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Fire Department Personnel Perspectives on Avoidable Emergency Medical Services Calls and Emergency Department Visits

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Abstract

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MPA, Eastern Washington University, 2010

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Dissertation Submitted in Partial Fulfillment

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Abstract

Frequent users of emergency medical services (EMS) and emergency departments (EDs) have an enormous impact on the United States' healthcare service delivery system and overall cost of health care. This qualitative study utilized a case study approach to examine this overlooked perspective, using advocacy coalition, policy change, and policy-oriented learning as its theoretical framework. Participants were identified using purposive sampling techniques. Individual interviews were conducted with ten firefighter staff members in a single county in Washington using an iterative analytic approach supported by NVivo 14 software to develop critical themes. This study aimed to obtain knowledge and insights into the high utilizers of EMS through interviews with firefighters who served that population, thus encouraging administrators and policymakers to consider qualitative data from frontline staff rather than making policy or program decisions solely based on quantitative data. The results indicated that interventions that could decrease the number of high EMS and ED utilizers are related to access to health care, providing the right care, and addressing social determinants of health through programs and resources in the community. Therefore, the results of this study have the potential to effect positive social change by encouraging the fire department, healthcare, and government leaders to implement effective policies, programs, funding, and interventions when working with this population.

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Dedication

I dedicate this research to frontline fire service members and emergency responders worldwide who serve to improve our communities. They are often the lowest paid, risking their lives to protect and serve others. I also dedicate this dissertation to my family for their time and support. Four family members have shown me their love and provided for me, and without their investment in me, I would have never completed a Ph.D. Those are my grandmother, Jane Render, my father, Joel Williams, Aunt Mary Duncan, and my mother, Therese Williams, who has shown me the value of service and led me down the road to the field of social work and public service. I also want to thank my other family members and friends, from whom I have learned the importance of family community and the connections I have made throughout my life—the love and support of my life partner, Marissa Braun.

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Chapter 1: Introduction to the Study

Introduction

The United States spends nearly twice as much on health care than any other country, yet has poorer population health outcomes (Papanicolas et al., 2018). According to the National Center for Health Statistics (2017), the United States' high rate of emergency department (ED) visits is an enormous problem, with the cost of ED visits far exceeding that of other kinds of care. For example, in 2018, there were an estimated 130 million ED visits (National Center for Health Statistics, 2017) in the United States. On top of that, there are additional costs such as emergency management services among police departments, fire departments, and crisis response units. Across the country, emergency medical services (EMS) face numerous challenges regarding their funding, management, workforce, infrastructure, and research base (Brooks et al, 2016).

EMS are critical, life-saving public health services that give care to patients at the scene of an emergency. EMS encompasses a range of related activities, including 911 dispatch, response to the scene by ambulance, treatment and triage by EMS personnel, and transport to a care facility via ground and/or air ambulance (NASEMSO Medical Directors Council, 2017). Local EMS agencies respond to nearly 28.5 million 911 dispatches every year (National Association of State EMS Officials, 2020). In 2022, estimates indicate that more than 18,200 EMS using 73,000 ground vehicles, ambulances, and fire engines responded to millions of EMS transport calls. In 2018, another study showed similar results, noting that typical EMS calls resulted in some 16 million transports from the scene of the call to EDs in 34 states (National Association of State

EMS Officials, 2020). In 19 states, 1.6 million transports were made from a scene to a destination other an ED (National EMS assessment, 2020). While this is unusual, it is becoming more commonplace as changes to protocol and reimbursement practices encourage ambulance crews to transport individuals to more appropriate facilities.

EMS may encompass multiple levels of medical response, depending on how the system is configured (Brooks et al., 2016). These may include EMS call-takers and emergency medical dispatchers working in a 911 call center; first responders (fire or police units); basic life support and/or advanced life support; ground ambulances staffed by individuals with different levels of training, depending on the requirements of the state; and air EMS units, which are usually staffed by paramedics or critical care nurses but may sometimes carry a physician. EMS represent the first stage in a full continuum of emergency care that also includes hospital EDs, trauma centers, inpatient critical care services, and interfacility transport (Brooks et al., 2016).

Many EMS calls and ED visits involving symptoms related to mental health and substance use disorders (M/SUDs) are both avoidable and preventable. M/SUD-related ED visits are more than twice as likely to result in hospital admission compared with ED visits that do not involve M/SUDs (Weiss et al., 2016). As many as 25% of adults in the United States have some form of mental health problem (Substance Abuse and Mental Health Services Administration, 2021). The same study also concluded that individuals with M/SUDs have increased rates of chronic diseases, including but not limited to cardiovascular diseases, diabetes, obesity, asthma, epilepsy, and cancer. The economic burden of serious mental illness in the form of lost earnings, healthcare expenditures, and

public assistance amounts to $317.6 billion per year, which is approximately $1,000 per person nationwide (Trautmann et al., 2016).

People with mental health disorders are more likely to have adverse outcomes that require use of the emergency response system related to marital disturbances, erratic employment and housing issues, and premature mortality due to suicide (Substance Abuse and Mental Health Services Administration, 2019). Additionally, people with serious mental illness and substance use disorders have a higher incidence of preventable medical conditions (Liu et al., 2017). Given this increase of mental illness and its impact on healthcare and emergency response systems, it is vital to gain understanding of and develop policies and interventions to reduce healthcare costs, improve service delivery, and increase people's quality of life.

Patients who are regulars in EDs have been given many titles, but one common term is "high utilizer," which is often used to describe patients who use the emergency response system or ED inappropriately. However, countless studies have shown that about half of those users are dealing with chronic medical conditions because a lack of preventive care and/or support that leads them to reach out to that system for help (Holman, 2020). Psychosocial factors are a driving force behind patients' repeat visits but attempts to manage those issues do not necessarily reduce the number of ED encounters (Wong et al., 2018).

Although the title "firefighter" does not suggest work of a medical nature, two-thirds (64%) of the reported calls to fire departments require EMS and rescue services, and only 4% of all reported fire department runs are fire-related (FEMA, 2019). Fire

departments play a significant role in encountering high utilizers in the EMS and healthcare system. As a result, fire department personnel have a wealth of knowledge on high utilizers and the situations that lead to EMS calls or ED visits. Given this context, a qualitative case study was conducted involving the fire department in a specific county in Washington, to obtain knowledge about interventions to reduce avoidable EMS calls and ED admissions.

Problem Statement

In 2020, Washington State ranked 46th out of all U.S. states for the combined prevalence of mental illness and low rates of access to care (Mental Health America, 2022). In a specific county in Washington, residents report higher rates of physical and psychological health, but also higher rates of preventable hospital stays compared to residents across Washington State (Tacoma-Pierce County Health Department, 2016a). In 2016, the average rate of preventable hospital stays per 1,000 people was 36 in Washington State (Tacoma-Pierce County Health Department, 2016b). An estimated 19.5% of adults (about 123,130 people, based on 2014 population estimates) in the county of study that meets the criteria for a mental health disorder (Croft et al., 2016). This report also stated that the rate of suicide in the county of study—at 18.5 per 100,000 residents—is higher than that of Washington State (15.4 per 100,000).

Lack of access to primary care is a significant barrier to quality care, which often results in unnecessary ED visits or worse. This barrier stems from lack of transportation, lack of financial stability, lack of an appropriate decision-making process, and lack of availability (Huot et al., 2019). Non-urgent use of the ED leads to increased medical

expenditure and poor management of care. On the front lines of many of these EMS calls and prior to ED visits, fire departments are involved with community members. They have a significant effect on providing service delivery, preventing ED visits, and reducing healthcare costs. Much of the high utilizer research focuses on high utilizers themselves and/or EDs; however, there is less focus on fire departments. Despite quantitative studies and data that show higher rates of M/SUD in the county of study, few qualitative studies have examined the county's underlying reasons for frequent EMS and ED use, especially through the eyes of frontline EMS workers.

Purpose of the Study

The purpose of this qualitative study was to explore and identify interventions that prevent avoidable EMS calls and ED visits from the perspective of fire department staff, focusing on their knowledge and lived experience serving high utilizers in single county in Washington. The qualitative knowledge obtained from interviewing fire department staff could assist administrators, government officials, and state legislators in better understanding the trends that fire departments are seeing, and their views on preventing avoidable EMS calls and ED visits. Participants were fire department staff within single county in Washington. Interviews were conducted with a local fire department to use that knowledge to create, develop, and adjust ways to prevent EMS calls and ED visits.

Research Question

The study addressed the following research question: What interventions are helpful in reducing EMS calls and preventable ED visits?

Theoretical and Conceptual Framework

The theoretical framework for this study consisted of advocacy coalition, policy change, and policy-oriented learning (Weible & Sabatier, 2017). Currently, a hierarchical authority is in place to develop public health policy and address the high use of EMS and EDs, which is costly and inefficient compared to other available services. According to the theory of advocacy coalition, people who hold similar beliefs usually form coalitions to coordinate their actions (Weible & Sabatier, 2018). Many small groups and organizations are currently forming together to address the problem of high utilization of the EMS and ED systems. Meanwhile, policy changes theory proposes that a change in policy is an indication of the success of an advocacy coalition (Schmid et al., 2019). Finally, policy-oriented learning theory argues that changes in opinions and tactics occur due to new knowledge and insights into a phenomenon.

Thus, applying the advocacy coalition framework helps identify the factors that contribute to high utilization of EMS and unnecessary ED visits. This in turn illuminates an organization's efforts to decrease high utilization of the EMS and ED systems and highlights the successes and failures, showing how the community has arrived at its current policies and budgets. In this framework, the research targets one group through direct contact interventions, collaborating with community partners to develop policies and budgets that can improve the quality of life of their community members.

Nature of the Study

The present study adopted a qualitative case study approach to obtain information about interventions to reduce EMS calls and ED visits from the perspectives of fire

department personnel (Rudestam & Newton, 2015). Qualitative research identifies and makes sense of patterns to build up a meaningful picture without compromising its richness and dimensionality (O'Sullivan et al., 2017). This study used purposive sampling, targeting a specific location and specific emergency management positions by conducting research on the fire department staff in single county in Washington. The resulting data can be used to guide policies and strategies for public administrators and legislators.

A qualitative case study approach was ideal for this study because it aimed to obtain experiences from frontline staff about a social problem rather than study the social problem itself (Patton, 2015). The present case study and its use of interviews to obtain knowledge and insight from frontline fire department staff has the potential to affect agency, community, and state-level policies.

Definitions

Advanced life support: Life-support activities that go beyond basic procedures to include adjunctive equipment and invasive procedures such as intravenous therapy, drug therapy, intubation, and defibrillation (American Heart Association, 2020).

Basic life support: Basic life-saving procedures such as artificial ventilation and cardiopulmonary resuscitation (Olasveengen et al., 2020).

Community paramedicine: A concept that allows paramedics and emergency medical technicians to operate in expanded roles by assisting with public health and primary healthcare and preventive services to underserved populations in the community.

Paramedics are trained in all aspects of basic and advanced life support procedures relevant to prehospital emergency care (Rasku et al., 2019).

Dispatch: Resources assigned to a reported emergency and information sent via radio or computer aided dispatch about where to respond, or the reported nature of the emergency (Olasveengen et al., 2020).

Emergency medical services (EMS): A system that provides urgent prehospital treatment and stabilization for serious illness and transport to definitive care to people in the community (Olasveengen et al., 2020).

Emergency management system: The organized delivery system for EMS within a specified geographic area—local, regional, state, or national.

Emergency medical technician (EMT): Someone who has completed the basic national standard training course, or its equivalent, and is trained in all phases of basic life support. In addition to patient care education, EMTs receive training in ambulance vehicle operations and perform interventions with the basic equipment typically found in an ambulance. EMTs are a critical link between the scene of an emergency and the healthcare system (National Highway Traffic Safety Administration, 2021a).

First responder: Personnel who respond to medical emergencies in an official capacity as part of an organized medical response team, but who are not the designated transporter of the patient to the hospital. First responders are called to the scene by emergency dispatch centers and include police officers, firefighters, rescue squads, or life-saving crewmembers trained to perform basic life support until the EMS team arrives (Hansen et al., 2015).

High utilizer: A term used by fire departments and other allied health professionals to describe people in the community who use the EMS system four or more times per year (Magee et al., 2021).

