convert to an FED and looked at factors that hospital officials are considering with regards to keeping the inpatient department at that hospital open. Surveys specific to these regions were put together by the group. For each of the areas of focus, the surveys were distributed by asking local Facebook page administrators to post the surveys on their respective pages so their members could take them. In some cases, the team was able to post the surveys to the page directly. A total of 127 patients took the survey from 26 towns. The total number of participants from each town is shown in Figure 17.

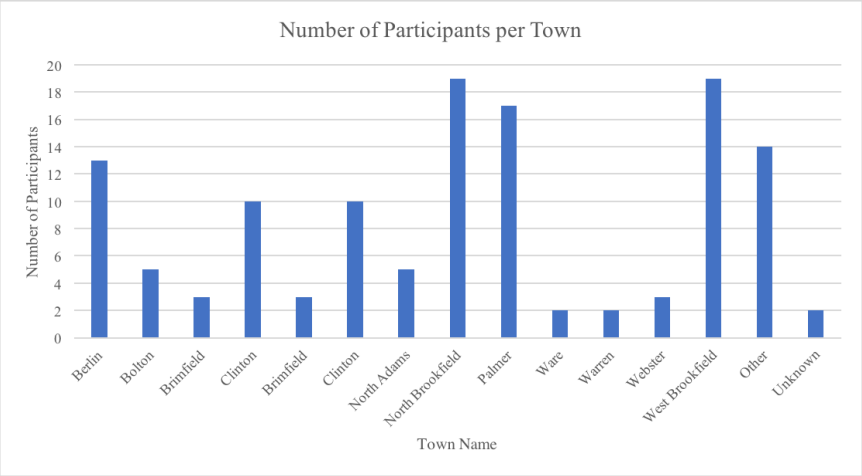

Figure 17: Number of Participants per Town

The largest number of participants originated from Berlin, Clinton, Leicester, Palmer, and North/West Brookfield. The most significant surveys originated from Tier 1 and 2 towns, such as Palmer and North/West Brookfield. Surveys originating from towns of similar economic status as Ware and with similar health needs, such as Clinton and North Adams, also contributed to the opinions gathered from our research. The main results of all of the surveys conducted are depicted in the preceding sections.

A total of three separate surveys were conducted for North Adams and surrounding communities, Clinton and surrounding communities, and Ware and surrounding communities. Each town had slightly different surveys depending on geographical location, the hospitals in the area, and specific opinions regarding services provided at local hospitals. Although the surveys were slightly different, a lot of questions were similar throughout. Table 11 shows the aggregated data from all surveys for common questions throughout. Hospital and geographically dependent questions will be discussed in their respective sections. It is also important to note that some of the patient survey questions were similar to the questions presented ED staff and EMS professionals surveys. These questions were important to gain an understanding of patient perspective.

List of Questions for All Patient Surveys

1. Type of insurance utilized
2. Were you seen at another facility for the same complaint prior to coming to the Emergency Department?
3. How long did you wait in the waiting room?
4. Did the ER staff, including your doctor, seem busy?
5. How satisfied were you with the overall experience?
6. In the past year, how many times have you been to the Emergency Department?
7. What do you consider a reasonable waiting time at your local Emergency Department?
8. Have you ever been hospitalized (admitted)?
9. Have you ever visited an Urgent Care Center?
10. How satisfied were you with your Urgent Care Center visit?
11. Would you visit an Urgent Care Center again?
12. Are you familiar with the concept of a Freestanding Emergency Department (aka Satellite Emergency Facility)?

Table 11: Patient Survey Results - Aggregated Data from All Patient Surveys

Participants Overview	**Percent Participant (%)** *Primary Care Physician				
1	**Private** 71.0	**Medicare** 15.9	**Medicaid** 6.5	**Other** 6.6	
2	**No** 67.3	**UCC** 7.5	**PCP*** 8.4	**Retail** 0.9	**Another ED** 15.9
3	**0-30 Mins** 71.9	**30-60 Mins** 8.3	**1-2 Hours** 4.2	**2-3 Hours** 1	**> 3 Hours** 3.1
4	**Yes** 38.5	**No** 61.5			
5	**1** 5.2	**2** 3.1	**3** 9.4	**4** 12.5	**5** 69.8
6	**1 - 3** 95.9	**4 - 7** 3.1	**8 - 11** 1	**12 - 15** 0	**15+** 0
7	**0 - 15 Mins** 10.3	**15 - 30 Mins** 59.8	**30 - 45 Mins** 5.2	**45 - 60 Mins** 2.1	**Based on emergency** 22.7
8	**Yes** 61.9	**No** 38.1			
9	**Yes** 42.1	**No** 57.9			
10	**1** 0	**2** 2.5	**3** 22.5	**4** 32.5	**5** 42.5
11	**Yes** 73.2	**No** 0	**Maybe** 26.8		
12	**Yes** 78.4	**No** 18.6	**Not Sure** 3.1		

As depicted in the results on Table 11, 71% of the participants had private insurance and 22.4% had Medicare or Medicaid. Most patients seemed to have had good experiences while visiting the respective hospitals. 71.9% of patients experienced wait times of 0-30 minutes with

few (8.3%) waiting longer than 1 hour. Over 80% of the participants were either satisfied (4) or very satisfied (5) with the treatment and care they received (Statement 5). The team believes that the high satisfaction level was largely due to short wait times. For that reason, an FED in Ware must strive to keep its wait times short in order to build trust and satisfaction amongst its patients and attract new ones.

When asked about the specific nature of their emergency, 16.8% of participants said they were seen at either their primary care physician, urgent care center, or retail clinic before visiting the ED for the same problem. 15.9% of participants reported being seen at another ED for the same emergency. In total, 32.7% of participants were seen at another facility before going back to the ED for a second time for the same medical emergency (Statement 2). Following the results of Statement 2, the team analyzed responses to Statement 6 to understand how many times our participants utilized the ED.

Furthermore, participants were given a list of emergency departments and asked to select all of the hospital EDs they utilized within the last 12 months. Although 95.9% of participants reported visiting the ED 1 to 3 times in the last 12 months, further analysis of individual surveys show that on average, these patients utilized the ED at least twice in the last 12 months. This was determined by looking at which hospitals these patients utilized in the last year. Over 30% of participants selected two EDs and approximately 15% selected three EDs. As expected, patients reported going to their community hospital (e.g. Mary Lane Outpatient Center) before making the drive to a distant metropolitan ED.

Patients were also asked if they have ever been hospitalized. 61.9% of patients reported being hospitalized at their community hospital. Given the significant number of hospital admissions, the team decided that any feasible FED model in Ware must contain two vital features. First, the FED must be able to hold up to two patients in a 24-hour observation room to help reduce the number of patients that need to be admitted. Secondly, it must either establish transport agreements with local ambulance services to take patients to the parent hospital or provide transportation via an FED operated ambulance.

Patients were also asked about their experience with UCCs. Over 90% of the 42.1% of the patients that utilized UCCs in the past rated their experience a 3 (neutral) and above on their level of satisfaction with the treatment and care they received. Additionally, 73.2% of the participants stated that they would visit a UCC again if need be. The participants seemed satisfied with the

medical services that they received, be it from a local hospital or a UCC, suggesting that any future changes regarding the availability of these services would have a negative impact on the overall satisfaction of local patients.

Lastly, patients were asked if they are familiar with the concept of FEDs. 78.4% answered "yes." Patients were given a follow-up question asking them to state what comes to mind when they hear the term "Freestanding Emergency Department". Some of the responses received from the 78.4% that said they were familiar with FEDs include, "triage", "Easy alternative to urgent care" and "Complex urgent care." The comments received from this question suggest that although some patients may be familiar with the concept, patient educational materials are necessary to clear up any misconceptions and draw a clear line between EDs, FEDs, and UCCs.

4.2.1 North Adams Regional Hospital Patient Survey

Amongst the general questions asked, such as type of insurance, average wait times and satisfaction levels with UCCs, the team focused on more specific questions aimed at gathering public opinion about the conversion of North Adams Medical Center to a satellite emergency facility. The specific questions are listed below; Question one was the question of focus in the North Adams survey. Question two aimed to gather public opinion about other health services they would like implemented in the community. A total of nine participants completed this survey.

List of Questions for North Adams and Surrounding Communities Patient Survey

1. In your opinion, if North Adams Medical Center was not converted to a Satellite Emergency Facility and instead was shut down, what would the impact on you and/or the community?
2. What additional medical services would you like to see implemented in your community? (These can be healthcare services, community programs relating to public health, or any other health needs you think would benefit the community)

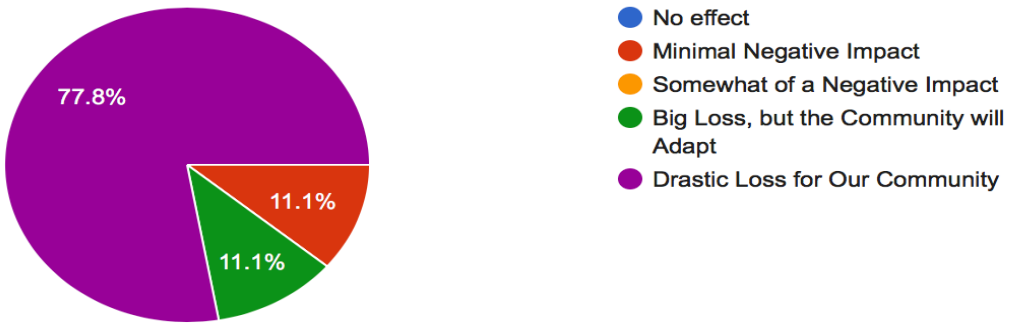

Figure 18: Impact of Closing North Adams Medical Center

Overall, all of the participants agreed that if North Adams Medical Center was to be shut down, it would have a negative impact on the community. As seen in Figure 18, none of the participants believe that the closure of North Adams Medical Center was going to be beneficial to the community. 77.8% (7/9) of participants believe that the closure would have been a drastic loss, with one participant (11.1%) saying the community would have adapted. Only one participant believes the closure would have had only a minimal negative affect.

All of the participants commented on the need for an inpatient department, as many people have to drive long distances in order to be admitted to a hospital. One participant stated that transportation time and cost was highly unfavorable, as this patient needed admission multiple times over the years and has had to pay additional costs for transportation. They stated that the excessive drive is "totally ridiculous, time consuming and, unfortunately, breaking [her] pocketbook." Two of the participants expressed the need for increased primary care physicians available to the community, as one participant had to wait 18 months for an appointment with a specialist.