Incident Command System (ICS): A managed approach developed to assist with controlling, directing, and organizing an incident with multiple resources or a hierarchy of roles (Olasveengen et al., 2020)

Mobile Integrated Healthcare (MIH): A patient-centered, innovative delivery model offering on-demand, needs-based care, and preventive services, typically delivered in the patient's home or mobile environment.

Prehospital care: Treatment that takes place in a dynamic, out-of-hospital environment. Healthcare professionals trained for analytic, resuscitative, stabilizing, or preventive purposes provide this type of care within communities before and during transportation to a medical facility (Rasku et al., 2019).

Triage: Originally a business concept that meant "to sort" and "divide into three," triage was developed by French surgeon Baron Dominique Jean Larrey as a means by which injured soldiers could be assessed on the battlefield as having the potential to return to the fight if treated first. Today, triage is used to sort patients in order of priority from the sickest to the not-so-sick (Nakao et al., 2017).

911: The 911 public EMS system utilizes the National Academy of Emergency Dispatch's Medical Priority Dispatch System to process and prioritize all calls, then dispatch ambulances to the scene for further patient assessment and subsequent transport (Newberger & Braithwaite, 2021).

Assumptions

For this study, I assumed that participants answered the interview questions honestly and truthfully and that they have experiences that are appropriate for this phenomenological study. Because participation in the study was completely voluntary, it was also assumed that participants would express a sincere interest in the study and its conclusions, as firefighters play an enormous role in prevention and interventions that reduce EMS utilization and ED visits.

Scope of the Study

In terms of scope, the study is focused on a single county in Washington State. Furthermore, the study targeted one area of emergency management in that community by focusing the research within fire department staff. Interviews were conducted with fire department staff who are frontline workers responding to EMS calls. This qualitative study was not intended to be statistically generalized to the State of Washington or to other states or countries.

Limitations, Challenges, and Barriers

The strength of the research design and topic was that it balances and enhances the quantitative data already available in relation to the high rate of EMS calls and ED visits, providing a more detailed explanation of this complex problem. The limitations of this approach are that the results in single county in Washington may not be generalizable to other populations (O'Sullivan et al., 2017). An additional limitation was that the qualitative research design increases the chances of researcher bias and unintentional

judgments of the meaning and themes of the qualitative data (Rudestam & Newton, 2015).

Significance

There was limited literature on the perspectives and experiences of frontline EMS responders, especially among fire department personnel. This study relied on qualitative data obtained using interviews with first responders about the root causes of EMS utilization, gathering insight into the reasons for using the EMS system and how to prevent over-use (Weible & Sabatier, 2018). It was essential to understand the perspectives of EMS staff to transform the way emergency responders interact with patients, primary care providers, and the public health system, as well as develop strategies for reducing reliance on emergency care. By reducing EMS calls and preventable ED visits, communities can put those funds toward addressing social determinants of health (SDOH), which in turn, can improve citizens' quality of life.

Social Change

Firefighters have long played a critical role in protecting lives and homes and in preventing and containing wildfires. Throughout the course of history, this profession has also adapted to the social environment to serve the common good. In modern times, that shift has meant that firefighters have gained more clinical skills in medical intervention, now serving as one of the main frontline responders in EMS calls. However, due to this more recent shift, fire departments' role in the medical field is often overlooked in clinical and medical research. Many studies examining how to interact with high-cost, preventable utilization of the EMS and ED systems focus on hospitals or high utilizers

themselves. Studies generally do not consider the perspectives of fire department staff, which limits researchers' understanding of what is happening on the ground. A better understanding of fire departments' strategies and challenges with this population will produce a clearer picture of the phenomenon of high utilization.

The present study can lead to more discussion and continued research involving fire departments and other emergency responders to design better interventions and programs to serve high utilizers, thereby reducing government and medical costs. As a result of this study, government administrators and firefighter chiefs can gain insight into direct service workers' understanding and possible solutions regarding high utilizers of the EMS and ED systems. In addition, administrators and policymakers can examine the system's design, programs, and training, seeking alternatives to reduce preventable EMS calls and ED visits.

Summary

This chapter identified the research gap regarding interventions to reduce EMS and ED utilization through the lens of frontline fire department staff who interact with high utilizers. It also provided background on the U.S. healthcare system related to ED visits and described how frequent use of the system generates increased cost, arguing for the need to obtain knowledge through the lens of fire departments to better understand the phenomenon of high utilizers. Thus, this study aimed to learn from frontline fire department staff based on their perspectives and lived experiences serving high utilizers. Also, to provide a sound theoretical foundation, this chapter discussed the advocacy coalition framework. As for the significance of studying the lived experiences of fire

department staff, the results of the study can have a significant impact on local decision-making and can increase government and community leaders' understanding of the problem. Chapter 2 includes a description of the literature search strategy and literature on high utilization, EMS, and fire departments. Chapter 2 also includes a detailed discussion of key concepts in the study.

Chapter 2: Literature Review

Introduction

The purpose of this multisite case study was to explore the experiences of fire department staff working with high utilizers in single county in Washington. It sought to understand the work experiences of fire department staff in order to glean valuable knowledge and insight into high utilizers of the current emergency response system in single county in Washington. Across the United States, fire departments are frequently on the front lines when assisting the most vulnerable and complex populations. They often interact with the community members who are struggling the most and/or call in most frequently to the EMS system. Firefighters are expected to respond to any domestic emergency at a moment's notice (Jahnke, 2012). Emerging research focuses on understanding firefighters' increased risk for disease and injury, but studies on the perspectives of fire service personnel are lacking.

System administrators and municipal leaders need more information from first responders' perspectives to inform decisions about budget, policy, and the design of the EMS system. The results of this research can help in understanding the work experiences of fire department staff and in learning best practices and interventions within the fire department and beyond to reduce high utilization while improving their quality of life. Insights from fire department staff perspectives will be important in developing and implementing strategies that can promote positive social change and reduce healthcare costs while improving people's lives.

There is a lack of research within the EMS industry on existing practices and standards (Maurin Soderholm et al., 2019). As a result, clinicians, first responders, and EMS system administrators have begun to question their systems, resulting in a revival of scholarly research. Researchers have made great strides in this area, but there are still unanswered questions. There is a need for evidence-based research, and use of the best available evidence for clinical and administrative decision-making, to improve patient health outcomes, the capability and quality of EMS systems of care, and the safety of patients and EMS professionals (Jensen and Travers, 2016). According to the National Highway Traffic Safety Administration (NHTSA, 2017), EMS professionals are not taking ownership of research and integrating it into their practice. Explanations may be lack of funding, not understanding the need for evidence-based practice supported by research, and the segregation of research and patient outcomes (O'Meara et al., 2015).

Prehospital research has been conducted under the umbrella of emergency medicine research, but not first responders or fire departments (Maurin Soderholm et al., 2019). Thus, there is a need for research on evidence-based changes when altering EMS practices or procedures, based on the frontline staff and the environments in which they work.

This chapter focuses on literature about the EMS system and fire departments, high utilizers' use of the EMS system, and the cost that such over-use has on society. This chapter provides a brief review of the literature search strategy and the theoretical foundation and background of key concepts.

Literature Review Strategy

To ensure a comprehensive review of the literature, I conducted an exhaustive search of library databases and used multiple search engines. I conducted this literature review using various sources from Walden University databases such as ProQuest, EBSCOHost, Academic Search, Google Search, PsycINFO Medline Simultaneous Search, dissertations and theses at Walden University, EBSCO Books, Google Books, JSTOR, Lexis/Nexis Academic Universe, Medline with Full Text, Health Complete, ProQuest Nursing and Allied Health Source, PubMed, Sage Premier Journals, and Science Direct. I used a broad range of key search terms to reduce the odds of overlooking relevant studies or information. Key terms included *advanced emergency medical technician, allied health care, basic life support, emergency medical services, emergency medical technician, first responder, fire departments, history of EMS, paramedic, paramedicine, prehospital medical care*, and *prehospital trauma life support.*

I attempted to locate as much research as possible that directly addressed the questions of this study. Very few studies were found that study firefighter perspectives specifically, and none that directly examine the research questions being asked. This lack of available scholarly resources merits additional investigation in this area. I tried to bridge this gap by finding studies that used similar research methods on fire departments.

Theoretical Foundation

Public policy involves the decisions, actions, or non-actions of the authorities having jurisdiction within a political subdivision (Oppermann & Spencer, 2018). The public policy process is complex, due to the vast quantity and diversity of people seeking

political influence. Each individual carries personal biases and beliefs that shape their political perspective and agenda. Stakeholders on one side of an issue seek political influence to focus on and push solutions to their problem, while another group of stakeholders with differing beliefs and agendas seek the same influence to achieve their respective political goals. In this way, different agendas contribute to conflicts during the policy development process. Most policy conflicts involve deep personal values, interests, financial influences, and coercion from many policy actors (Sabatier & Weible, 2017). Public policy research is essential to better understand the interactions over time and the environmental influences that affect public policy (Sabatier & Weible, 2017). Public policy research provides concrete understanding of the policymaking process and the influences that contribute to policy change.

The goal of this study was to better understand the experiences of fire department staff working with high utilizers, and to obtain knowledge to improve practices and policies. A variety of theoretical frameworks are available to investigate and explain the policy process of the fire service. I reviewed several theoretical frameworks prior to selecting the advocacy coalition framework, The advocacy coalition framework, and the multiple streams framework are the prevailing theories related to fire service public policy (Hannah et al., 2022).

Developed by John Kingdon, the multiple streams framework identifies three streams of the policy process: issues, political solutions, and campaigning (Herweg et al., 2018). Normally, each stream exists independently from each other (Sabatier & Weible, 2017). Major policy changes occur when the identification of the problem, the mapping

of solutions, and political support for change all converge. The multiple streams framework provides a precise policymaking process for public policy that may apply to the fire service in various aspects of the profession (Herweg et al., 2018).

While the multiple streams framework may apply to a variety of problems facing the fire service, I decided against this framework in the present study because the multiple streams framework deals with policy changes under ambiguous conditions (Sabatier & Weible, 2017). For instance, when faced with the clearly defined problem of recurring firefighter fatalities in traffic incidents, the suggested solution was to create a standard for professional qualifications of traffic incident management personnel (Hughes, 2021). The recommended solution to the problem was agreed upon by most industry experts and line-of-duty fatality reports. In this example, using the multiple streams framework was helpful with a clearly defined problem, versus a more complex concept of “high utilizers.”

The advocacy coalition framework seeks to explain policy changes over a long span of time (Sabatier & Weible, 2017). This framework defines the policy process in terms of opposition among coalitions of stakeholders that promote their beliefs regarding problems and solutions. The framework is designed to deal with policy problems with significant conflicts and disputes. A considerable number of problems plague the fire service, and separate groups within the fire service may push for different solutions to a problem facing the organization (Diamantes, et al, 2020). According to the advocacy coalition framework, policy stakeholders will seek allies who share core beliefs regarding the solutions to the problem (Gregory et al., 2020). Because it is prevalent in many areas

of the fire service policymaking process, the advocacy coalition framework helps explain policy changes in instances where there is disagreement regarding the solution (Sabatier & Weible, 2017).

Literature Review

Emergency Medical Services

It is important to recognize the foundational concepts of EMS, and the vision that formed the new paradigm over time. While EMS is a newer concept, it is safe to argue that related concepts have existed for centuries. For example, there are records of Emperor Mauricius in 590 CE creating a squad of horsemen with modified saddles that would retrieve wounded soldiers and transport them to medical tents during the Byzantine Wars (Bell, 2009). This was one of the first instances of EMS, where a system was in place to compensate the horseman for each transport of an injured soldier to the medical tent (Bell, 2009). These so-called horse ambulances bring together the three critical components of an EMS system: rescue immediately following an injury, use of specially designed vehicles, and direct transfer to a place of care. Today, first responders, EMTs, paramedics, and fire department staff are likely trained well beyond the skills of the men that rode the horses centuries ago. Further, modern technology has advanced the EMS system with the use of ambulances and helicopters to provide quick transport to a location that can provide critical care (Goyal & Cohen, 2022).