4.2.2 Clinton Hospital Patient Survey

Much like the North Adams survey, the Clinton Hospital patient survey focused on gathering public opinion in the case of a Clinton Hospital closure. Although the team asked hypothetical questions, the closure of Clinton Hospital has been contemplated many times by UMMMC management. However, a decision was made for Clinton Hospital to remain open due to the significant industrial activities taking place during the morning and afternoon hours. At night, the town has a population of approximately 20,000 people. During business hours, the population in Clinton rises to approximately 40,000 people. Leaving Clinton without access to emergency services was deemed dangerous by UMMMC officials and a decision was made for the ED to remain open for the foreseeable future. However, this does not imply that the inpatient facility is safe. UMMMC is actively considering closing the seven-bed inpatient facility. They hope the closure and conversion to an FED will reduce overhead costs and make Clinton Hospital more financially stable.

Participant origin included Clinton, Boylston, West Boylston, Berlin, and Bolton. A total of 34 participants completed this survey. The two main Questions of focus from the survey are listed below. Figures 19 and 20 show participant answers to Questions 1 and 2, respectively.

List of Questions for Clinton and Surrounding Communities Patient Survey

1. In your opinion, what impact would a complete closure of Clinton Hospital have on you and/or the community?
2. In your opinion, what is the impact if Clinton Hospital was to completely end inpatient services? - meaning they can no longer admit patients

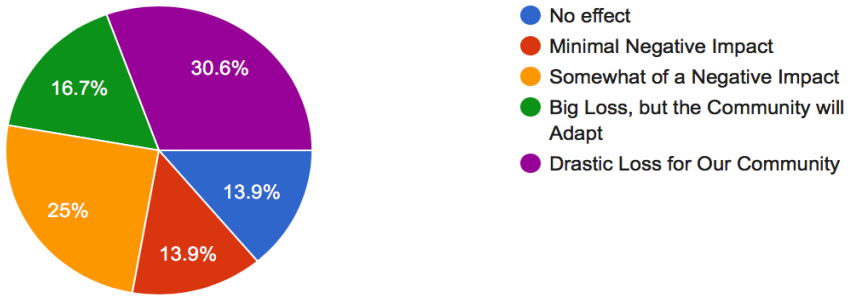

Figure 19: Impact of Completely Closing Clinton Hospital

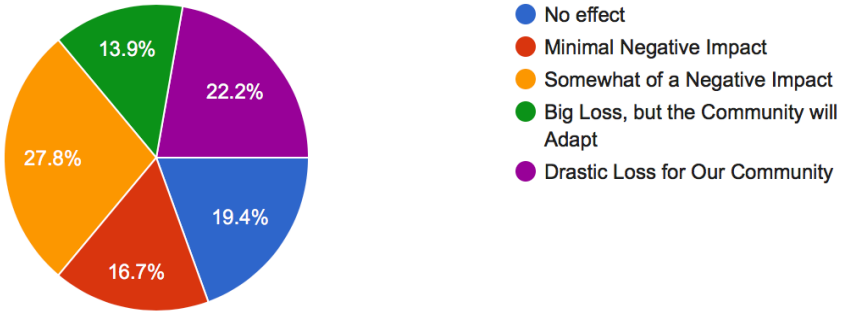

Figure 20: Impact of Terminating Inpatient Services at Clinton Hospital

Over 85% of the participants agreed that a complete closure of Clinton Hospital would have at least somewhat of a negative effect, with 30.6% of the participants agreeing that it would be a drastic loss for the community. 13.9% of the participants agreed that the closure would have no effect. 61.2% of the participants agreed that the closure of the inpatient services of Clinton Hospital would at least have a minimal negative effect on the community, with 22.2% agreeing that it would be a drastic loss and 19.4% who believe it would have no effect. Based on these results, it is clear that closure of the inpatient department or the hospital itself would have an overall negative impact on the community.

4.2.3 Mary Lane Outpatient Center Patient Survey

The Mary Lane survey was the most important survey of this project and the group hoped to gather a sufficient amount of quality answers from as many participants as possible. The group, to the best of their abilities, asked questions that did not influence or disrupt the politically sensitive situation at Mary Lane Outpatient Center. The major questions of focus are listed below. The audience of focus were residents of Ware, Tier 1 and Tier 2 towns. Distributing the survey to Ware residents proved difficult for multiple reasons. First, Ware does not have a public Facebook group the team could have joined. Second, attempts to have Ware Fire Department Chief, Thomas Coulombe, post the survey were met with strong political pressure from Baystate officials to not do so. For that reason, the team posted the survey to Tier 1 and Tier 2 towns Facebook groups hoping some Ware residents will take it. It also allowed the group to gauge the opinions of those most affected by the closure. A total of 97 participants completed the survey. Only 2 of the participants came from Ware. Figures 21 to 24 show the results for each question listed below.

List of Questions for Ware and Surrounding Communities Patient Survey

1. Were you familiar with the decision to end inpatient services (meaning the hospital can no longer admit patients) at Mary Lane Hospital?
2. In your opinion, what was the impact on the community when Mary Lane Hospital completely halted its inpatient services?
3. In your opinion, what impact would a complete closure of Mary Lane Outpatient Center (Emergency Services, blood work, and imaging) have on you and/or the community?
4. If Mary Lane Outpatient Center was to completely close, what would you like to see in its place?

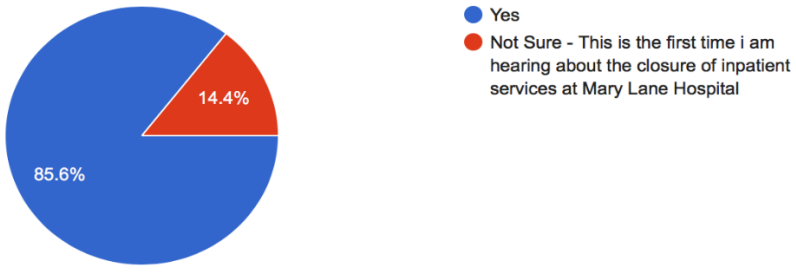

Figure 21: Question 1 - The Decision to End Inpatient Services at Mary Lane

As seen in Figure 21, the majority of our participants were aware of the conversion of Mary Lane Hospital to an Outpatient Facility. However, 14.4% of participants did not know about the

conversion. It was hypothesized that some people were not aware of the conversion; however, a closer inspection of the individual surveys of those 14.4% revealed that more than half of them frequently utilized Mary Lane with some even indicating that they have been hospitalized at Mary Lane pre-conversion. This was an important discovery by the team. Patients who frequently utilized Mary Lane in the past but are not informed about of the conversion are not aware of the services that are no longer available to them and how this would change the way the hospital provides care to them. These statistics further stress the need to educate patients about FEDs and more importantly, make it clear that the hospital they frequently visit can no longer admit them.

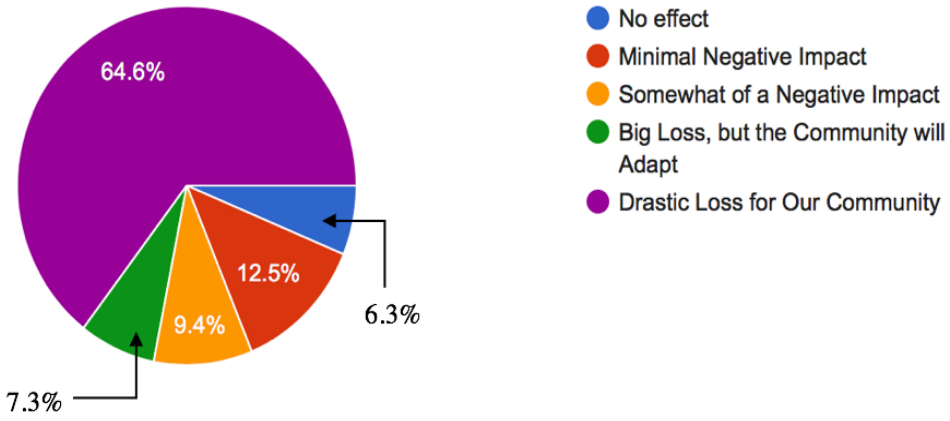

Figure 22: Question 2 - Terminating Inpatient Services at Mary Lane Outpatient Center

To assess the impact of closing the inpatient facility, patients were presented with Question 2 (see Figure 22). Immediately, it became clear that closing inpatient services is detrimental to the community. 64.6% said that suspension of inpatient services is a drastic loss for the community, 29.2% said suspension of inpatient services has near minimal negative effects and 6.3% said it has no negative effect on the community. Further analysis of individual surveys shows that the majority of the 64.6% that said it is a drastic loss for the community were never admitted into Mary Lane Hospital. Comments reveal that patients are worried that by not having inpatient services, the FED is not as capable of taking care of patients. This further stresses the need for patient educational materials to make sure patients completely understand that FED have a very broad scope of practice and provide services analogous to that of full EDs.

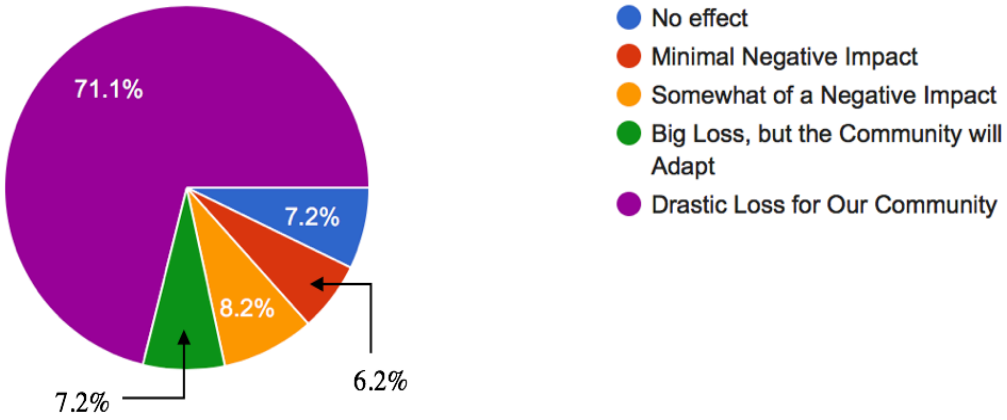

Figure 23: Question 3 - Impact of Completely Closing Mary Lane Outpatient Center

With the threat of Mary Lane Outpatient Center completely closing in two years, the team wanted to study the effect of its complete closure (Figure 23). As expected, the majority (71.1%) of patients indicate that it will be a drastic loss for the community. This is simply due to the strong community presence Mary Lane maintained for so many years. Not only does the outpatient center provide emergency care, it provides access to primary care physicians, specialists, lab work, X-rays, physical therapy, MRI, and community health programs. Taking all of these services away from the town would have adverse side effects.

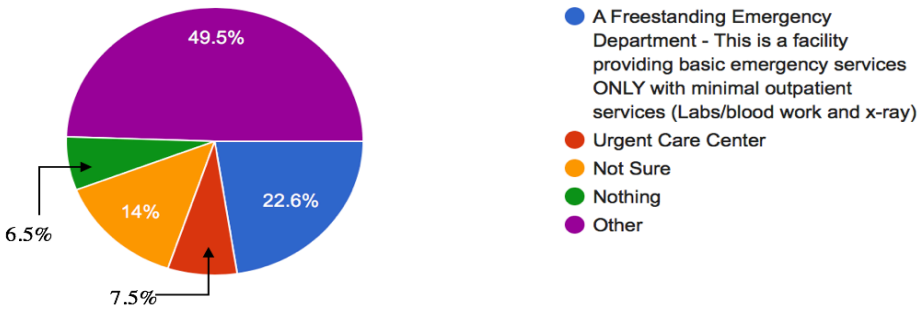

Figure 24: Question 4 - Replacing Baystate Mary Lane Outpatient Center

Lastly, patients were asked what they would like to see replace Mary Lane Outpatient Center after its closure (Figure 24). Understandably, many (49.5%) chose “other” and indicated in the comments section that they would like to have a full hospital. However, considering the number

of inpatients declining in the area, it is not financially feasible for any hospital system to operate a full hospital with such few patient admissions.

4.2.4 Interview with Diane Nichols

The team was able to interview the Director of the North Brookfield Senior Center, Diane Nichols. From this interview, the team was able to gain an understanding regarding the point of view of local seniors and the closure of the Mary Lane Hospital inpatient department. Considering the high senior population in Ware and surrounding towns, fast treatment at a local ED is essential to their wellbeing. The effects of old age unfortunately include frequent medical visits and hospitalization, which Mary Lane Hospital provided for the senior community in that area. The closure of its inpatient department has negatively affected the senior community. In cases of hospitalization, seniors now have to travel long distances to utilize the inpatient services at either Wing Hospital in Palmer or UMMMC in Worcester, both at least a half hour drive from Ware and surrounding towns. Diane stated that a main concern of the senior community is driving, especially in a metropolitan setting, which adds unnecessary stress and puts seniors at greater risk of danger. Diane continuously emphasized the senior community's desire to re-establish inpatient services at Mary Lane Outpatient Center. Furthermore, Diane also emphasized the fact that overall, seniors would prefer to frequent UMMMC for their medical needs rather than any of the Baystate system hospitals. The interview with Diane gave the group a unique point of view regarding the status of Mary Lane Outpatient Center, as often times, the needs of the senior community are underrepresented and overlooked when making financial decisions about hospital status.

Chapter 5. Conclusions and Recommendations

5.1 Conclusions

Taking into account all of the research, survey outcomes, and interview results, the team was able to harvest several important conclusions regarding the necessity and importance of emergency care in Ware and surrounding communities. Convenient and accessible emergency care is of interest to members of all communities. Providing healthcare to individuals in need is a moral obligation of society, regardless of location; ethically every individual should have equivalent access to appropriate emergency care. One of the major points made in the ED staff and EMS surveys is the fact that increased transport time puts critical rural patients at greater risk compared to other patient groups. Most of the participants who agreed with this statement (62.8%) worked in metropolitan EDs, which suggests transport time is of high importance even to those who live close to major EDs.

Considering the high senior population in Ware and surrounding towns, fast treatment administered by a local emergency department is essential to their well-being. Due to the effects of advancing age, geriatric members of the community represent the highest risk, whether they are experiencing an emergency or simply seeking non-urgent medical help. Mary Lane Outpatient Center provides the senior population of Ware and surrounding towns with quick, accessible and convenient care, and its closure would have the most negative impact on the senior population.

Diane Nichols is an active member in the senior community in North Brookfield and surrounding towns. Having followed the recent closing of Mary Lane Hospital and its impact on the senior community, she expressed disappointment of the closure, and desire from the senior community to re-establish the inpatient facility at Mary Lane. During the group's interview with Ms. Nichols, one of the critical points she made was that in cases of hospital admissions, senior residents have to travel long distances to visit their loved ones, mainly to Wing Hospital in Palmer and UMMMC in Worcester. Worse, most fear their loved ones would be admitted at Baystate Medical Center in Springfield. Generally, senior residents avoid driving in crowded city traffic due to safety concerns.

Re-establishing inpatient services in Ware and especially at Mary Lane Outpatient Center is not an easy task. Enormous overhead costs and declining number of patients needing admission means the neither Baystate nor UMMMC can afford to bring inpatient services back. Diane expressed that a UMMMC-run FED is a superior alternative to a Baystate-run FED (i.e. Mary

Lane Outpatient Center). This is simply due to the fact that majority of the local senior centers have transportation available to Worcester. If a patient is to be admitted into UMMMC in Worcester, transportation is available for their loved ones.

A major point gathered by the surveys is the need for educational materials to educate patients about proper emergency department usage and the capabilities offered by FEDs compared to traditional EDs and UCCs. Significant confusion between the facilities exists, and educational material is needed in order for patients to properly distinguish between the two. Furthermore, the group found that the literal name "Freestanding Emergency Department" generates confusion in the general public. In the surveys, participants were asked what they thought of when they heard the term "Freestanding Emergency Department" and some of the responses included "hospital on wheels" and "mobile emergency department." In order to avoid confusion during patient education, the group suggests to avoid using the name "Freestanding Emergency Department" when officially naming a new FED, and focus more on names like "Outpatient Facility" and "Satellite Emergency Department."

Overall, the survey and interview results suggests that a UMass Memorial Medical Center-operated FED is financially feasible and welcomed by the residents of Ware and surrounding communities. If an FED is implemented in Ware, it will have the following benefits:

- Prompt access to emergency care for approximately 13,000 area patients annually
- Decreased patient-hospital transport time
- Decreased the risk of serious injury or even death for critical patients
- Reduced overcrowding at metropolitan emergency departments
- Access to common outpatient services such as lab test and X-Ray
- Decreased Ware EMS workload
- Admission for geriatric patients in a trusted and easily accessible hospital system

In the case that Baystate Health officials decide to fully discontinue Mary Lane Outpatient Facility services after two years, a contingency plan is beneficial not only for the community but also for nearby EDs and local EMS agencies.

5.2 Hospital Design Recommendations

In the event that Mary Lane Outpatient Center closes the existing outpatient emergency department after two years as proposed, the team drafted potential floor plans for a new facility named Ware Outpatient Center. The politically sensitive situation involving Mary Lane Outpatient Center prevented the group from further exploring the facility as a site for a UMass Memorial Medical Center-operated FED.

To appropriately meet the health needs of the community, three concept models for Ware Outpatient Center were presented to the project sponsor. The patient surveys were studied in order to assess the services aside from the ED that are regularly utilized by patients. These studies were then used to develop FED concept models that provide services the community vitally needs. In conjunction with the patient surveys, the interests of other stakeholders such as the UMMMC management staff were considered. The proposed concept must be financially feasible to build and maintain to be successfully operated by UMMMC. It is important to note that the three concepts presented are not modeled after a particular hospital. Rather, they are the combination of several floor plans of exciting hospitals.

The first model presented is a facility providing only emergency services and two observation beds. This concept is the cheapest to build and maintain. However, this concept does not adequately meet the needs of the community. In addition to the 13,000 ED visits and 1,300 observation patients at Mary Lane Outpatient Center, the community heavily utilizes lab and imaging services. Figure 25 shows the proposed floorplan for Concept Model 1.

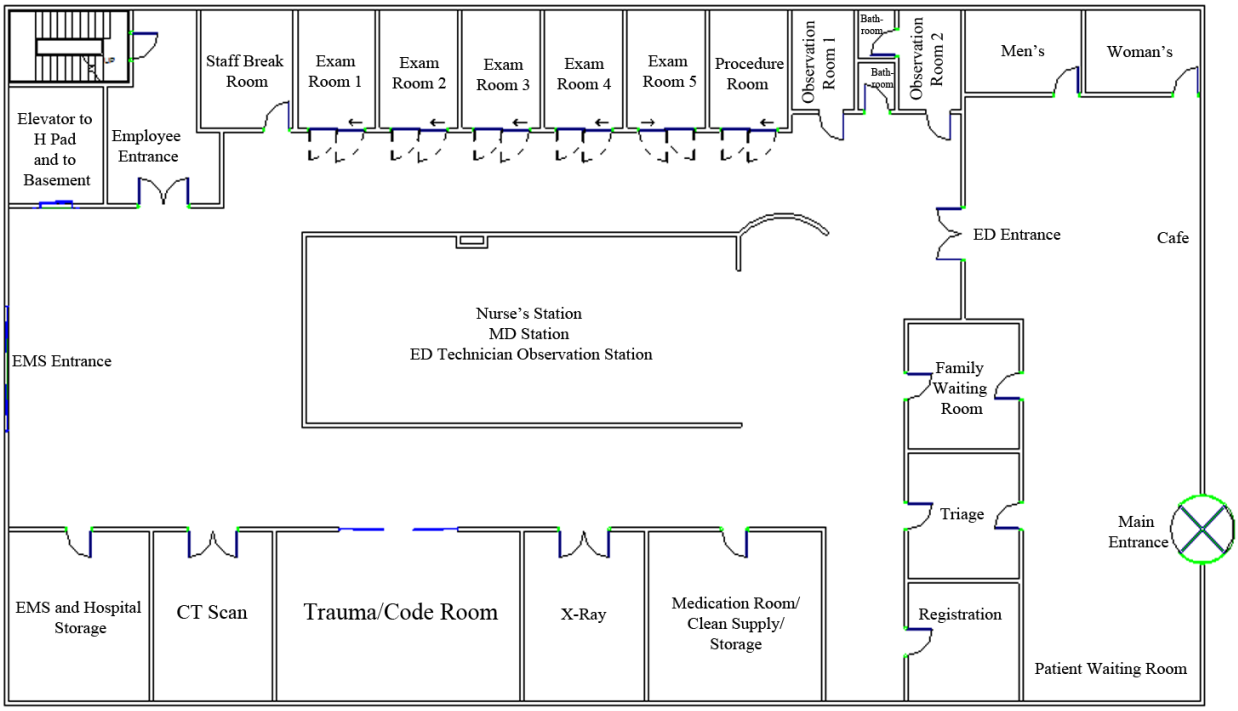

Figure 25: Concept Model 1 - Freestanding Emergency Department Floor Plan

The second concept was designed to accommodate emergency services, two observation beds, lab services, and imaging. Like the first model, model two includes five exam rooms, a procedure room, a trauma room, x-ray, CT, and a patient service center. The patient service center

is where patients can get blood drawn and have x-rays. This model will cost more to build and maintain than Model 1 and will require the hiring of several additional support services personnel. Due to the addition of the patient service center, at least two phlebotomists and at least two radiology technicians will be needed. Figure 26 depicts the proposed floor plan for the second concept model providing emergency services, observation beds, and a patient service center.