In the 15th century, Queen Isabella of Spain ordered the design of the first "modern ambulance," adding padding to horse-drawn carts and covering them with awnings to transport wounded soldiers during the Moorish Wars to field hospitals in

liberated territories (Bell, 2009). Interestingly, during the Napoleonic Wars, Baron Dominique Jean Larrey recognized the value of bringing medical care to the battlefield; he also designed the “ambulance volante,” or flying ambulance, and began dispatching surgeons and medical assistants to the battlefield, believing that if care was rendered sooner, they might be able to save more lives (Remba et al., 2010). This idea has expanded over the centuries, leading to first responders and fire department staff having more complex training to treat certain medical conditions and to the expansion of mobile medical clinics and mobile urgent care units.

The Napoleonic Wars also saw the concept of triage, from the French *trier*, meaning “to sort.” Larrey proposed identifying those who were the sickest and treating them first (Price, 2018). Although this concept of triage is still seen in today’s EMS system, first responders are not trained to triage in any emergency.

Throughout history and to this day, the EMS system has relied on volunteers and first responders. Concepts of public health and EMS started to emerge in the 1850s, with the passing of the Sanitary Act of 1866 as part of Great Britain’s effort to raise awareness of public health concerns (Lee et al., 2016). Within that act was an effort to systematize ambulance services. The act was passed in response to the cholera outbreak that lasted over 30 years, during which time many physicians realized that transporting the sick via public conveyance (e.g., cabs and hackneys) propagated the outbreak; they needed to isolate infectious patients, which renewed public interest in ambulances (Bell, 2009).

Throughout history and to this day, the EMS system has relied on volunteers and first responders. *A Farewell to Arms* by Ernest Heming was based on his experience as a

volunteer ambulance driver with the Italian Army during the First World War (Rennie, 2018). It was during World War One when the concept of first responders emerged, referring to personnel who would respond to a medical emergency as part of an organized team, triaging the situation and, if needed, directing transport, though the first responder was not the designated transporter to the hospital (Hansen et al., 2015). Today, this role is typically filled by firefighters, but it could also be police officers or those working on a rescue squad (Hansen et al., 2015). The concepts of triage and first responders stayed about the same during World War Two, but improved medicine and surgical techniques and the modernization of vehicles and aircraft helped improve rapid access to definitive care and the formal implementation of triage (Rohlfs et al., 2015).

In the Korean and Vietnam Wars, triage, deployment of resources, and rapid transport of the wounded were formalized and subsequently used as the foundation for modern-day trauma and EMS systems. The use of the helicopter for medical transport had a major impact on survival rates (Bell, 2009). Rapidly transporting injured soldiers on the battlefield to higher-level care facilities made a significant impact on patient outcomes (Dickey, 2015). Communities began implementing trauma and EMS systems because the rapid recognition of medical emergencies and transportation to definitive care are two of the most important concepts in patient survival (Alanazy et al., 2019).

The development of modern-day EMS systems was driven in part by the experiences of the Korean and Vietnam Wars. During the Korean War, the U.S. Army implemented Mobile Army Surgical Hospital (MASH) units, which brought surgeons and resources closer to the battlefield. If injured in the field, soldiers were first sent to

Battalion Aid Stations for initial triage and care, where they were assessed by field medics, nurses, and medical officers and, if necessary, triaged to a MASH unit for more definitive and advanced care (Schauer et al., 2021). A similar concept remains in play today within the civilian world with emergency medical responders, EMTs, and paramedics. Responsibilities can vary, with some serving as first responders and others charged with providing transportation, while also caring for the patient. In hospitals, there are emergency rooms, trauma receiving rooms, and, for the most serious cases, operating suites (Costantini et al., 2015).

In 1966, the Highway Safety Act created a panel of experts that suggested that the federal government provide funding for the development of programs to reduce deaths from cardiac disease and heart attacks, develop formal EMS systems, and train emergency medical responders (Smeby, 2014). In addition to laying the groundwork for EMS systems, this funding is what began the educational advancement of first responders so that they could become EMTs. This funding also led to technological enhancements that enabled first responders to become not just EMTs, but paramedics.

In his 1972 State of the Union Address, President Nixon called for more funding to support the continued development of EMS in the United States, which led to the nation's modern EMS system (Edwards, 2019). Improvements included a set of standards that dictated what an ambulance should look like and what it should carry, as well as a standardized training regimen for EMTs and paramedics (Abir et al., 2021). Interestingly, the Department of Transportation, not the medical system, was tasked with this mission, creating an emergency response system with multiple systems of information by

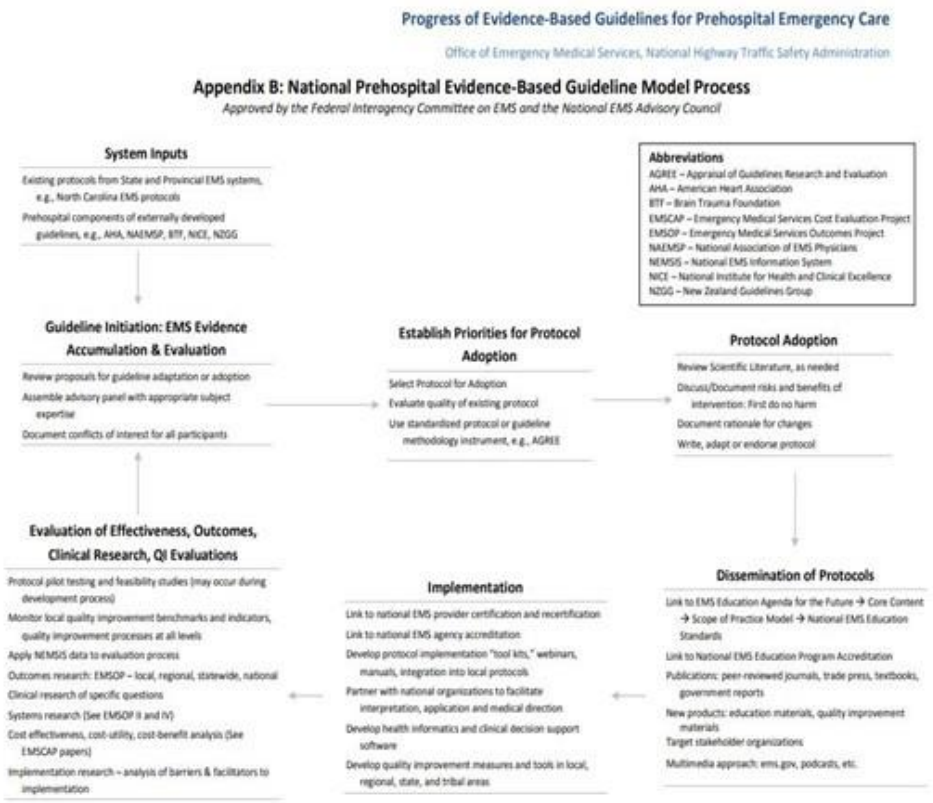
combining FIRESCOPE software and an EMS system developed by the Department of Transportation. FIRESCOPE was a system designed for efficient interagency resource coordination of fire and other emergencies in Southern California. Many different funding sources and government departments played a part in developing what today exists as the National Incident Management System (NIMS), which is explained in more detail later in this chapter.

Despite federal funding, there were many unknowns about how the EMS system would work and how it would be funded. With the limitations to Medicare and Medicaid policy allowed for reimbursement of services other than hospital transports, the Emergency Triage, Treat, and Transport (ET3) model was developed in 2019 as a voluntary, five-year payment model that provides greater flexibility to ambulance care teams to address emergency healthcare needs of Medicare Fee-for-Service beneficiaries following a 911 call (Ostermayer et al., 2017). The goals of the model are to provide person-centered care, increase efficiency in the EMS system, and encourage appropriate utilization of EMS (Cheek, 2021). Another impact was the 2010 passing of the Patient Protection and Affordable Care Act, which effected changes to the EMS system related to financial reimbursement, acuity, volume, and ongoing care delivery initiatives. There is a lack of convincing evidence supporting a recognizable impact of community paramedicine programs on health outcomes, as well as a lack of quality research aimed at evaluating the effects and economic impact of community paramedicine programs (Nolan et al., 2018).

Guidance during 2000's for first responders and prehospital response was limited to medical studies related to the ED. Many providers that make up EMS have applied these interventions and guidelines from a medical perspective and in the hospital environment. In 2012, the National Prehospital Evidence-Based Guideline Model encouraged multiple sources of information for input, including established protocols, scopes of practice, and the input of EMS researchers and professionals (Turner et al., 2021). In this eight-step model, two of the steps are devoted to ensuring the validity and scholarly value of the information gathered, which helps meet the standard that decisions about EMS protocols and guidelines are evidence-based (Turner et al., 2021). In addition to the dissemination of these updates, the designers ensured an evaluative step was included in the model, which required professionals and EMS system designers to review the effectiveness and outcomes of changes. The National Association of State EMS Officials (NASEMSO) endorsed the model, which has proven it to be an effective mechanism for establishing prehospital treatment guidelines and EMS system design (Carter et al., 2018).

Figure 1

National Prehospital Evidence-Based Guideline Model



"The Neglected Disease of Modern Society" is a landmark paper by the National Academy of Sciences that is often credited for blueprinting the foundations of EMS in the United States (Ritchie, 2020). According to this document, EMS of the future will entail community-based health management that is fully integrated with the overall healthcare system. It will have the ability to identify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to treatment of chronic conditions and community health monitoring. This new entity will be developed by redistributing

existing healthcare resources and by integrating with other healthcare providers and public health and safety agencies. It will improve community health and result in more appropriate use of acute healthcare resources. EMS will remain the public's emergency medical safety net (Alanazy et al., 2019).

The EMS Agenda for the Future, a federally funded position paper, represents an original effort by the NHTSA to align EMS with projected future needs and visionary goals. The vision is for EMS to be community focused and fully integrated with the broader healthcare system, possessing the ability both to identify illnesses and to provide appropriate care for acute and chronic conditions alike (National Highway Traffic Safety Administration, 2021b). The EMS Agenda for the Future identified 14 specific EMS attributes in which continued development is necessary to ensure future success: integration of health services, EMS research, legislation and regulation, system finance, human resources, medical direction, education systems, public education, prevention, public access, communication systems, clinical care, information systems, and evaluation (National Highway Traffic Safety Administration, 2021a). This vision suggests the need for medical intervention as opposed to simply transporting patients to the nearest ED, as some interventions are immediately and critically necessary to sustain life under certain medical circumstances.

The NHTSA (2021) also released a document on the EMS workforce and the future of EMS as an industry. Unique to this NHTSA effort was a collaborative approach among the host agency and the University of San Francisco's Center for the Health Professions. The University of Washington's Center for Health Workforce Studies and

Department of Family Medicine also contributed through a paired research project specifically addressing the future viability and sustainability of EMS. Recruitment of EMS personnel was recognized as being an enduring and inherent obstacle, and one in which there are no current national strategies to address it.

Many patients with low-acuity medical conditions depend on EMS and hospital EDs for medical care, even though such conditions are more appropriately treated in nonemergency settings such as clinics and primary care physician offices (Abramson et al., 2021). The highest group using EMS and EDs for low acuity is the homeless population. In one study, a program in Orange County followed a traditional response role, referred to as emergency triage response, where the paramedic evaluated patients on scene and then determined if hospital ED transport was warranted, while a second program in Mecklenburg County used an emergency response system that employed nurses and evidence-based protocols to validate ambulance necessity prior to responding (Ritchie, 2020). The study found a significant difference in the way patients from the two groups followed instructions: the patients receiving instructions over the phone were more likely to follow the given instructions than patients receiving similar instructions in person. However, the Orange County program used a broader spectrum of patient conditions, which may have impacted the results. Nonetheless, high participant satisfaction was realized globally, which was interpreted as a willingness among low-acuity patients to accept alternative solutions that did not result in transport to a hospital ED (Ritchie, 2020).

Hospital ED overcrowding has been documented by the Office of the Assistant Secretary for Planning and Evaluation, whose "Trends in Utilization of Emergency Department Services from 2009-2018" reported that 31.1% of ED visits in the United States was for routine or episodic care rather than for acute or urgent care (2021). There were over 143 million ED visits in 2018, and of these, more than 20 million ended in admission to the same hospital, while over 123 million ended in a release. Numerous studies have developed definitions of ED overcrowding, but in its simplest form, overcrowding exists when there is no space left to meet the timely needs of the next patient requiring emergency care(Salway et al, 2017). The United States spends more money on health care than any other industrialized nation, resulting in a disproportionately sparse number of successful patient outcomes. In 2010, ED visits accounted for approximately 12.5% ($328.1 billion) of overall national health expenditures (Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services, 2021). The estimated average cost of a visit (not adjusted for complexity of care) to the ED in the United States was $530 in 2017, although this was higher for patients with Medicare as an expected payer ($660 per visit) and those with private insurance as an expected payer ($560 per visit), and lower for patients with Medicaid as expected payer ($420 per visit) and those with self-pay or no charge ($460 per visit) (Karaca & Moore, 2020). In the United States, EDs are required to stabilize all patients under the Emergency Medical Treatment and Labor Act (EMTALA), regardless of their ability to pay, though they may be billed for those services afterwards.

From the first organized ambulance service formed within the Napoleonic army in 1792, to the origins of first responders in World Wars One and Two, to the passing of the Emergency Medical Services Systems Act of 1973, and to the NHTSA's 1996 vision of a more community-based healthcare system (Ritchie, 2020), there have been ongoing efforts to manage low-acuity patients, including the diversion concepts promulgated by the American Ambulance Association in 1997. While EMS remains inherently confined within the NHTSA's scope, paramedics as practitioners have realized an expanded role in several different areas (Ritchie, 2020).

Partly a product of an ongoing national nursing shortage and the transport requirements of EMTALA, the critical care paramedic emerged to fill new roles of expanded scope care, which were solidified in 2002 by the Centers of Medicare and Medicaid Services (CMS) through the creation of a new fee schedule allowing for the transport of critically ill patients from an originating hospital to one offering a higher level of care. Efforts to expand the scope of paramedic care to include treatment of low-acuity or episodic patients in the prehospital setting is discouraged by design, as Medicare and other payers only pay for ambulance transports to hospital EDs (Ritchie, 2020).

The problem, perhaps, is that EMS remains fundamentally grounded in the physical act of transporting patients. CMS officials maintain the opinion that EMS are a transportation benefit, an opinion supported by the Social Security Act, whose language frames ambulance transport as being necessary only when other methods of transport are not advised based on the patient's condition. Ultimately, while the bulk of EMS costs are

allotted to sustaining a state of readiness and preparedness to respond to both medical and traumatic emergency situations, reimbursement of EMS remains contingent on patient transport (Ritchie, 2020).

With no payment models that directly reimburse EMS for services provided outside of transportation, some alternative solutions have been offered, such as obtaining federal healthcare innovation grants, sponsorship funding, bundled payment, or cost avoidance programs, the latter three of which are contingent on stakeholders such as hospitals and accountable care organizations passing along shared savings to EMS agencies (Zavadsky & Hooten, 2016). One study found that in 31.8% of events, fire, and police first responders and first responder interventions were associated with significantly higher odds of survival (Salhi et al., 2022). The same study also found that in an out-of-hospital cardiac arrest program, 72% of respondents came from the fire service rather than from non-profit or private providers. There are mixed models where the fire service and private providers work together to deliver emergency responses. One study found that a majority (57%) of fire department first responders are basic life support providers, while 36% have advanced life support training (Price, 2018).

The largest source of funding in health care is the federal government through Medicare and Medicaid, followed by private insurance carriers (Blewett et al., 2018). Providers are struggling to stay in business in the face of the steadily increasing cost of providing emergency medical care, as well as declining reimbursement funds from Medicare and Medicaid (Blewett et al., 2018). According to the Office of the Inspector

General of the United States (2021), in 2005, patients and healthcare providers spent more than $3 billion on emergency and nonemergency prehospital medical transport.

The existing EMS reimbursement model is a flawed paradigm based on a CMS fixed-fee schedule, which often fails to compensate for total operating costs (Ritchie, 2020). There is an excessive cost in maintaining a constant state of emergency preparedness, a system where costs can only be recovered through increased patient transport. Such a paradoxical system financially incentivizes an upsurge rather than a reduction in hospital ED patients, therefore undermining the collaborative efforts outlined in cost avoidance and other shared-savings programs aimed at keeping patients out of the hospital.

In a research effort made possible through a CMS grant, authors studied a random 5% of Medicare claims between 2005 and 2009 involving Medicare-covered ambulance events (Jones, 2020). The researchers identified two aims of the study: predicting the likely impact on EMS transport numbers if the CMS allowed providers to manage certain patients through alternative measures not resulting in hospital ED transport and calculating the resulting cost savings. The study found that EMS transported 21 million patients to EDs and that EMS providers frequently transported patients for conditions that would not qualify as true emergencies. Furthermore, through a validated algorithm, it was estimated that 12.9-16.2% of Medicare patients were transported for complaints that were either of a lower acuity or were otherwise best treated in the primary care setting. In fact, according to the study's data, around 34.5% of patients not admitted to the hospital were discharged with low-acuity conditions that did not require hospital ED level of care

(Jones, 2020). It was further concluded that these low-acuity patients account for 15.6% of all EMS transports to hospital EDs that are covered by Medicare. It was also estimated that Medicare could have saved $560 million had there been alternative treatment options that circumvented ED transport.

A key difference between hospitals and EMS agencies is that the CMS offers hospitals partial reimbursement for uninsured patients through Hill-Burton and Disproportionate Share Hospital payments (Roeper et al., 2018). EMS receive no such reimbursement from the CMS and often recover no money for uninsured transport. Within the language of the Patient Protection and Affordable Care Act, EMS are among the Essential Health Benefits outlined in Title I, Subtitle D, Part I, Section 1302. EMS falls under exchange-based health plans, but the focus is on hospital ED services, with no reference to EMS (Roeper et al., 2018). However, EMS are mentioned within Title V Healthcare Workforce, Subtitle B, which recognizes the importance of integrating EMS into the broader healthcare system and of facilitating possible reimbursement for services extending beyond ED transport. The National Healthcare Workforce Commission recommends that EMS, as an industry, transition beyond traditional roles and expand services to befit a more community-based system focused on treatment of chronic health conditions (Clark et al., 2017).

In some states, EMS are not considered an essential service. In these places, EMS do not receive taxpayer money for their services, and thus their access to resources and funding is significantly lower than their emergency counterparts(Spitzer, 2020). When a fire department is the sole provider of first responder and advanced life support transport

services, the department, and therefore the community, receive a greater benefit relative to the number of resources spent (Fogley, 2014). The rationale for cross-training fire department personnel is that the provider is both a firefighter and a paramedic, which theoretically creates efficiencies where personnel can respond to fire and rescue responses as well as emergency medical care requests (Lindsey & Gunderson, 2020). There are potential downsides, however, including not having personnel available for fire and rescue when assigned to a medical emergency and the need to master and maintain skills excellence in multiple disciplines. There is also the question of having too many paramedics on staff, which results in fewer opportunities for individual paramedics to perform skills and maintain their proficiency (Lindsey & Gunderson, 2020).

In 2004, the Homeland Security Presidential Directive charged the Secretary of Homeland Security with developing and administering the National Incident Management System (NIMS) (FEMA, 2017). This established a set of uniform processes and procedures that all emergency responders at all government levels would use to conduct response operation, regardless of cause, size, or complexity. NIMS was created from historical knowledge and events, responding to the need for a consistent nationwide template that would enable governments and responders to work together effectively and efficiently to manage incidents and planned events (FEMA, 2017). NIMS works closely and proactively with public departments and agencies as well as the private sector “to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment” (FEMA, 2017).

NIMS and the 911 System

Before NIMS, the concept of an Incident Command System (ICS) was developed more than 30 years ago, in the aftermath of a devastating wildfire in California. Over the course of 13 days in 1970, 16 lives were lost, 700 structures destroyed, and over half a million acres burned (Leonard, 2021). The overall cost and loss associated with these fires totaled $18 million per day. The responding agencies cooperated to the best of their ability, but numerous problems with communication and coordination hampered their effectiveness. This event led Congress to mandate that the U.S. Forest Service design a system that would expand the capabilities of Southern California wildland fire protection agencies to effectively coordinate interagency action and to allocate suppression resources in dynamic, multiple-fire situations (Leonard, 2021).

The California Department of Forestry and Fire Protection; the Governor's Office of Emergency Services; the Los Angeles, Ventura, and Santa Barbara County Fire Departments; and the Los Angeles City Fire Department joined with the U.S. Forest Service to develop the system (Fagel et al., 2021), which became known as FIRESCOPE (Firefighting Resources of California Organized for Potential Emergencies). Two major components came out of this work: ICS and the Multi-Agency Coordination System. FIRESCOPE ICS is primarily a command-and-control system delineating job responsibilities and organizational structure for the purpose of managing day-to-day operations for all types of emergency incidents (Fagel et al., 2021). It was formally adopted by the Los Angeles Fire Department, the California Department of Forestry and

Fire Protection, and the Governor's Office of Emergency Services, and it was endorsed by the State Board of Fire Services (FIRESCOPE, 2022).

FIRESCOPE ICS was reviewed for the possibility of a national application beyond the original purpose for which it was designed. By the 1980s, the use of ICS in response to non-fire incidents was increasing. Although FIRESCOPE ICS was originally developed to assist in the response to wildland fires, it was quickly recognized as a system that could help public safety responders provide effective and coordinated incident management for a wide range of situations, including floods, hazardous materials accidents, earthquakes, and aircraft crashes (Fagel et al., 2021). The system was flexible enough to manage catastrophic incidents involving thousands of emergency response and management personnel.

By making relatively inconsequential modifications to FIRESCOPE ICS's terminology, organization, and procedures, the NIMS ICS was adapted beyond fire events to all events and environments, thus yielding the National Interagency Incident Management System (Fagel et al., 2021). In the years since FIRESCOPE and NIMS were blended, the FIRESCOPE agencies and the National Wildfire Coordinating Group have worked together to update and maintain the ICS Operational System Description.

Recognizing the continuing challenges faced by the fire service in applying a common approach to incident command, the National Fire Service Incident Management System (IMS) Consortium was created in 1990 (Fagel et al., 2021). Its purpose was to evaluate an approach to developing a single command system. The consortium consisted of many individual fire service leaders, representatives from most major fire service

organizations, and representatives from federal, state, and local agencies, including FIRESCOPE and the Phoenix Fire Department. One of the significant outcomes of the consortium's work was an agreement on the need to develop operational protocols within ICS, so that fire and rescue personnel would be able to apply ICS as one common system (Fagel et al., 2021).

In 1993, the IMS consortium completed its first document: Model Procedures Guide for Structural Firefighting. As an outcome, FIRESCOPE incorporated the model procedures, thereby enhancing its organizational structure with operational protocols (FIRESCOPE, 2022). These changes enabled the nation's fire and rescue personnel to apply ICS effectively regardless of what region of the country they were assigned to work. The National Fire Academy, having already adopted FIRESCOPE ICS in 1980, incorporated this material into its training curriculum as well. NIMS provides a consistent, flexible, and adjustable national framework within which government and private entities at all levels can work together to manage domestic incidents, regardless of their origin or nature. "This flexibility applies across all phases of incident management: prevention, preparedness, response, recovery, and mitigation (Federal Emergency Management Agency, 2017). NIMS provides a set of standardized organizational structures—including ICS, the Multi-Agency Coordination System, and public information systems—as well as requirements for processes, procedures, and systems to improve interoperability among jurisdictions and disciplines in various areas.

The Department of Homeland Security acknowledges that the overwhelming majority of emergency incidents are handled daily by a single jurisdiction at the local level. However, there are instances in which effective domestic incident management operations depend on the involvement of emergency responders from multiple districts, as well as personnel and equipment from other states and the federal government (Ryan, 2016). These instances require effective and efficient coordination across a broad spectrum of organizations and activities. The success of such operations depends on the ability to mobilize and effectively utilize multiple outside resources. These resources must come together in an organizational framework that is understood by everyone and must utilize a common plan, as specified through a process of incident action planning.