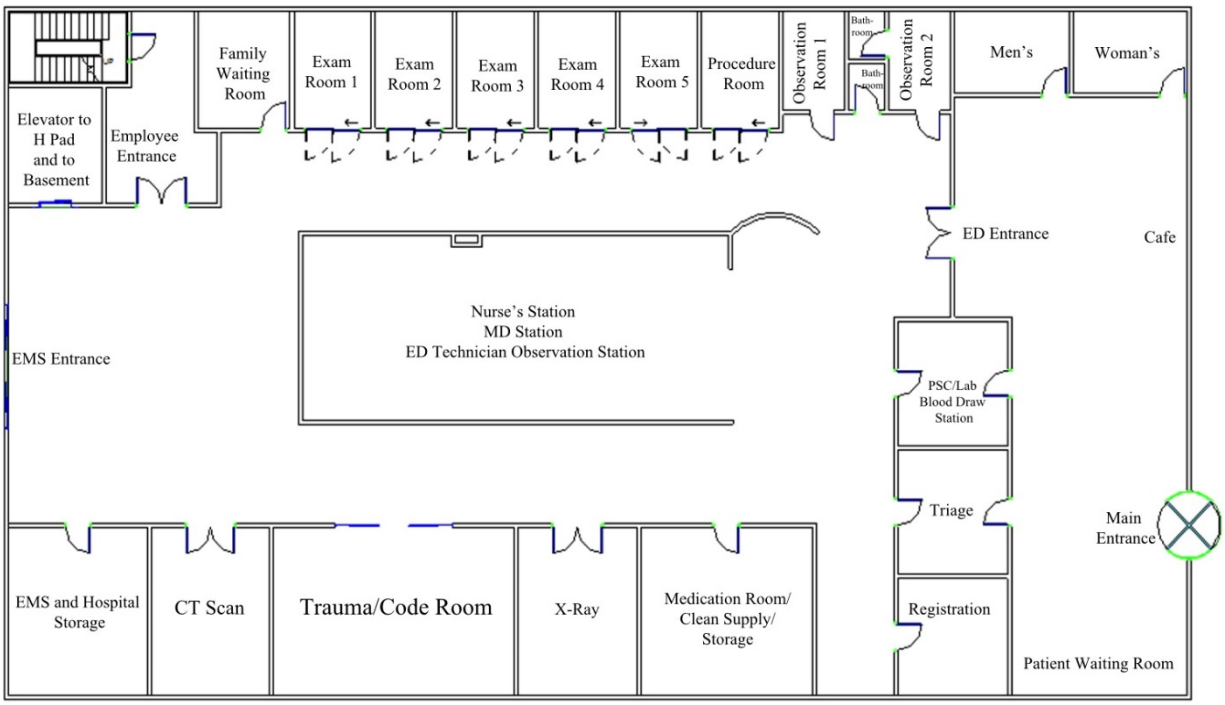

Figure 26: Concept Model 2 - FED and Patient Service Center

The team realized that the second model the second was sufficient to address the health needs of the community. However, the very design of the proposed hospital made it unsuitable. The main patient waiting room and PSC were not big enough to handle the volume of patients projected to use the hospital. The nurse's station provided good visibility to all patient rooms but was far from the medication and clean supply room. While the EMS entrance provided enough room for ambulances, it took up too much area, thus wasting floor space. It was clear that simply designing a hospital with the necessary services was not enough. The team went back to the drawing board to design an FED that provided the necessary services and was well designed.

The last concept is the most expensive to build and maintain. This model provides services similar to those of the second model but with the addition of a Primary Care Physician (PCP) office. Concept Model 3 is shown in Figure 27. Currently, Mary Lane Outpatient Center provides access to primary care physicians. However, PCP offices at Mary Lane are at risk of closing with

the rest of the hospital. The specific number of patients that utilize PCP services at Mary Lane is unknown. For that reason, the project team cannot accurately predict the number of patients that will utilize it. However, what is known is that many elderly patients in the area require PCP services, as pointed out during the team's interview with Diane Nichols.

The team proposes that the third concept model include a PCP office with a background in geriatric medicine. A PCP with this background will have the expertise to provide care to the geriatric community around Ware. It is also important to note that the FED will only require one to two PCPs at any given time. Although one to two physicians alone are not enough to meet the demands of the large geriatric community in Ware and surrounding towns, the team is estimating these physicians should be sufficient for several reasons. UMMMC operates a family health center in Barre, MA that is approximately 20 minutes from Ware with easy access. The Barre Family Health Center provides access to PCPs and specialty physicians. If a UMMMC-operated FED is to open in Ware, UMMMC management staff believe that residents looking for PCPs will more than likely turn to Barre Health Center. Positioning several PCPs at the FED will provide access for those that cannot make the short drive.

In addition to the PCP office, Concept Model 3 includes a transport ALS ambulance staffed by two paramedics. By including a transport ambulance in model 3, the team hopes to decrease the workload on Ware paramedics. When surveyed, 42.9% and 78.6% of the paramedics agreed or strongly agreed that increased patient load decreases quality and Ware EMS is responsible for transferring patients requiring admission, respectively. The goal of the transport ambulance is to handle the majority of transfers to acute care facilities, making Ware paramedics more available to the community.

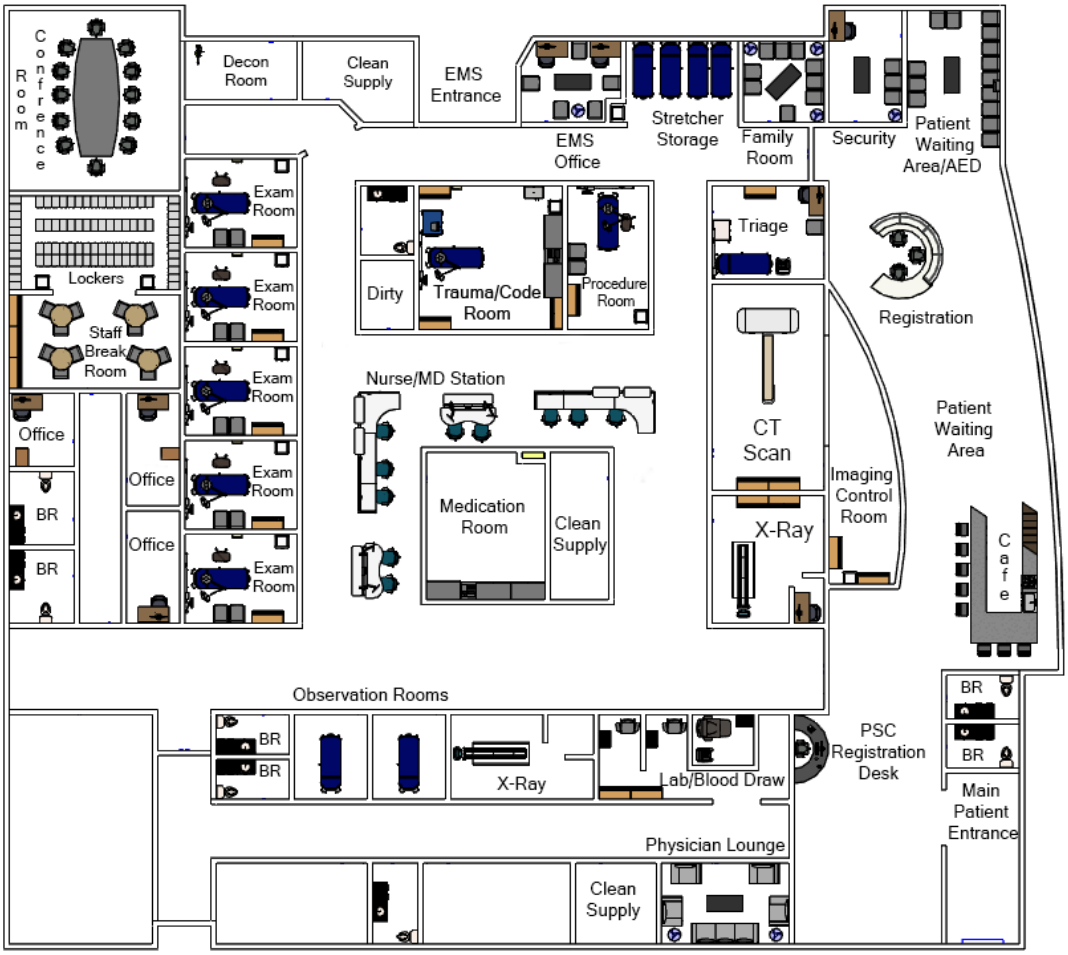

Figure 27: Concept Model 3 - FED, Patient Service Center, and PCP Offices

The three models were presented to Dr. Volturo and the features of each were highlighted. It was quickly decided that Concept Models 1 and 2 were not adequate to handle the patient load and did not provide the necessary services. Dr. Volturo determined that Concept Model 3 was best equipped to handle the patient load, provide necessary resources, alleviate Ware EMS workload, and meet the demands of the geriatric community. Dr. Volturo made a few design suggestions to streamline patient care and make the model staff friendly. The suggestions were implemented and the updated floorplan in shown in Figure 28. The upgraded model includes seven exam rooms instead of five, a procedure room, a code/trauma room, the PSC, and PCP office.

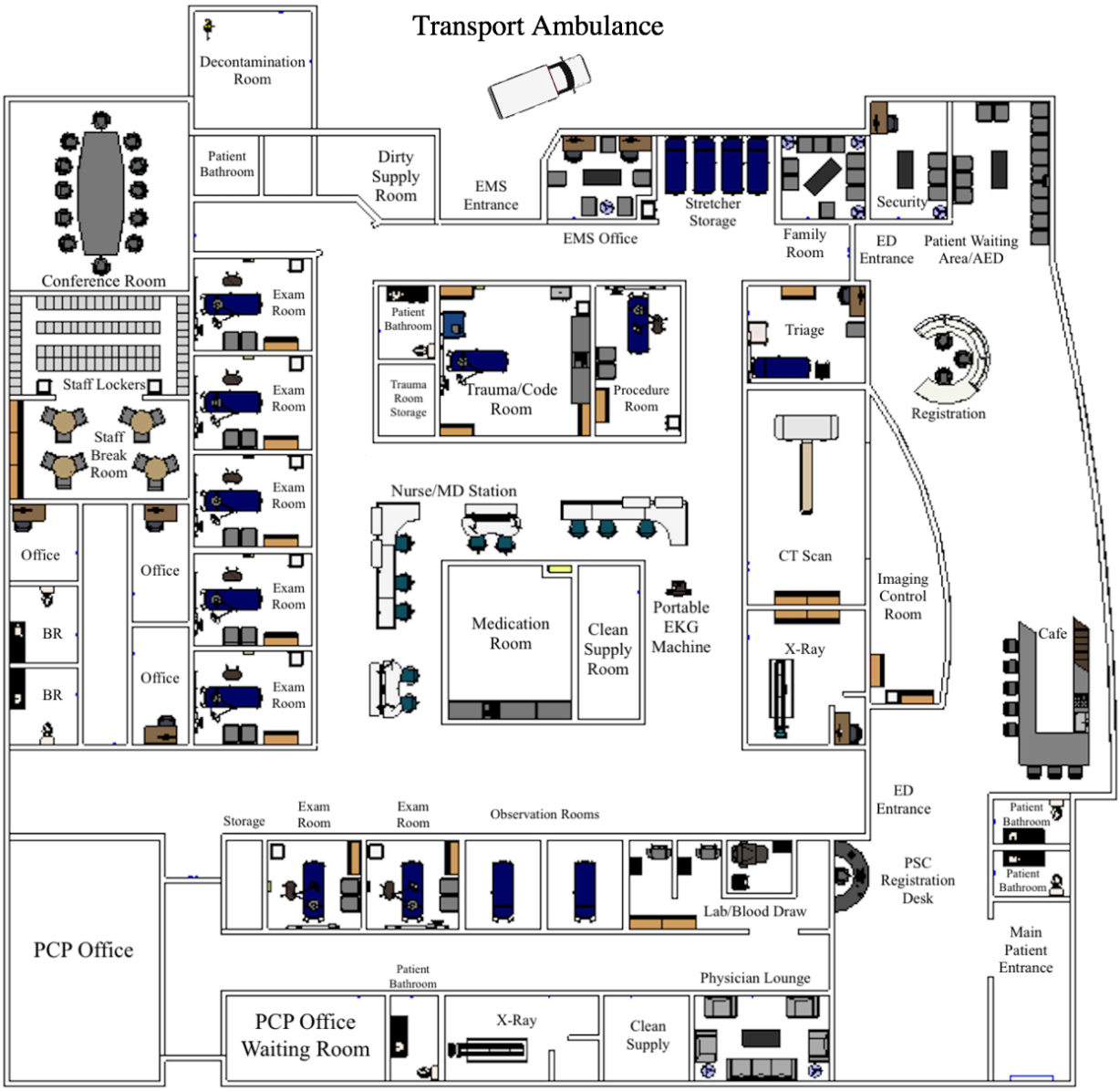

Figure 28: Final Model 3 - FED, PSC, and Primary Care Physician Offices

The team suggests that of the concept models, Concept Model 3 is best suited to provide Ware with the necessary services while also providing staff a comfortable and user friendly hospital design. Several key design changes make model 3 superior to the first two models:

1. EMS entrance is directly adjacent to the trauma/code room, allowing paramedics to bring critical patients right in
2. Nurse station provides direct visualization to all patient rooms
3. Medication room and clean supply close to nurses and doctors
4. CT and X-ray are easily accessible
5. Decrease workload of Ware EMS
6. Make Ware EMS more available to the community

When presented to Dr. Gregory Volturo, he agreed that Concept Model 3 is the best design for a Ware FED due to the aforementioned benefits. Dr. Volturo also agreed that this model would turn the most profit due to the observation rooms, PCP office and PSC.

5.3 Business plan

Objectives

The main objective for Ware Outpatient Center is to provide emergency care for the patients that were previously using Baystate Mary Lane Hospital for their emergency needs. A secondary objective is to reduce overcrowding in the metropolitan Emergency Departments by keeping these rural patients out of those hospitals.

Mission

Ware Outpatient Center has a mission to provide high quality emergency health services to any and all patients, regardless of race, color, religion, creed, sex, sexual orientation, gender identity, national origin, ancestry, age, veteran status, disability unrelated to job requirements, genetic information, military service, or other protected status. This facility also aims to increase the amount of emergency care available to rural residents in west central MA.

5.3.1 Company Summary

Ware Outpatient Center will be located in Ware, MA, and will provide service to Ware and the surrounding community. The floor plan is shown in Figure 27 and depicts a hypothetical design for the facility. The facility is projected to include exam rooms (5), procedure room (1), trauma room (1), and observation rooms (2), along with a laboratory, imaging suites, and a triage station. The entire facility will measure approximately 11,000 square feet. The lot around the facility providing parking and walking space will measure approximately 15,000-18,000 square feet. The total space required for the facility and the necessary parking space will be between 26,000-30,000 square feet.

Ownership

Ware Outpatient Center will be owned and operated by the UMMMC system. UMMMC will serve as the parent hospital and will have a transfer agreement with Ware Outpatient Center for all cases requiring high acuity care. The FED will operate a transport ambulance taking care of all patient transportation needs.

Start-up Summary

Total cost for the establishment of the facility was calculated by taking into account all essential emergency and general equipment necessary for general exam rooms, observation rooms, trauma/code room, procedure room, and laboratory. The equipment required for the patient service center and triage station equipment costs were also calculated based on the size of the proposed facility. Costs for equipment essential for each area of the facility were researched and listed in an excel spreadsheet.

The total cost for the equipment necessary for all units of the facility was calculated to be approximately $552,000. The summed up prices for each of the main units of the facility are listed in the table 12. The total cost for the construction of the facility was extrapolated from prices paid by other hospitals; building the facility (not including equipment) was estimated to be between $6M-$7.6M The expansions of Lowell General Hospital ($543 per sq.ft) and Milford Regional Hospital ($692 per sq. ft) EDs were used to calculate a price range for building the FED in Ware. These hospitals were chosen due to comparable ED requirements of the communities in which they are located. The total startup cost for the facility is expected to be between $6.5M-$8.1M, which includes equipment.

Table 12: Total Cost of Equipment

Facility Specification	**Total Cost ($)**
General Exam Rooms (5)	$43,300
Trauma/Code Room	$128,700
Procedure Room	$10,500
Laboratory	$36,400
Imaging Equipment	$309,700
Triage Station	$10,100
Observation Rooms (2)	$5,590
General Equipment	$8,000
Total Cost	**$552,290**

5.3.2 Services

Ware Outpatient Center will provide access to outpatient emergency care and diagnostic services. The facility will provide cardiac, stroke, trauma, and general medical care to patients of all ages from pediatrics to geriatrics. In addition to providing emergency services, Ware Outpatient Center will provide patients with access to a Patient Service Center (PSC) providing lab and imaging services. The PSC will be located within the FED to allow easy access to patients. Since the hospital will be part of the UMass Memorial system, it is mandated by the Centers for Medicare & Medicaid Services (CMS) to provide all of these services to insured and uninsured patients. In conclusion, Ware Outpatient Center will be capable of undertaking any task that a regular ED can perform, except major surgical procedures. A summary of all the services offered by Ware Outpatient Center in shown in Table 13 below.

Table 13: Services Offered at Ware Outpatient Center

Cardiac Care	Stroke Care	Trauma	Lab and Imaging
Resuscitation	CT Imaging	Lab and Imaging	Blood Tests
EKG/Lab Work	Thrombolytic Agents	Chest Tube Insertion	X-Ray, Ultrasound, CT
Transport to an acute care facility for continuity of care	Transport to an acute care facility for continuity of care	Transport to an acute care facility for continuity of care	

5.3.3 Market Analysis Summary

Target Market

Ware Outpatient Center's target market are the residents of Ware and its surrounding towns, specifically working and middle class families. A significant part of the population (~21.1%) fall within the poverty line. It is estimated that 5.1% of Ware's population is without health insurance which is considerably higher than Massachusetts' average of 3.1%. Senior citizens also make up a considerable part of North Brookfield's population, around 20% (919) of the population are 65 or older. Therefore, it is essential that the Ware Outpatient Center is able to accept Medicare and Medicaid (US Census Bureau, 2015).

Competition and Competitive Edge

In order for the Ware Outpatient Center to be successful it must fit the community's needs and provide top of the line emergency services. The most important aspect the center must have to be able to compete with surrounding emergency departments is that it must accept both private and federal insurance. As described in Table 13, the center will be able to provide services ranging

from cardiac and stroke care to general medical emergencies. In addition, lab and imaging services will also be provided.

Location is another critical aspect when considering the competitive edge this center will have. Its central location in the town of Ware provides the residents of Ware and surrounding towns with a quality Emergency Department without having to travel long distances. Seniors are high users of EDs and often times are forced to travel long distances when, which is inconvenient for them. Reliable transportation is a key aspect when considering competitive edge. Many times convenience of travel is just as important to patients as the quality of care of hospitals. Since patient flow would be distributed within several EDs, wait times should be reduced, providing an overall better experience for the patient.

5.3.4 Strategy and Implementation Summary

Networking - Community Programs

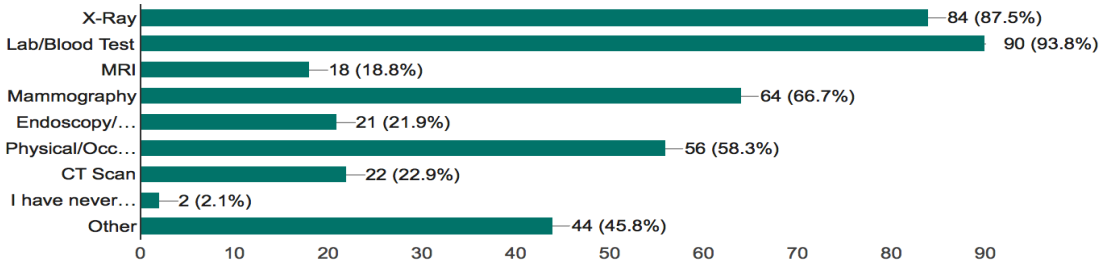

Figure 29: Commonly Utilized Outpatient Services

Community programs provided by hospitals contribute services and resources essential to a society's good health. Certain screening procedures and equipment are necessary to an ED's success. Specific services that must be provided by all EDs include X-rays, CT scans, and blood work. These services will be offered 24/7/365 by the Ware Outpatient Facility. The recommended Ware Outpatient Center will also include a PCP office along with a transport ALS ambulance. Hours of operation for this department will vary based on exact needs, funds, and staffing availability. Furthermore, during the team's interview with Diane Nichols, she expressed the high demand by the senior community for a physical therapy facility, as well as a PCP office specializing in geriatric care. The addition of a physical therapy facility will depend on the funds available, the staffing capability and a detailed study on the definite need of the facility. Figure 28 above details the most common services utilized by patients from Tier 1 and 2 towns. The graph

shown in Figure 29 was retrieved from the patient surveys. As described above, all of these services will be offered at the projected Ware Outpatient Center.