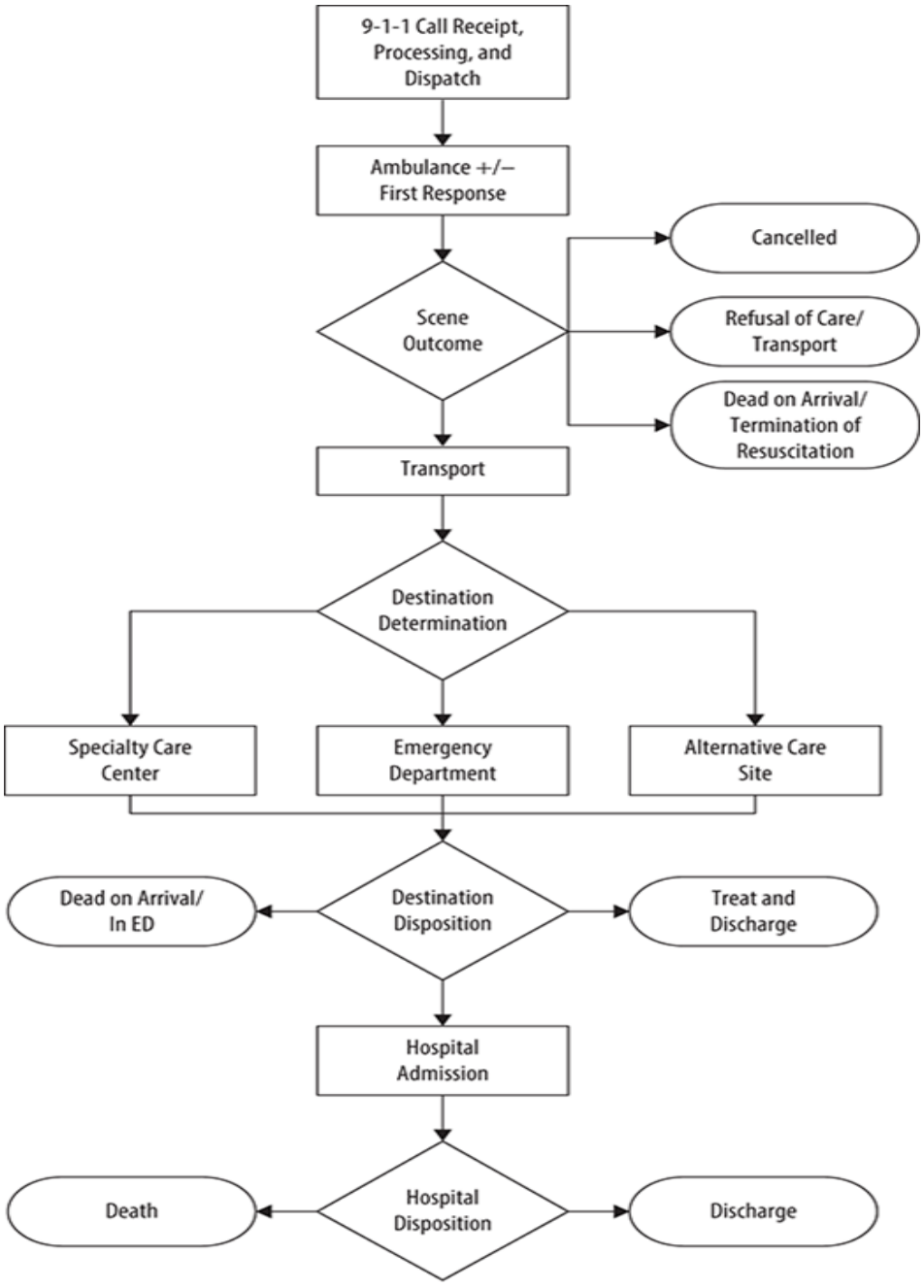
When Homeland Security released NIMS on March 1, 2004, Secretary Tom Ridge and Under Secretary Brown specifically highlighted compliance with ICS as being implemented quickly (Cushman & Cooney, 2016). They recognized that in some cities, the fire and police departments had worked together using ICS for years. In other places, only the fire department had used ICS. Although law enforcement, public works, and public health were aware of the concept, they regarded ICS as a fire service system. NIMS ended this discrepancy because Homeland Security Presidential Directive 5 requires state and local adoption of NIMS as a condition for receiving federal preparedness funding.

The majority of patients who enter the emergency healthcare system do so by making a telephone call to the 911 system. The Medical Priority Dispatch System and the Association of Public Safety Communications Officials' Emergency Medical Dispatch

Program are specifically designed to extract the caller's information through a question-driven protocol and to direct appropriate resources based on that information (Cushman & Cooney, 2016). The instructions could include directing a bystander to perform CPR, assist with the delivery of a newborn, or apply self-care such as hemorrhage control or aspirin administration. Figure 2 shows an EMS system design.

Figure 2

EMS System Design (Cushman & Cooney, 2016)



Fire Departments

A significant loss of life and property due to fires has led governing authorities to develop solutions to prevent and reduce harm from fire events. The modern-day fire service has evolved over the course of history. Some elements of modern fire service equipment and personnel mirror the distribution of fire protection measures distributed throughout the ancient city of Rome, as many fire service experts agree that the first known organized fire service originated at the height of the Roman Empire (Aldrete, 2018). Emperor Augustus created the Vigiles in 6 CE to mitigate the risk of fire that had previously plagued the capital of the empire (Aldrete, 2018). Rome suffered several major fires prior to the establishment of the Vigiles due to its dense population and highly combustible construction and housing materials.

The Roman authorities divided the city into fourteen patrol zones, in which they distributed fire protection equipment and cohorts (Aldrete, 2018). In addition to exhibiting some form of police authority, the Vigiles patrolled Rome to prevent fires from spreading through enforcement of laws related to fire prevention regulations. The Vigiles protected the capital of the Roman Empire for over four hundred years, until the collapse of the empire (Aldrete, 2018). The fire service did not advance for hundreds of years following the downfall of the Roman Empire, as civilizations continued to converge and form many great cities throughout the ancient world.

In the early 1600s, London developed fire protection measures and policies that would later contribute to the growth and evolution of the fire service in the United States (London Fire Brigade, 2018). Fire service policies in the United States have been shaped

by policies and laws that often resulted from reactive measures related to tragic or financially costly events. Following the Great Fire of London in 1666, when crowded homes, dense population, and flammable building materials contributed to widespread death and destruction throughout the city, the fire service experienced major advancements (Field, 2017). The insurance industry also contributed to the development of the first fire brigades in London, offering subscriptions to buildings for insurance and fire protection services (London Fire Brigade, 2018). Each insurance company developed its own fire brigade that would be sent to the insured properties to minimize damage (London Fire Brigade, 2018). Procedures from the United Kingdom thus contributed to the development of the United States' initial fire service.

Due to the dense populations and combustibility of construction methods and building materials, fire incidents plagued early settlements in colonial America. A major 1608 fire in Jamestown contributed to the development of the first form of fire incident response in the New World (Hughes, 2021). Great conflagrations swept through and consumed many communities. As a result of several such fire events, communities established fire protection services, fire prevention laws, and building codes (Hughes, 2021). The original firefighters consisted of members of the community who would band together with buckets of water to suppress fires.

Some communities established fire wardens to monitor and enforce strict fire prevention ordinances. Like the Roman Vigiles, fire watch personnel would observe and report any observations of fire. One of the first known organized fire service organizations began in 1648 in New Amsterdam, later renamed New York (Hughes,

2021). Another early form of fire service was a coordinated volunteer fire suppression department, formed in 1736 by Benjamin Franklin in Philadelphia following a widespread fire. The first paid fire department was established in Cincinnati in April 1853 (Hughes,2021). Government-paid fire departments eventually formed, providing services for major metropolitan areas. Due to a lack of federal regulation, many of the early fire services operated at the local level of government. To this day, the modern fire service throughout the United States mostly operates at the local level of government.

Throughout the history of the fire service, each local level of the profession has operated independently from each other (Bel & Belugas-Castro, 2021). This form of autonomy has resulted in a wide range of strategies and tactics regarding fire department operations. The modern fire service still exhibits this siloed individualism regarding operations. Prior to the Civil War, many fire departments operated and were organized like a business. As in London, many fire service organizations were private companies, paid for by the insurance industry (Hughes, 2021).

The modern fire service also continues to operate according to a paramilitary organizational style, even though the American fire service has evolved significantly since the development of the early colonies, when the original fire suppression personnel were members of the community who carried buckets of water with the common goal of preventing the fire from consuming the entire community (Hughes, 2021). The original members of the “bucket brigade” did not need specific skills or training; they only needed the ability to carry buckets of water to the fire and splash the area. As the problem of fire and the impact of conflagrations grew, the demand developed for the government to take

the lead of the fire service (Hughes, 2021). The growth of the fire service was thus influenced by public demand and expectation. The skills needed for effective fire ground operations eventually spilled into the roles of EMS and technical rescue.

Significant advancements in the 20th century contributed to the rapid evolution of the fire service. The public demand for rapid emergency medical care quickly expanded across the nation, with many fire departments across the nation broadening the scope of their service to include emergency medical response to meet the needs of their community (Cannuscio et al., 2016). Public demand for rapid prehospital emergency medical care contributed to the quick advancement of EMS throughout the United States (Wang, 2019).

Still, like the fire service, much of the modern EMS system was influenced by military war-time practices. In a study that showed the importance of changing the culture of the EMS professional's response when providing mental health care, Jungmann (2018) revealed that many patients were released from the ED shortly after first responders dropped them off due to a lack of resources and inpatient beds. That research is relevant to the present study's goal to understand the culture of fire departments and how to view people in the community with mental health issues.

The Mesa Fire Department in Arizona was an early adopter of collaborating with hospitals to reduce EMS calls during the flu epidemic in 2007 (Durham, 2014). Mesa Fire & Medical teams came up with an idea to handle the basic life support calls with trained paramedics and EMTs using vehicles called Transitional Response Vehicles. These teams had one paramedic captain and one firefighter EMT, with the main objective of utilizing

the resources in such a manner that these calls would be responded to without dispatching the full fire department crew engine. Based on data showing that 7-10% of calls involved behavioral health issues and that 80% were not emergency calls, the department expanded the program in 2013 to include advance practice providers as well as licensed crisis counselors to manage more complex medical and behavioral health issues (Durham, 2014). By expanding the team, the unit was able to resolve most issues without transporting the patients to the hospitals. The behavioral health units are staffed by one master's level licensed clinician and one EMT fire department staff member. The Mesa Fire Department concluded that they had a 75% diversion rate for patients treated under this new program (Durham, 2014).

Terp et al. (2017) conducted the first peer-reviewed longitudinal description of trends during the enforcement of the Emergency Medical Treatment and Labor Act (EMTALA). The study concluded that since EMTALA, avoidable ED utilization has increased, as all patients presenting to an ED are required to receive timely medical screening and evaluation regardless of their ability to pay. Despite this change in the law, the study did not highlight how such a change impacts EMS workers, including fire departments.

The role of the fire service in rescuing and rendering aid to fire victims contributed to the transition of the fire service to include EMS (Hughes, 2021). The fire service has contributed to many initial advancements in the origin story of EMS, and the fire service has evolved alongside EMS to provide rapid prehospital emergency care. A reduction in the number of fires and the increased demand for additional services are

contributing factors for fire service's evolution into part of EMS (Cannuscio et al., 2016). Approximately 85% of the more than 43,000 fire departments across the United States provide EMS (Hughes, 2021).

High Utilizers

The definition of high utilizers, or high-frequency users, varies across studies. The definition of high-frequency visitors to rural EDs is six or more annual visits, with other useful subsets including very high-frequency users (12 to 19 annual visits) and super users (≥ 20 annual visits) (Matsumoto et al., 2017). Despite how regularly researchers discuss high-frequency ED users, there is no consistent definition; published studies use a range of definitions and acknowledge that a standard has not been established. The most common standard used to define high-frequency ED users is four or more annual individual patient visits, though definitions have ranged from three or more to 12 or more annual visits. These definitions generally apply to 3-10% of the patients who visit an urban hospital ED.

One study attempted to develop a definition of frequent use of an ED by comparing differences in the observed frequency distribution with that of a theoretical frequency distribution (Matsumoto et al., 2017). A retrospective analysis of ED attendance and minor injury unit attendance in one city over one year was conducted. From these data, the expected frequency distribution was determined based upon a Poisson distribution, which led to a proposed definition of "frequent user" as any patient who makes more than four attendances per year. The study identified that there is a group of patients who present repeatedly due to non-random events, confirming the existence of

"frequent users" (Matsumoto et al., 2017). Their characteristics are clearly different from those of other patients in the ED.