5.3.5 Personnel and Management Summary

Based on statistics gathered from the American Academy of Emergency Medicine, it is recommended that emergency departments have a 1:3 nurse-to-patient ratio. The facility will likely contain that same ratio. This means that a total of 3-4 nurses would have to be present at all times in the facility. That number will increase to 4-5 nurses during peak hours. It is recommended to have one technician responsible for the observation room, two taking care of general patients, and one technician available to assist in trauma situations; therefore, a total of four technicians must be available during high volume times. All technicians must be BLS-certified and phlebotomy-trained. Doctors typically see between two and five patients per hour. One doctor will be on site at all times, including two on-call doctors for extreme cases and peak hours. The radiology department consisting of a CT and X-ray room will employ 4-5 technicians. Two additional Medical Lab Technicians will be needed to staff the lab. Other essential staff, such as maintenance, janitorial, housekeeping, and registration desk will be appointed by the owners. All employees will be offered essential benefits as specified per industry standards.

5.4 Financial Feasibility

Based on the results of the surveys and interviews, along with the business plan formulated above, the establishment of an FED in Ware is financially feasible due to the considerable demand present in the region of interest. The 13,000 ED patients alone are not sufficient to keep the hospital financially afloat. However, when combined with observations and PCP visits, the overall earnings are enough to keep an FED running and profitable. Considering the significant elderly population in Ware, an FED equipped with a PCP office would be highly beneficial, saving residents the hassle of traveling long distances to receive the care they need. In the case that a new FED needs to be constructed, Concept Model 3 would be the best model for Ware. This model contains seven exam rooms, a PCP office, and all of the necessary resources and equipment needed to run a successful FED. The total construction and equipment cost of this model would be $25-$45 million. Such range is provided to account for specifics that the group was unable to determine, such as the taxes involved, exact cost of construction (which varies with the construction company), the exact area and cost of the land, and the exact cost of the FED's association with UMMMC.

5.5 Educating Patients, Emergency Department Staff, and EMS Staff

Responses received in the surveys of nurses and EMTs suggest that many health professionals have some misconceptions regarding FED services and operation. If an FED is to be opened in Ware, patients, ED staff, and EMS personnel would need to understand how an FED functions and what services it can offer. Educating new and existing staff could be done during orientation and monthly meetings, respectively. An example of an ED staff educational flyer can be seen in Appendix E.

Educating patients poses a more difficult problem. There are many ways to educate the public about the FED, including a website, posters and billboards around Ware, radio advertisements, mail outs, info sessions soon after opening, town hall meetings and an app for cell phones. An example of a patient educational flyer can be seen in Appendix F.

It is paramount that the public understand the differences between a full hospital, an FED, and an urgent care center. Utilization of the correct facility for medical care will decrease healthcare spending, reduce overhead spending, reduce overcrowding at metropolitan EDs, reduce stress on doctors, and increase patient satisfaction.

In addition to the staff of the FED and the general public, EMTs must be made aware of what cases an FED can or cannot handle. An example of an EMS educational flyer can be seen in Appendix G. This would ensure that patients who cannot be treated at the FED are taken to a full hospital where they can receive treatment. This also ensures that patients who do not need a full hospital can get the care they need without the long and costly ambulance ride. EMT education will ensure that the people in Ware receive the medical care that they deserve in the fastest possible time. To achieve quick and easy EMT, staff, and general public education, several informational flyers were created. The ED staff, patient, and EMS flyers can be seen in appendix E, F, and G, respectively.

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Appendix A - Emergency Department Background Information

A1. Hospital Designations

Emergency Departments (EDs) fall under one of five designations. The designation level determines the types of services offered. However, regardless of their designation or lack thereof, every ED must be able to stabilize a patient and transport them if needed. The highest designation is a **level 1 trauma center. Level 1 hospitals can provide all services.**

Table 14: Hospital Designation Levels

Level 1 Trauma Center	Level 2 Trauma Center	Level 3 Trauma Center	Level 4 and 5 Trauma Centers
• Linked to an educational institution • Research • Specialties 24/7 for all age groups • Around the clock operating rooms	• General Surgeons • Some provide specialty surgeries • Transfer agreements with level 1	• Community hospital • Outreach programs • Surgeons and anesthesiologist • Stabilize and transport to levels 1 or 2	• Initial diagnosis services and stabilization • Transfer agreements

A2. Designation vs. Verification

Emergency departments are either a designated or verified trauma center. Hospitals seeking trauma designation will work to comply with the requirements of one of the designation levels. When hospitals adhere to state and local protocols, they are granted trauma designation. After obtaining a state designation, hospitals may be verified by the American College of Surgeons (ACS).

The ACS conducts voluntary verification inspections and has a strict criteria concerning the designation levels. The inspections aim to verify that the hospital is properly equipped to handle patients at their designation level. Also, ACS inspections affirm that all state and local protocol are adhered to. Lastly, the ACS will make recommendations to hospital to improve operational protocols to increase patient safety and satisfaction (amtrauma.org).

A3. Triaging Patients at the Emergency Department

Patients are triaged using the Emergency Severity Index (ESI). The ESI provides a guideline for staff to properly triage patients so that the most critical patients are seen first. Patients

triaged with an ESI of 1 require immediate life-saving interventions. ESI 5 is the least critical and will often be seen last.

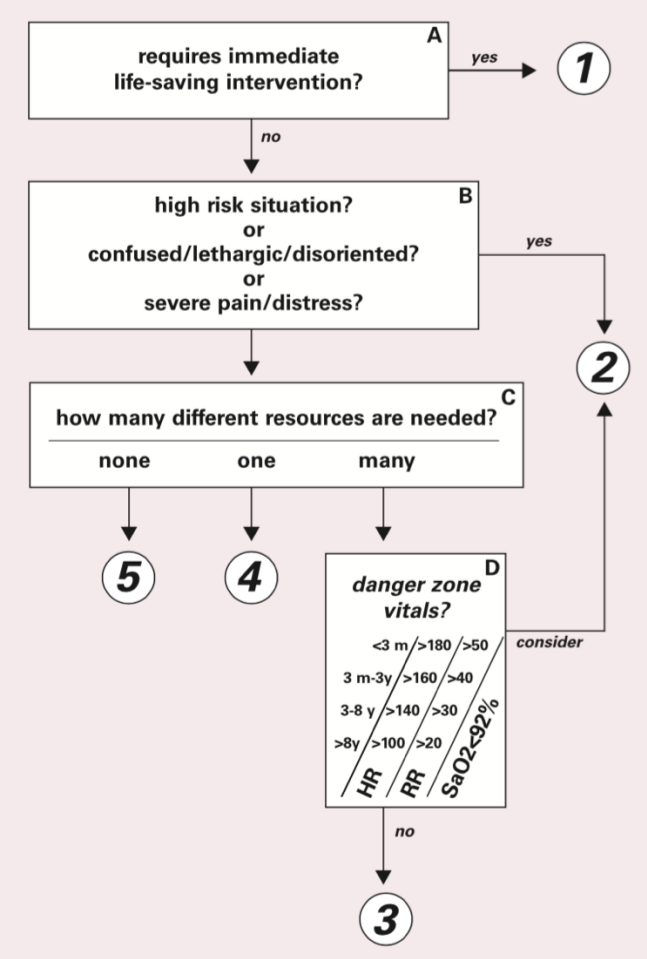

Figure 30: Emergency Severity Index Guideline

Appendix B - Patient Surveys

B1. Ware and Surrounding Towns Survey

1. Have you ever visited an emergency department?
    a. Yes
    b. No
2. Please select the town you're from
3. Insurance
    a. Private
    b. Medicare
    c. Medicaid
    d. Uninsured
    e. Other:_____
4. If you have ever visited an emergency department, please choose ALL emergency department(s) visited. Please Choose ALL that apply. If the emergency department you visited is not listed, please include the name in the "other" section
    a. Baystate Mary Lane Outpatient Center (Ware, MA)
    b. Baystate Wing Hospital (Palmer, MA)
    c. Baystate Noble Hospital (Westfield, MA)
    d. Baystate Medical Center (Springfield, MA)
    e. UMass Memorial Medical Center - University Campus (Worcester, MA)
    f. UMass Memorial Medical Center - Memorial Campus (Worcester, MA)
    g. St. Vincent Hospital (Worcester, MA)
    h. Other_____
5. Reason for your visit
    a. Accident
    b. Abdominal Pain
    c. Chest Pain
    d. Shortness of Breath
    e. Back Pain
    f. Headaches/Migraines
    g. Allergic Reaction
    h. Broken Bones
    i. Other:_____
6. On a scale from 1-10 (10 being the worst pain in your life), how bad was your pain when you arrived at the Emergency Department?
    1 2 3 4 5 6 7 8 9 10
7. Were you seen at another facility for the same complaint prior to coming to the Emergency Department? If yes, please specify below
    a. I was not seen at another facility for this emergency
    b. Urgent Care Center (e.g. ReadyMED, CareWell, etc.)
    c. Primary Care Doctor
    d. CVS Minute Clinic or other Retail Clinic
    e. Other:_____

8. How long did you wait in the waiting room?
    a. 0-30 minutes
    b. 30-60 Minutes
    c. 1-2 Hours
    d. 2-3 Hours
    e. More than 3 hours
9. Did the ER staff, including your doctor, seem busy?
    a. Yes
    b. No
10. How satisfied were you with the overall experience?

    Very Dissatisfied 1 2 3 4 5 Very Satisfied
11. In the past year, how many times have you been to an emergency room?
    a. 0 - 3
    b. 4 - 7
    c. 8 - 11
    d. 12 - 15
    e. 16+
12. What do you consider a reasonable waiting time at your local Emergency Department?
    a. 0 - 15 Minutes
    b. 15 - 30 Minutes
    c. 30 - 45 Minutes
    d. 45 - 60 Minutes
    e. The waiting time should depend on the emergency
    f. Other:_____
13. Have you ever visited a primary care doctor or specialists at Mary Lane?
    a. Yes
    b. No
14. Have you ever been hospitalized (Admitted) at Mary Lane?
    a. Yes
    b. No
    c. Not Sure
15. If you have ever used outpatient services (x-ray, MRI, lab/blood test, or mammography) at ANY hospital, please specify below. Check ALL that apply
    a. X-Ray
    b. MRI
    c. Lab/Blood Tests
    d. Mammography
    e. Endoscopy/Colonoscopy
    f. Physical/Occupational Therapy
    g. CT Scan
    h. I have never used outpatient services at any hospital
    i. Other:_____

Section 2: Urgent Care Centers

16. Have you ever visited an Urgent Care Center? (If you have never visited an Urgent Care Center, please skip this section and go on to section 3, "Hospital Closures")
    a. Yes
    b. No
    c. Not sure
17. How satisfied were you with your Urgent Care Center experience?
    Very Dissatisfied 1 2 3 4 5 Very Satisfied
18. Would you ever visit an Urgent Care Center again for your emergency health needs?
    a. Yes
    b. No
    c. Maybe
19. Please tell us why you would or would not visit an Urgent Care Center again

Section 3: Hospital Closures

20. In your opinion, what impact would a complete closure of Mary Lane Outpatient Center (Emergency Services, blood work, and imaging) have on you and/or the community?
    a. No effect
    b. Minimal negative impact
    c. Somewhat of a negative impact
    d. Big loss, but the community will adapt
    e. Drastic loss for our community
21. Are you familiar with the concept of a Freestanding Emergency Department?
    a. Yes
    b. No
    c. Not Sure
22. What comes to mind when you hear the term "Freestanding Emergency Department"?

If you are not familiar with Freestanding Emergency Departments (FEDs), the following paragraph gives a general definition of FEDs

FEDs are hospitals that are separate and distant from a parent hospital. These hospitals only offer emergency services and do not admit patients. Thus if a patient needs to admitted, they must be transported to the parent hospital. These facilities have a larger scope of practice than urgent care centers and often have a level 3 trauma center designation.

23. Were you familier with the decision to end inpatient services (meaning the hospital can no longer admit patients) at Mary Lane Hospital?
    a. Yes
    b. Not Sure – This is the first time I am hearing about the closure of inpatient services at Mary Lane Hospital
24. In your opinion, what was the impact on the community when Mary Lane Hospital completely halted its inpatient services?
    a. No effect
    b. Minimal negative impact
    c. Somewhat of a negative impact
    d. Big loss, but the community will adapt
    e. Drastic loss for our community

25. What are your opinions regarding the recent conversion of Baystate Mary Lane Hospital to Mary Lane Outpatient Center, nit providing ONLY emergency services and minimal outpatient (labs and imaging) services?
26. If Mary Lane Outpatient Center was to completely close, what would be a good replacement?
    a. A Freestanding Emergency Department - This is a facility providing basic emergency services ONLY with minimal outpatient services (Labs/blood work and x-ray)
    b. Urgent Care Center
    c. Not Sure
    d. Nothing
    e. Other
27. What additional medical services would you like to see implemented in your community? - These can be healthcare services, community programs relating to public health, or any other health needs you think would benefit the community. Please list below
28. Any comments/questions/concerns - if you would like to receive a response from the research team, please be sure to include you email.

B2. Clinton and Surrounding Towns Survey

1. Have you ever visited an emergency department?
    a. Yes
    b. No
2. Please select the town you're from
3. Insurance
    a. Private
    b. Medicare
    c. Medicaid
    d. Uninsured
    e. Other:_____
4. If you have ever visited an emergency department, please choose ALL emergency department(s) visited. Please Choose ALL that apply. If the emergency department you visited is not listed, please include the name in the "other" section
    a. Clinton Hospital (Clinton, MA)
    b. Leominster Hospital (Leominster, MA)
    c. Marlborough Hospital (Marlborough, MA)
    d. UMass Memorial Medical Center - University Campus (Worcester, MA)
    e. UMass Memorial Medical Center - Memorial Campus (Worcester, MA)
    f. St. Vincent Hospital (Worcester, MA)
    g. Emerson Hospital (Concord, MA)
    h. Baystate Mary Lane Outpatient Center (Ware, MA)
    i. Baystate Wing Hospital (Palmer, MA)
    j. Baystate Noble Hospital (Westfield, MA)
    k. Baystate Medical Center (Springfield, MA)
    l. Other_____

5. Reason for your visit
    a. Accident
    b. Abdominal Pain
    c. Chest Pain
    d. Shortness of Breath
    e. Back Pain
    f. Headaches/Migraines
    g. Allergic Reaction
    h. Broken Bones
    i. Other:_____
6. On a scale from 1-10 (10 being the worst pain in your life), how bad was your pain when you arrived at the Emergency Department?
    i. 2 3 4 5 6 7 8 9 10
7. Were you seen at another facility for the same complaint prior to coming to the Emergency Department? If yes, please specify below
    a. I was not seen at another facility for this emergency
    b. Urgent Care Center (e.g. ReadyMED, CareWell, etc.)
    c. Primary Care Doctor
    d. CVS Minute Clinic or other Retail Clinic
    e. Other:_____
8. How long did you wait in the waiting room?
    a. 0-30 minutes
    b. 30-60 Minutes
    c. 1-2 Hours
    d. 2-3 Hours
    e. More than 3 hours
9. Did the ER staff, including your doctor, seem busy?
    a. Yes
    b. No
10. How satisfied were you with the overall experience?
    Very Dissatisfied 1 2 3 4 5 Very Satisfied
11. In the past year, how many times have you been to an emergency room?
    a. 0 - 3
    b. 4 - 7
    c. 8 - 11
    d. 12 - 15
    e. 16+
12. What do you consider a reasonable waiting time at your local Emergency Department?
    a. 0 - 15 Minutes
    b. 15 - 30 Minutes
    c. 30 - 45 Minutes
    d. 45 - 60 Minutes
    e. The waiting time should depend on the emergency
    f. Other:_____

13. Have you ever visited a primary care doctor or specialist at Clinton Hospital?
    a. Yes
    b. No
14. Have you ever been hospitalized (Admitted) at Clinton Hospital?
    a. Yes
    b. No
    c. Not Sure
15. If you have ever used outpatient services (x-ray, MRI, lab/blood test, or mammography) at ANY hospital, please specify below. Check ALL that apply
    a. X-Ray
    b. MRI
    c. Lab/Blood Tests
    d. Mammography
    e. Endoscopy/Colonoscopy
    f. Physical/Occupational Therapy
    g. CT Scan
    h. I have never used outpatient services at any hospital
    i. Other:_____

Section 2: Urgent Care Centers

16. Have you ever visited an Urgent Care Center? (If you have never visited an Urgent Care Center, please skip this section and go on to section 3, "Hospital Closures")
    a. Yes
    b. No
    c. Not sure
17. How satisfied were you with your Urgent Care Center experience?
    Very Dissatisfied 1 2 3 4 5 Very Satisfied
18. Would you ever visit an Urgent Care Center again for your emergency health needs?
    a. Yes
    b. No
    c. Maybe
19. Please tells us why you would or would not visit an Urgent Care Center again

Section 3: Hospital Closures

20. In your opinion, what impact would a complete closure of Clinton Hospital have on you and/or the community?
    a. No effect
    b. Minimal negative impact
    c. Somewhat of a negative impact
    d. Big loss, but the community will adapt
    e. Drastic loss for our community
21. Are you familiar with the concept of a Freestanding Emergency Department?
    a. Yes
    b. No
    c. Not Sure
22. What comes to mind when you hear the term "Freestanding Emergency Department"?

If you are not familiar with Freestanding Emergency Departments (FEDs), the following paragraph gives a general definition of FEDs

FEDs are hospitals that are separate and distant from a parent hospital. These hospitals only offer emergency services and do not admit patients. Thus if a patient needs to admitted, they must be transported to the parent hospital. These facilities have a larger scope of practice than urgent care centers and often have a level 3 trauma center designation.

23. In your opinion, what is the impact if Clinton Hospital was to completely end inpatient services - meaning they can no longer admit patients?
    a. No effect
    b. Minimal negative impact
    c. Somewhat of a negative impact
    d. Big loss, but the community will adapt
    e. Drastic loss for our community

24. If Clinton Hospital was to completely close, what would be a good replacement?
    a. A Freestanding Emergency Department - This is a facility providing basic emergency services ONLY with minimal outpatient services (Labs/blood work and x-ray)
    b. Urgent Care Center
    c. Not Sure
    d. Nothing
    e. Other
25. What additional medical services would you like to see implemented in your community? - These can be healthcare services, community programs relating to public health, or any other health needs you think would benefit the community. Please list below
26. Any comments/questions/concerns - if you would like to receive a response from the research team, please be sure to include you email.

Appendix C: EMS and Nurse Surveys

C1. EMS Survey

Section 1: These questions are meant to classify your service and the type of environment you operate in.

1. I am a(n)…
    a. EMT
    b. AEMT
    c. Paramedic
    d. Other
2. My service is located in…
    a. The USA
    b. Other
3. What kind of service does your company run?
    a. Strictly 911
    b. 911 and transport
    c. Strictly transport
    d. Specialty transport (eg. Boston Children's Hospital critical care transport)
    e. Other
4. How do you describe the environment your service operates in?
    a. Rural (secluded area, very little population)
    b. Urban (located within a large city)
    c. Suburban (located on the outskirts of a large city)
    d. Large city/town (eg. Boston)
5. Where are your EMS services based?
    a. Private company
    b. Fire department
    c. Hospital based

Section 2: This section deals with the hospitals you frequently visit. If your service does not run 911 calls, please skip this section and continue with section 3.

6. On average how long is the transport time from scene to the hospital? Your answer can be in minutes, miles, or kilometers

7. I often transport patients to the ED who can be treated at their PCP or Urgent Care Center
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
8. At handoff, the staff (either doctors or nurses) seem busy
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree

Section 3: Implementing Freestanding Emergency Departments

9. Emergency departments today have become overcrowded
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
10. Are you familiar with the concept of a Freestanding Emergency Department (FED)?
    a. Yes
    b. No

    If not, the following paragraph gives a general definition of FEDs:

    FEDs are hospitals that are separate and distant from a parent hospital. These hospitals only offer emergency services and do not admit patients. Thus, if a patient needs to admitted, they must be transported to the parent hospital. These facilities have a larger scope of practice than urgent care centers and often have a level 3 trauma center designation.