Another study used the term "ED over-use," defined as repeated, non-urgent visitation to the emergency room, when outpatient visits to either primary care or a mental health office would be more reasonable (Matsumoto et al., 2017). Correct identification of frequent users of an ED may permit the use of targeted interventions to meet their healthcare needs. Understanding preventable EMS calls and ED visits versus non-preventable ones is helpful in developing interventions for this population. Table 1 shows the published definitions of frequent users of EDs, represented as visits per year unless otherwise stated.

Table 1

Definitions of EDs

Authors	Country	Definition
Lucas and Sanford (1998)	United States	2 in the previous month or 4 in the previous year
Zuckerman and Shen (2004)	United States	3
Genell Andren and Roseenqvist (1987)	Sweden	4
Hansagi et al. (2001)	Sweden	4
Olsson and Hansagi (2001)	Sweden	4
Byrne et al. *(2003)*	Ireland	4
Sun et al. *(2003)*	United States	4
Mandelberg et al. *(2000)*	United States	5
Williams et al. (2001)	United Kingdom	7
Kne et al. *(1998)*	United States	11
Chan and Ovens (2018)	Canada	12
Lynch and Greave (2000)	United Kingdom	6 in 6 months
Pope et al. (2000)	Canada	Several attendances and potential for heavy future use

Without intervention, some frequent users of the ED become infrequent users over time. One study had an initial cohort of 232 patients attending ≥ 4 times per year. At the end of a two-year follow-up, 159 patients were alive and living in the area, of whom 43 remained heavy users of the ED (Shen et al., 2018). Other investigators have found

similar patterns of reduced use, demonstrating that only 17% of patients remained frequent users of the ED over a four-year period (Kne, 1998).

In a systematic review of 39 articles via PubMed and research from the National Library of Medicine related to non-urgent use of the ED from 1980 to 2008, researchers had difficulty clearly classifying non-urgent ED visits due to the lack of a clear definition (Matsumoto et al., 2017). Non-urgent ED visits can have two major conditions: the use of public insurance, such as Medicare and Medicaid, or being uninsured. Brim analyzed 49,725 ED visits in 2005 in Washington State using a quantitative cross-sectional descriptive design (as cited in Noe-Norman, 2017). The convenience sample comprised adults who sought care from the ED during normal primary care business hours. Brim defined non-urgent ED use as patients having stable vital signs and ED providers offering basic care. Medicare and Medicaid insured the majority of the sample population, and 31% were uninsured. Surprisingly, 38% listed the ED as their primary source of care (Noe-Norman, 2017). These findings support the evidence that public insurance leads to ED over-use.

A national sample of 241,167 ED visits evaluating insurance type and primary care treatable visits from 1997 to 2009 showed that ED visits among Medicaid users or people with no insurance were double that of individuals with private insurance, who had more access to primary care treatable visits during hours of availability (Kim et al., 2017). Another study conducted a cross-sectional analysis of a national sample of 32,737 adults using the 2011 National Health Interview Survey, which focused specifically on insurance type and reason for ED use (Noe-Norman, 2017). The study supported the

findings that users of Medicare and Medicaid frequented the ED due to lack of access and a perceived need for an ED visit. This finding supported the evidence that patients with Medicaid insurance were frequent ED users and in the greatest need of a new healthcare model.

In an evaluation of the Affordable Care Act's expansion of healthcare access, ED use was analyzed in 12 local hospitals by 25,000 Medicaid recipients in Portland, Oregon, from 2008 to 2009 (Zhao et al., 2020). Users of Medicaid were 40% more likely than non-users to frequent the ED for primary care treatable conditions within primary care hours of operation. These statistics add evidence for the need for more coordination and behavioral interventions to solve the problem of ED misuse. Research concerning primary care mental health and ED utilization rates among patients with chronic medical conditions in Pennsylvania found that care was sought most for diabetes mellitus, high blood pressure, cardiovascular disease, congestive heart failure, asthma, and chronic obstructive pulmonary disease (COPD) (Park et al., 2017). In addition, data from 2008 to 2011 were analyzed from Blue Cross of Pennsylvania using a difference-in-differences research design. Participants in the patient-centered medical home (PCMH) with chronic illness had lower ED rates than the non-PCMH group (David et al., 2015). The researchers attributed this reduction to improved preventive care.

Hostettler (2016) addressed the excessive cost of health care and the impact of repeated and often excessive use of hospital EDs by a small group of patients with chronic medical conditions. The study specifically focused on heart failure, a condition reported to affect 5.8 million people in the United States. While other chronic medical

conditions such as diabetes and COPD also represent a considerable number of repeated visits to EDs, heart failure alone accounts for nearly one million hospitalizations annually and roughly 25% of 30-day rehospitalizations, which subsequently reduces reimbursement amounts to hospitals via readmission penalties (Hostettler, 2016). Hostettler claimed that reducing hospital readmissions requires collaboration and a need for alternative solutions.

In a dissertation study, Scharf (2019) used data from a mobile integrated community health pilot program in Queen Anne's County, Maryland, to study diagnosis prevalence and comorbidity of participants enrolled in the MIH program. The study focused on frequent 911 use and ED overcrowding. Findings from the study revealed that 94.85% of participating patients were comorbid, with an average of 5.88 diagnoses per patient.

The Green Valley Fire District in Green Valley, Arizona, sponsors a nurse practitioner MIH program titled Fire-Based Urgent Medical Service (FBUM), which was launched in March 2015. The program features licensed nurse practitioners (NPs) and an NP hotline that can be called an alternative to 911. Spera (2018) evaluated FBUM's success at decreasing ED visits for low-acuity patients, finding that 90.9% of participants called the NP hotline as opposed to calling 911.

Mesa Fire & Medical Department, located in Maricopa County, Arizona, sponsors an MIH program aimed at diverting low-acuity patients away from EDs. Green (2018) studied 65 aspects of another advanced practice MIH program geared toward ED

overcrowding, revealing that the program had resulted in 64.3% of patients being successfully diverted to more appropriate facilities.

There have been many studies and strategies targeting high utilizers and how to reduce EMS and ED frequency. State policy has sought increased public access to health insurance. Incorporated case management interventions have shown some success but have failed to meet the needs of the chronically mentally ill and have increased the cost of providing case management services (Dieterich et al., 2017). Some states have considered implementing higher copays to reduce ED visitation due to low copays being linked with increased visitation; however, studies have showed that collecting copays for non-urgent visits did not significantly change ED or outpatient medical provider use among Medicaid beneficiaries. Still, due to the ethical dilemma of creating a barrier to imminent care, most states' plans have been reconsidered. Patient education focused on ED usage has also been successful, but long-term effects have yet to be determined (Morley et al., 2018).

Given that social determinants of health (SDOH) are a major factor for individuals who frequently use the EMS and ED systems, it is important to understand the impact of SDOH on behavioral health and health conditions. One study concluded that there is a link between mental disorders and several other physical health condition interventions that would reduce inequalities and thus improve health for the overall population (Kivimaki et al., 2020). The findings of that study suggest that policymaking at all levels of governance would make a positive difference; even interventions at a local fire department could impact SDOH and improve health across society.

Alcohol-intoxicated individuals in one study were identified and diverted to sobering alternative facilities instead of the ED (Marshall et al., 2021). The study concluded that EMS played an essential role in facilitating triage to alternative sobering facilities and reducing ED visits. This study is critical to the present research project, as it shows the impact of EMS in reducing ED admissions and the importance of understanding frontline fire department staff. Investigating patients who had a primary care-related emergency department (PCR-ED) visit, another study found that PCR-ED patients had actual or perceived problems accessing appropriate care (Schlesiger, 2021). This study also identified a need for patient care coordination, finding that people with care coordination had a lower rate of return to the ED. The savings associated with reduced PCR-ED visits were more significant than the cost of implementing a navigation program. The results showed that many conditions are preventable, and that appropriate primary care and behavioral health visits could decrease costs to the healthcare system. In light of this, the present study contributes by helping to understanding the impact of other systems, including the fire department, on care coordination and how it can increase access to care and reduce EMS utilization.

According to the Mobile Integrated Healthcare and Community Paramedicine (2015) survey, the Colorado Springs Fire Department answers around 60,000 911 calls annually. This fire department collaborated with a couple of local hospitals to research these large volumes of 911 calls and to formulate a plan to redirect and oversee some of them without using the ED. The research showed that 77% of the patients had mental health issues along with other medical conditions. That study led to the creation of

Community Assistance Referral and Education Services (CARES), a program in which EMTs and paramedics do home visits, provide education, and navigate patients to mental health or other community resources. The CARES program results showed a 50% decrease in 911 usage among two-thirds of patients.

In 2008, the San Diego Fire-Rescue Department was struggling with a high homeless population and EMS over-use, which led to a partnership with Rural/Metro Ambulance to improve referrals to community resources and create an electronic referral system (Jensen, 2016). They adopted a software called Street Sense, which uses algorithms to sift through EMS patient care reports and identify frequent callers. In addition to finding frequent users, the Street Sense algorithms look at all the patient care reports for a particular patient and do a computer-aided dispatch in real time. While developing this referral system, the department faced challenges such as privacy and consent from patients, impact on workforce, collaboration procedures, and case management. Despite all these challenges, the integration with technology resulted in a significant drop in transports among the most frequent EMS users in San Diego.

In response to a substantial increase in ED care in Dallas, Texas, the Fire-Rescue Department developed a program in March 2014 called Mobile Community Healthcare Program (MCHP), whose goal was to identify high utilizers, with a focus on reducing their dependence on the 911 system (Seals & Ngugi, 2014). The fire department had an assigned case manager who collaborated with frequent users and community organizations. The aim was to help high utilizers become less dependent on the EMS system. The evaluation of the program over a six-month period indicated that the

majority of patients enrolled in the program reduced their overall 911 system utilization. After this success, the fire department expanded the program to local hospitals. In this phase, MCHP was designed such that in-home services were offered on behalf of the hospitals to the patients who had restricted mobility and transport to the hospitals. MCHP also provided post-discharge services during this phase. Those enrolled in the program had 24-hour access to the mobile community paramedics and hence did not have to use 911 calls for any assistance.

Another study investigated the utilization of ambulance services resulting from alcohol and drug intoxication over a period of one year in a metropolitan area, emphasizing characteristic differences between patients with one-time use versus those with repeated use (Campbell, 2020). The results showed that 92% of the patients used the ambulance services only once, whereas the 8% of the patients who were transported by the ambulance multiple times had an M/SUD condition. Sobering centers might relieve hospital EDs of patients not requiring acute emergency care and, in addition, could provide intervention services to prevent relapses (Samuels, 2021). This research is necessary because it shows how the EMS system's ability to provide interventions for M/SUD populations could lead to a reduction in EMS use and ED visits.

In a descriptive analysis of a population who frequently use urban EMS, Norman et al. (2016) identified common factors that contribute to such use. The study concluded that many of the patients were using EMS for recurring chronic conditions. Still, most of them did not have a care coordinator or case manager to support their ongoing conditions. With better care management, readmissions could decrease. This research shows a strong

correlation between substance abuse/misuse and high/super-frequent EMS use (Norman et al., 2016). It is thus essential to understand the fire department's response to managing high/super-frequent EMS users.

Local Background and Context

In single county in Washington, there was a 50% reduction in ED use and hospital readmission for patients who were assigned a case manager as soon as they called 911 (Bevin et al., 2018). The connection because EMS and case management or other community services is vital, and it is thus important to understand the views that fire departments have on community coordination and referrals. In a survey of preventable hospital visits and data across Washington State, Tacoma-Pierce County Health Department (2016a) concluded that there was relatively high rates of preventable hospital visits and low rates of access to care. The average rate of preventable hospital stays in Washington was 36 per 1,000 people in Washington State. Given this information, it is essential to understand how to improve access to care and reduce preventable hospital visits through the lens of frontline EMS staff.

Summary

The review of the literature documented the key concepts of the study, including theoretical foundations, EMS, NIMS and the 911 system, fire departments, high utilizers, local background, and the context of where the study was conducted. Literature from the perspective of fire department on interventions and strategies, while growing, is extremely limited. Studies conducted in EMS and fire departments are crucial for improving our knowledge of high utilizers, who demand a high number of resources in

the community. Additional knowledge will direct administration and policy toward more effective programs and policies to reduce utilization. Fire departments across the country are struggling to maintain adequate personnel to meet the needs of the communities they serve. The fire service is steeped in a rich tradition of family values and serving the community. The review of literature also highlighted the importance of understanding complex medical and behavioral health conditions and the need to connect individuals with care management to reduce readmissions Past research also shows a strong correlation between substance abuse/misuse and high/super-frequent EMS use.