11. I often wish I had a nearby trauma center to stabilize my critical patient before transporting to a high acuity hospital
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
12. Increased transport time for rural patients puts them at a greater risk than any other patient group
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
13. A freestanding emergency department can provide quick, quality care for rural patients
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
14. Freestanding emergency departments can potentially decrease the risk of death for rural high-acuity patients (e.g. major trauma, cardiac arrest, etc.)
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree

C2. Nurse Survey

1. I am an…
    a. ED Nurse
    b. ICU Nurse
    c. ED Tech
    d. Other
2. Does your hospital have a trauma designation/verification? If yes, please select the level
    a. Level 1 Trauma Center
    b. Level 2 Trauma Center
    c. Level 3 Trauma Center
    d. Level 4 Trauma Center
    e. Level 5 Trauma Center
    f. My hospital is not trauma designated or verified
3. How would you describe your hospital?
    a. Community Hospital
    b. Teaching Hospital
    c. Non-Teaching Hospital
    d. Other
4. How do you describe the environment your hospital is located in?
    a. Rural (secluded area, very little population)
    b. Urban (located within a large city)
    c. Suburban (located on the outskirts of a large city)
    d. Large city/town (eg. Boston)
5. I often treat patients who can be treated at their PCP or Urgent Care Center
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
6. Emergency departments today have become overcrowded
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
7. Increased transport time for rural patients puts them at a greater risk than any other patient group
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree

8. Increased patient load decreases the overall quality of care provided to patients, particularly those of lower acuity
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
9. Overcrowding sometimes negatively affects my performance in the workplace
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
10. Are you familiar with the concept of a Freestanding Emergency Department (FED)?
    a. Yes
    b. No

    If not, the following paragraph gives a general definition of FEDs:

    FEDs are hospitals that are separate and distant from a parent hospital. These hospitals only offer emergency services and do not admit patients. Thus if a patient needs to admitted, they must be transported to the parent hospital. These facilities have a larger scope of practice than urgent care centers and often have a level 3 trauma center designation.

11. A freestanding emergency department can provide quick, quality care for rural patients
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
12. Freestanding emergency departments can potentially decrease the risk of death for rural high-acuity patients (e.g. major trauma, cardiac arrest, etc.)
    a. Strongly agree
    b. Agree
    c. Neither agree nor disagree
    d. Disagree
    e. Strongly disagree
13. Is your hospital located near a freestanding emergency department?
    a. Yes
    b. No
14. Do you work at a Freestanding Emergency Department?
    a. Yes
    b. No
15. Do you think FEDs benefit the main issues EDs face?

16. What is your general opinion regarding FEDs?

Appendix D: Phone Notes with Diane Nichols

- The 8-12 senior center leaders of the area had a meeting with Baystate officials. Officials were adamant about the fact that Mary Lane emergency would be open.
- Concerns were voiced that there would be no emergency services in Ware but Baystate officials feel certain that Mary Lane Outpatient Center will remain open for at least two years.
- Senior citizens in the area are high users of the emergency department.
- If Mary Lane Outpatient Center patients have to be admitted they will be admitted into the Baystate system. They would prefer to be transferred to a UMass Memorial hospital in Worcester versus Springfield or Palmer.
- 9% of ED visits result in inpatient care
- If they get transported and outside of Baystate services then they will get charged extra for the transportation.
- Senior citizens are concerned about the geographical location of Baystate. Senior centers do not have transportation readily available to Springfield or palmer. They do however have transportation available to Worcester.
- The building adjacent to Mary Lane Outpatient Center has just been bought by someone turning it into elderly care or residential services, adding even more of an elderly population in Ware.
- Seniors would have more confidence in going to a Ware hospital if it was under the umbrella of UMass Memorial. She doesn't know if they have an opinion on the care. They would make the drive into Worcester if they were not going to call an ambulance.

Appendix E: ED Staff Educational Flyer

Appendix F: Patient Educational Flyer

Appendix G: EMS Educational Flyer

WHAT IS A FREESTANDING EMERGENCY (FED)?

FEDs are structurally separate and distant emergency departments, usually affiliated with parent hospitals. FEDs utilize board certified physicians and registered nurses (RNs). By establishing an FED in Ware, MA, UMass Medical Center hopes to provide emergency care to approximately 13,000 patients annually and over 40,000 outpatient procedures, such as blood work and imaging.

OUR MISSION

Provide rural communities with services analogous to metropolitan EDs without the risk of long distance driving or prolonged transport times. Safe, accessible, high quality medical care is a service that should be available to all residents, no matter of geographical origin. Examples of these services include:

- Cardiac, Respiratory, Stroke, and Trauma Care
- CT Imaging, Lab Work, X-Ray, and Ultrasound
- 2 - 24 Hour Observation Beds
- Access to PCPs for Geriatric Community
- Transfer to Acute Care Facility via FED Operated Transport

WHEN SHOULD I TAKE A PATIENT TO AN FED?

-For all medical emergencies that would be normally brought to the ED

-FED will have its own transport Ambulance

-All inpatients will be admitted to UMass Medical Center

-An FED can be bypassed for a PCI Center for a positive field activation

CONTACT US

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Appendix H: Proposed Design Renderings

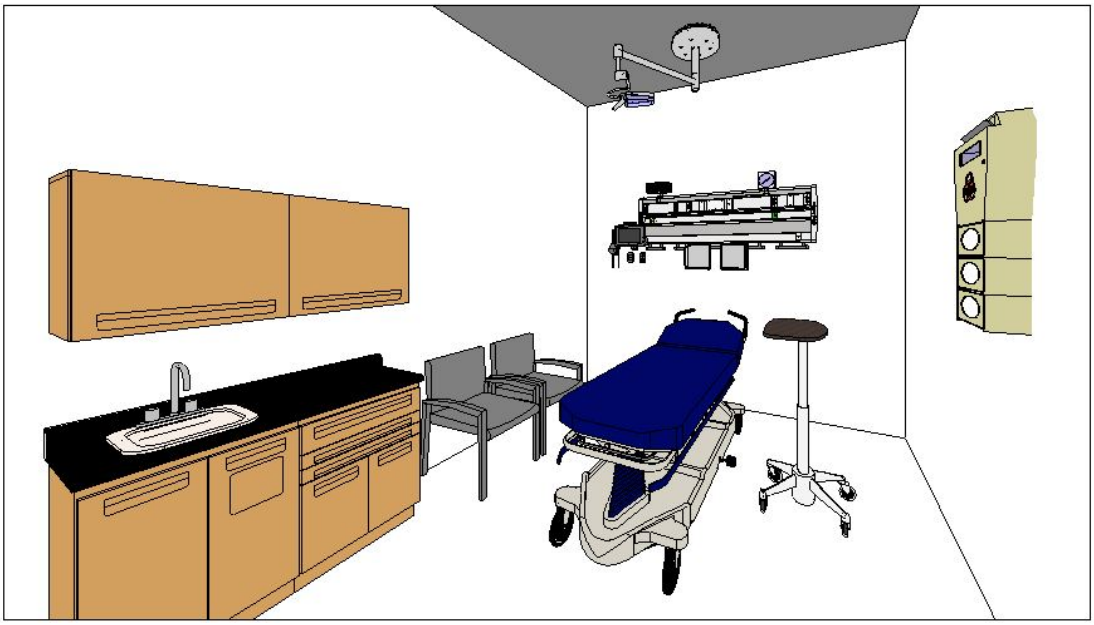

Figure 31: Patient Room

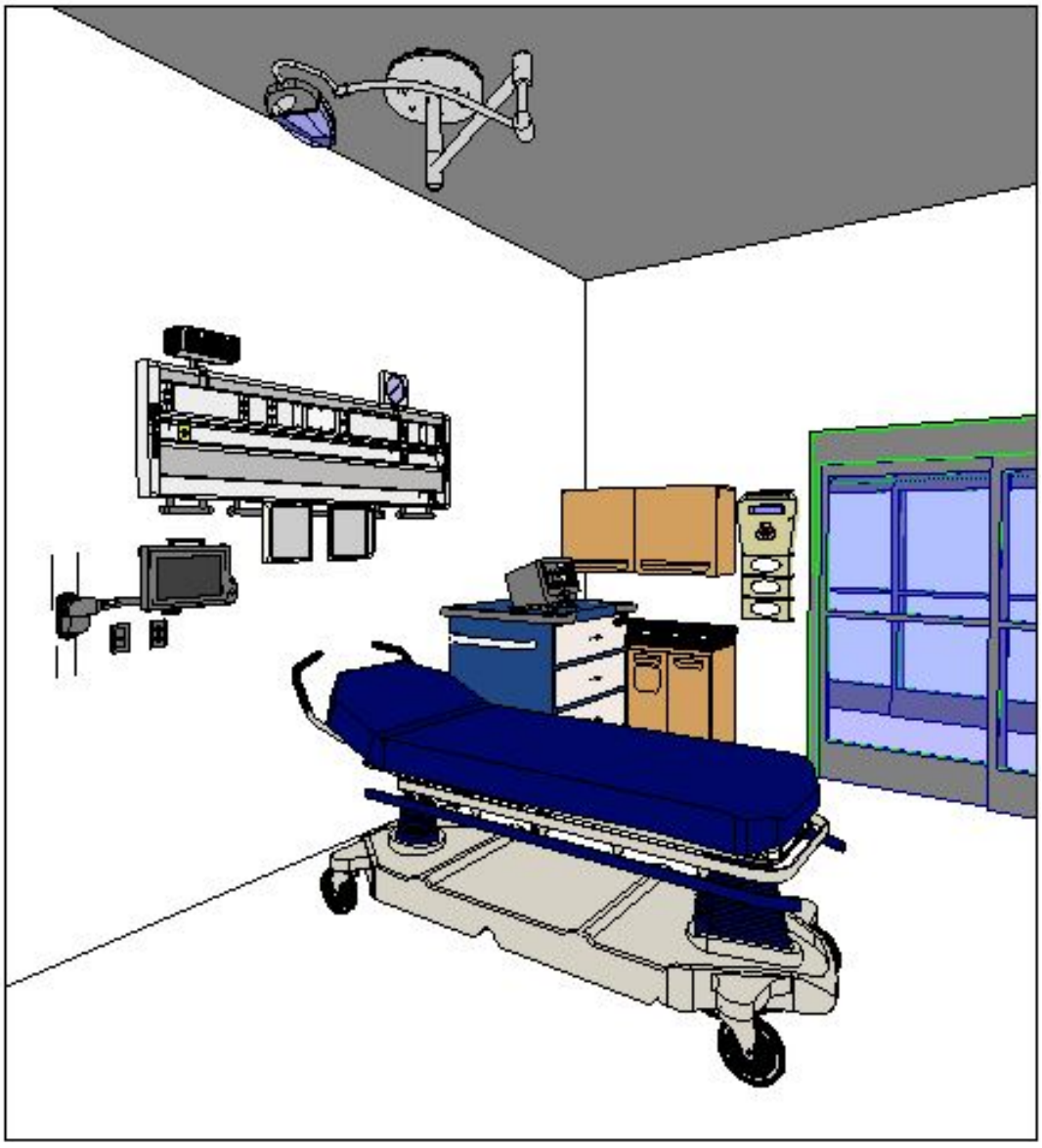

Figure 32: Trauma/Code Room

Figure 33: Nurse's Station