According to Zhou many studies revealed a dynamic in which public health insurance synergistically increased ED use (2017). Non-urgent ED use from lack of access to services was also a contributing factor to increased financial cost and ED visits in this population. The literature review highlighted the need for more qualitative methods and studies within the EMS and fire department. As pointed out, for most of the history of EMS and fire departments, they have not been well positioned for data collection. However, with better systems in place today, fire departments have access to more information and means of collecting information. It is easy, for example, to find details on the local fire department because information can be accessed from state and local databases.

Moreover, research in other areas can impact the design of fire department services. Fire departments have pulled on research from a wide range of disciplines, including medicine, military, kinesiology, sociology, psychology, and many others. However, there is a clear need for internal research within fire departments to improve

knowledge and, in turn, to influence other professionals such as those in medicine, political science and policy, social services, and others. If department budgets are to expand and if there are to be changes within fire departments and beyond, those improvements need to be based on data derived from valid research methods. Without data to support the need for different interventions, programs, and funding for fire departments to work with high utilizers, nothing will change the status quo. In Chapter 3, the methods, materials, procedures, participants, sampling, data collection methods, research design, and data analysis of this study are presented.

Chapter 3: Research Method

Introduction

Fire departments play a key role in encountering community members who frequently make calls to the EMS system and utilize emergency departments. Specifically, fire department personnel have a wealth of knowledge on high utilizers and the situations that commonly lead to EMS calls or ED visits. This chapter introduces the qualitative case study on the fire department in single county in Washington, which was conducted to obtain knowledge on interventions to reduce avoidable EMS calls and ED admissions.

The purpose of this case study was to explore fire department personnel's work experiences with high utilizers. This research thus examines the work experiences of fire department staff, who are frequently on the front lines when assisting the vulnerable population who tend to use the EMS system the most often, to glean valuable knowledge and insight into high utilizers in the current emergency response healthcare system.

In this chapter, I outline the qualitative research methods used in this study to analyze fire department personnel's perceptions of their interactions with high utilizers of the EMS system. The chapter provides a framework for examining the interventions and experiences of firefighters assisting high utilizers. I collected data by interviewing firefighters and chief officers using narrative inquiry, specifically oral histories. A series of interview questions was created to elicit responses from a participant pool of firefighters in single county in Washington State.

This chapter includes the study design and the justification for that design, along with the instruments used in the study. Furthermore, the chapter outlines the case selection parameters, research question, role of the researcher, participant selection criteria, and ethical considerations and protections. The chapter concludes with a description of data collection procedures, data analyses, and validity and trustworthiness.

Research Design

This study employed a qualitative design with a case study methodology. Qualitative research is warranted when researchers set out to comprehend the environment in which they live and work through experiences, opinions, reflections, and observations rather than through statistical analysis (Creswell, 2018). Qualitative methods are best for describing, decoding, and comprehending the meaning of naturally occurring phenomena in the social world (Creswell, 2018). The objective of this research was to examine the perspectives and experiences of fire department staff regarding high utilizers of the EMS system. The study adopted the following research question: What interventions are helpful in reducing EMS calls and unnecessary ED visits?

A case study design was appropriate to address the research question and gaining a deeper understanding of participants' perceptions. Single case study research explores a specific group in an in-depth exploration of intricate phenomena within a specific context (Yasir et al., 2019). The use of the case study design helps ascertain participants' strategies, procedures, decisions, and methods of implementation by identifying similar themes and triangulating records (Campbell et al., 2020).

A phenomenological design was not suitable for this study because such an approach focuses on participants' lived experiences, rather than explaining the facts (Neubauer et al., 2019). An ethnographic design involves the study of groups of people in their natural environment within their culture (Asenahabi, 2019). The focus of this study was to explore fire department staff members' leadership strategies in managing hazardous operations, not the lived experiences of groups.

Qualitative research is the preferred approach when the researcher desires to obtain insight into how and why something occurred (O'Sullivan et al., 2017). Because the beliefs and thoughts of firefighter staff inform department policies, standards, and practices addressing high utilizers, the perceptions of department administrators ultimately influence the behaviors, actions, and outcomes of high utilizers. Thus, a significant benefit of the case study method is that data may be ascertained in the natural environment (Asenahabi, 2019). A lack of scholarly knowledge on the totality of circumstances that contribute to high utilizers through the eyes of firefighters justified an in-depth analysis of this recurring phenomenon.

Role of the Researcher

The researcher is the primary research instrument in qualitative inquiry (Kross & Giust, 2019). Collecting valid, reliable data and answering the research question are imperative to the integrity of the study, as is defining and explaining one's role as observer, participant, or observer-participant (Shaw & Satalkar, 2018). In the present study, I used a qualitative method to explore phenomena and provide an interpretation of

meanings (Kross & Giust, 2019) by conducting interviews and member checking with current fire department personnel.

As a trained therapist and clinician, I have extensive interviewing experience and knowledge of the healthcare system, both of which are relevant to the study (Yasir et al., 2019). In conducting the interviews, I aimed to maximize the possibility of benefits from the interviews while minimizing the possibility of harm to the participants, thus enhancing the integrity of the study (Weiss, 2019). The potential for bias exists because of my experience in the field of health care, coupled with my experience working with fire departments to coordinate care for high utilizers. I also had a previous working relationship with the fire department in the county where I conducted the study.

To minimize bias and maintain consistency, I performed each interview in the same manner for each participant. The participants had the choice to withdraw at any time by verbally communicating their intentions. Each participant voluntarily signed an informed consent form before the interview. Prior to each interview, they were also told that their responses to the interview questions would be recorded. A transparent interview process includes divulging all aspects to participants before the interview process (Dejonckheere & Vaughn, 2019).

Concerning the role of interviewer, I possess extensive training and experience in qualitative interview techniques and practices. I served as a therapist for over 12 years in many different settings, including inpatient psychiatric, substance use disorder (SUD) facilities, outpatient, and hospital, including the ED and pediatric units. Additionally, I have conducted countless interviews in a professional, clinical, and non-biased way. I

have worked alongside fire departments in the past to improve the quality of care among people in their communities. However, I did not have any close personal relationships with the fire department participants in this study.

Methodology

After evaluating the research techniques that would contribute to knowledge in the field, I opted for a case study qualitative method of inquiry because there is limited qualitative research that attempts to understand high utilizers through the experiences of fire department personnel. This section provides an overview of the methodology selected for this study, addressing participant selection, case selection, instruments, data collection and review procedures, interview procedure, and data analysis.

Qualitative research is a broad approach to research that uses many different methods to collect and analyze data. Gathering data on social problems and knowledge through qualitative means can deepen our understanding of phenomena and concepts (Varpio et al., 2020). This type of research typically employs coding, especially for studies using interview questions, to break data segments down into smaller parts (Elliott, 2018). Research validity is the main component for qualitative research and supports the theory that is generated (Johnson et al., 2020). The goal is to use the narrative data to explore and gain a deeper understanding of the phenomenon, which in turn leads to better policies and programs based on that phenomenon (Williams & Moser, 2019).

Qualitative research has several important strengths that make it a desirable choice for health and public health research. This form of research involves the collection of data in the natural settings of the people and places under study (Williams & Moser,

2019). Qualitative research also uses several different data collection techniques to answer a question. Furthermore, qualitative studies provide detailed descriptions of specific events, situations, and experiences to gain in-depth insight into the experience of participants (Jackman et al., 2022). Finally, qualitative designs address the why and how of decision-making and, with a strong basis in the field of sociology, can help understand government programs' response to high utilizers (Patton, 2015).

Narratives are a protracted answer to a research question in a story form that can become an entire life story. Narratives have several functions, including recounting stories to construct individual and group identities, arguing a point, and rallying people to action (Beach & Wise, 2022). Narrative weaves information into a rich texture that policymakers can understand because of the vivid descriptions that can be developed (Chapman et al., 2021). The main ingredients for narrative analysis are truth, richness, consistency, congruency, and unity. Linking the past with the present is something that only narratives can accomplish (Willis, 2019). As a field of inquiry, narratives have evolved over the years because scholars have been able to use them to respond to the different challenges of the times. The validity of narrative research lies in the ability to inform future studies and contribute to social change by empowering participants (Beach & Wise, 2022).

Participants

This study used a purposive sampling method. In purposive sampling, researchers use their judgment to select participants who are most likely to provide data to address the research problem (Campbell et al., 2020). The purposive strategy may be based on

years of experience, location, or size of the participant group (Ames et al., 2019). The purposive sampling method gains a multi-perspective view of the subject matter, helping researchers gain knowledge from experts based on specific criteria.

In the current study, I targeted the specific location in Washington, and the specific emergency management positions of fire department staff. Interviews were conducted with fire department staff who serve as frontline workers responding to EMS calls. Participants in this study included current chief officers and other fire department personnel. Fire department volunteers were not excluded in this study if they were active and had experience with high utilizers. I ensured that all participants were fully aware of the study and how data would be used prior to the interviews. I sent a letter by email to fire departments throughout that county inviting their participation in the study. The letter described the proposed study, the intent of the interviews, and how data would be used (see Appendix A).

The study sample included 10 participants. Fire departments that consented to the study were asked to provide a list of firefighters' emails from their database so that I could contact them for interviews. A consent form was provided to each interview participant prior to the commencement of data collection. The consent form assured participants that the collected data would remain secure, and that the names of participants would remain confidential. The conditions set forth on the consent form were agreed upon prior to the commencement of interviews. The selection of the primary data collection method also correlated well with a qualitative study.

It is important to ensure that, no matter the data collection technique that is used, participants feel comfortable with the process (Lobe et al., 2020). Potential participants were asked to participate in interviews via Zoom and Google Meet. The interviews consisted of 16 questions and took approximately 30 minutes to complete. The rationale for video call versus phone call was that video is a better way to build trust and improves communication thanks to body language and non-verbal cues, allowing the researcher to have a more comprehensive understanding of the person (Peoples, 2020).

Participation in the study was entirely voluntary. I gave each participant a code number; no actual names were saved or noted in the raw data or final analysis. Data were kept secure by password protection and data encryption. Data will be kept for at least five years after the completion of the study, as required by Walden University. During the interviews, I clarified participants' answers and asked follow-up questions to reveal further information. In addition, I employed member checking to ensure the accuracy of participants' answers, inviting participants to review their responses during a scheduled meeting after the interviews were transcribed.

Saturation is a major component in the validity of a qualitative study (Aldiabat & Navenec, 2018). The researcher must ensure that the data are sufficient, as emerging data from participants may fill the gaps needed to address the research question (Saunders et al., 2018). As the interviews progress, participants repeating the same responses may be an indication that saturation has occurred. Some researchers have suggested that it is appropriate in a single case study to use a sample of 10 participants, while others have recommended 12 or 10 to 15 participants (Tenny et al., 2021). In the present study, the

eligibility criteria for selecting participants were that they were fire officers with at least five years of experience who manage hazardous operations within fire departments. Determining participant criteria ensures that participants possess the experience needed to provide essential data to the study (Mosser & Korstjens, 2018). Experienced fire officers are likely to speak openly, knowing the interview purpose is to enhance the industry based on their experiences (Johansson & Svensson, 2019).

Ethical Procedures

Ethical dilemmas should be anticipated and resolved by the researcher (Creswell, 2018). To alleviate any ethical concerns, I ensured that all participants were fully aware of the study and how data would be used. Psychological discomfort is another ethical concern for the researcher (O'Sullivan et al., 2017). Respondents must remain unharmed throughout the research process (Ravitch & Carl, 2019). Ethical protections in the present study met all requirements of Walden's Institutional Review Board (IRB). The informed consent process began with an email ascertaining participation in the study (Creswell, 2018). Afterward, the participants reviewed the informed consent form, which included specific instructions and procedures.

The qualitative interviews were arranged to accommodate the participants' schedules. Before starting the interview, participants reviewed the informed consent form. Participants had the chance to ask questions and receive answers throughout this process (Creswell, 2018). The final step of consent was to ask the participants to sign the form at the interview setting, prior to starting the interview, and to return the signed form to me.

Participant withdrawal from the process was at the participants' discretion. Participants were given face-to-face, email, or telephone notification that they could withdraw at any time if they were uncomfortable or for any other reason. If a participant withdrew, they would be assured the same level of confidentiality as if they had completed the process. As was explained to participants in the initial email describing the study, there were no incentives for participating in the study. The privacy section of the consent form explained confidentiality to all participants. The use of participants' names, business names, or any identifying information in the study reports was prohibited.

The collected data will remain in a locked filing cabinet in my office for a minimum of five years after the completion of the study. The hard drive is protected by secure fingerprint software, and the only assigned person's fingerprint is the researchers. Data security procedures ensure that participants' confidentiality remains secure during and after the study (Roth & Unger, 2018). After five years, the study materials will be disposed of through a professional disposal service.

I created a series of interview protocols to fully account for any ethical or other associated risks. As mentioned, audiotapes and transcripts of the interviews were stored in a secure location in my home. Any information contained in the interview transcripts that can be used to determine the identity of the interview participants was removed. This study did not ask participants to discuss any questions of a personal nature. The focus was on participants' thoughts and experiences with high utilizers in their role at the fire department. Being in any study does involve some risk of minor discomforts that can be

encountered in daily life, such as fatigue and stress. The questions also had the potential to bring up memories or traumatic events that could impact the participants.

Instruments

The researcher is a primary instrument in inquiry during the qualitative research process (Malmqvist et al., 2019). To understand the participants' perspectives, the researcher's task is to open dialogue with participants about how their perspectives influence the institution of policy. Interviews allow the researcher to explore details concerning the experiences, motives, and perspectives of other people (Edwards & Holland, 2020). The researcher is scientifically obligated to view data objectively, setting aside personal expectations and beliefs on controversial issues (Creswell, 2018). Instead, attention is focused on the respondent and the opinions, feelings, and ideas they express to the researcher (Ravitch & Carl, 2016).

The research instrument developed for this approach (see Appendix C) included in-depth and open-ended questions designed to specifically identify potential barriers in fire department leadership regarding the interventions and experiences of working with high utilizers in their community. The in-depth interview protocol begins with developing a qualitative questionnaire with open-ended interview questions inspired by the literature review (Creswell, 2018). I developed open-ended interview questions framed around the topics of staff members' experience in the fire department and their encounters with high utilizers. In-depth interviews allow the researcher to ascertain respondents' opinions and perspectives related to certain incidents (Dejonckjeere & Vaughn, 2019).

Data Collection Procedures

The qualitative case study approach facilitates the examination of a phenomenon within its context by analyzing various forms of data (Williams & Moser, 2019). The present study utilized in-depth semi-structured interviews and literature review. Using multiple data sources helps enhance the credibility of case study research (Cheek et al., 2018). The review of pertinent and contextual organizational data is a fundamental element of data acquisition and analysis procedure (Patton, 2015; Ravitch & Carl, 2016). In the case of the present study, the literature review process includes an analysis of other studies that used similar methods to understand fire departments and high utilizers.

The interview process is used to explore the perspectives, experiences, and insights of those impacted by a particular phenomenon. According to Ravitch and Carl (2016), “Interviews are at the center of many qualitative studies since they provide deep, rich, individualized, and contextualized data that are centrally important to qualitative research” (p. 146). The individual interview collection process allows the researcher to focus on the individual’s experiences and perspectives related to a specific phenomenon. Interviews invite a research participant to provide as much information as possible for the study. A significant objective of this form of inquiry is to investigate the topic from the viewpoint of the participant while concurrently obtaining understanding as to why the participant developed this perspective (Linneberg & Korsgaard, 2019).

The steps detailed below were used to inform interview participants of the overall research process, including data collection, analysis, and validation of findings:

1. I sent an email detailing the nature of the study to fire department staff.

2. After one department responded stating their willingness to participate in the study, 10 fire department staff members volunteered to participate.
3. One-on-one meetings in Zoom or Google Meet were scheduled with each participant.
4. At each interview, participants received a consent form, which they signed prior to the start of the interview. This form provided details about the study and how data would be used, asking for consent for the interviews to be audio recorded.
5. Interviews were digitally recorded, transcribed, and analyzed per the steps outlined in the data collection and data analysis sections of this chapter.
6. The respondents were given the opportunity to review their transcript for accuracy and contribute additional comments on previous statements to elaborate further.

After obtaining agreement and consent from the participants to move forward with the interview, I began each interview with demographic questions to strengthen rapport and help me and the interviewee feel comfortable; however, to protect the participants' identities, I did not document or code any demographic information. I then explained definitions and key terms, in addition to providing a list of these terms to participants for review throughout the interview.

Data Collection

During the study, I served as the primary data collection instrument. One of the main tasks for the researcher as primary collection instrument is to gain trust and acceptance during the data collection process (McGrath et al., 2019). Data analysis is ultimately in the hands of the researcher. In the present study, the data collection process began with obtaining research data from one-on-one semi-structured interviews in which participants responded to open-ended questions. Semi-structured interviews can help the researcher uncover new information by allowing the participants to speak with candor (DeJonckheere, & Vaughn, 2019). Semi-structured interview responses also allow the participant to expound on their responses (Bearman, 2019). A purposive qualitative study involves at least 10 participants who respond to open-ended questions exploring the concepts of the study (Peterson, 2019).

The primary method of data collection in this study was interviewing. The interview process relied on an interview guide and primarily used open-ended questions to encourage detailed responses. It is recommended that new qualitative researchers use interview protocols to help collect data, as it ensures participants stay on topic and do not venture off into unrelated stories (Clark & Vealé, 2018). Interviewing is a powerful format in qualitative research. In a qualitative study, subjects' observation coincides with the research problem and looks to directly answer the research questions. Semi-structured interviews with open-ended questions provide a good format for generating responses (Clark & Vealé, 2018). A researcher needs to conduct qualitative interviews in a manner that makes the process enjoyable and engaging for the participants (DeJonckheere,

&Vaughn, 2019. The study relied on one sources of data to explore the research question: Interviews with fire department employees serving as first-line responders with fire department

Qualitative research has several tools for collecting data in a manner that is free of bias. A researcher should use the best tools based upon the interaction required (Belotto, 2018). Recorded data are often transcribed for data analysis later. As data collection begins, interview protocols provide a set of questions along with a guide for walking a new qualitative researcher through the process (Roberts, 2020). In the present study, participants were asked each question and permitted to answer at their discretion. Follow-up questions were asked as needed. After the interview, participants were debriefed and excused from the interview process.

To ensure that the responses were valid, upon transcribing the responses from participants, I conducted member checking by meeting with the participants individually to share the summary of my interpretations. Member checking, a process wherein the researcher and participants discuss the transcripts to ensure accuracy and minimize errors (Motulsky, 2021), may uncover omitted information (Candela, 2019). Member checking thus helps validate collected data to reduce errors and uncover missed information. Transcripts were shared with participants in an electronic form within one week of the interview to allow adequate time to review the content during the member checking process.

During each interview, following the interview protocol (Appendix A) helped maintain consistency with the interview process. Following an interview protocol during

the process is essential to maintaining the integrity of a study, ensuring that each interview is conducted the same way for each participant (Billups, 2019). I asked the same questions for each participant to maintain consistency and ensure reliability (see Appendix B).

The use of organizational data tracking systems throughout the data collection process included Excel spreadsheets, hardbound journals, and recording devices. Hardbound journals served as a repository for personal notes about each interview and as a log of work files. In addition, reviewing documents such as training curriculum, standard operating procedures, and response reports made available by the fire chief provided a deeper understanding of the department's current strategies. Organizational tracking systems and tables keep order and a chain of custody for research data, protecting participants' anonymity and privacy and providing a logical sequence of storing data for later retrieval (Cloutier & Ravasi, 2021).

The requirement for retention of all research data is a minimum period of five years before destroying electronic data and paper materials at a secure location (Creswell, 2018). Given the importance of data security for research participants, it is recommended that researchers store all research materials in a locked drawer or fireproof lock box for this period of time. Researchers should safeguard in a secured location any interview notes that reflect on participant mannerisms, body language, or other pertinent information about the interview (Sipes et al., 2022).

Data Analysis Plan

Utilizing a comprehensive data analysis process ensures that the interview responses are descriptive enough to provide a rich context of usable data. Analyzing data sets for qualitative studies requires organizing and coding data into themes (Williams & Moser, 2019). This analysis involves ensuring that data are labeled, categorized, and accounted for. In the current study, each of the interviews was transcribed and analyzed to determine relevant themes. The data set was coded using the NVivo 14 software package. Data were analyzed shortly after the interview process to help ensure that the obtained information was accurate.

I first transcribed the interviews and used analysis key words, themes, and concepts. I then sorted data into themes, applying coding measures. While sorting by key words, themes, and concepts, all pertinent information was included. All other data were saved but not included in the final analysis.

I coded all participants with an identifying number for HIPPA and privacy reasons. The study requested no personal information other than professional experience in the line of work at the fire department. Coding is a process for organizing data to develop theories that can be further researched (Bingham & Witkowsky, 2021). Recommended coding stages to analyze data include open coding, axial coding, and selective coding (Williams & Moser, 2019). Open coding analyzes data line-by-line to create separate units of meaning. During axial coding, sections of data are reconstructed to create a system of categories and/or sub-categories (Qureshi & Ünlü, 2020) that the researcher can compare and contrast (Corbin & Strauss, 1990). Selective coding breaks

data into themes that are pertinent to the research questions (Qureshi & Ünlü, 2020). Using the four key elements of narrative policy analysis—setting, characters, plot, and moral—aids in coding data into themes. Relationships between categories and themes link participants and shed light on the phenomenon being studied (Cypress, 2018).

As mentioned, the software program NVivo 14 was used to code, sort, and analyze the data. I ensured that all collected information was used as intended and in such a way that enhanced the results. Coding data into categories and phrases is a systematic way for a researcher to analyze data in smaller segments. The process of coding enables a researcher to analyze and compare the selected data and to recognize any patterns that may require further investigation (Williams & Moser, 2019) The most complex part of data analysis is properly coding transcribed interviews. Computers now have an important role in assisting researchers with data analysis; however, the manual process still has a place, and most often a combination of the two is utilized (O'Connor & Joffe, 2020).

The first step in the data analysis process was to code the interview transcripts using the NVivo software package. NVivo allows for several active links, moving from node to node with ease (Swygart-Hobaugh, 2019). Coding all parts of a project is an ideal approach and is the simplest method for organizing data. Nodes represent ideas that allow coding to be organized into data trees, which can be restructured as needed. NVivo provides effective tools that allow researchers to find and filter data in order to obtain results (Houghton et al., 2017). The querying feature is also a reliable tool for searching data for quick results based on the coding that has previously taken place.

The transcribed data were then analyzed line-by-line. This method breaks data into segments, looks for assumptions, extracts actions and meanings, determines significance, and identifies any gaps (Peoples, 2020). The final step in the data analysis process was to categorize the data, which involved looking for a collection of instances from the data that revealed relevant meanings and patterns. Using those methods, emerging themes and patterns were extrapolated, thus helping to answer the research question, and ultimately providing fire departments, county government, and other stakeholders with knowledge to better understand what the fire department staff is experiencing when addressing the needs of high utilizers, as well as ideas and solutions to better assist fire departments and other stakeholders to improve policies and resources for high utilizers.

Once the data analysis process was completed, the findings of the study were verified. While there are several avenues available to perform this verification process, this study used the three steps detailed by Creswell (2018): member checking, clarifying the researcher's bias, and peer debriefing.

Using the member checking technique allowed participants to view the findings and determine whether those findings were accurate. In this study, participants were members of a volunteer fire department and had expert knowledge of the volunteer fire service. Interview participants were sent copies of their transcripts to ensure that I correctly captured the data, and each participant verified the accuracy of the interview transcripts.

A peer with graduate-level experience in qualitative studies also reviewed the data findings, as it is a common practice for researchers to conduct a peer review by providing analysis and contributing to the overall research process (Johnson et al., 2020; Tumin & Tobias, 2019). The reviewer was given full transcripts of the interviews, information on how the data were processed and analyzed, the types of participants in the study, and the findings. The reviewer approved the collected data and verified the recommendations and conclusions of the study. The third and last step in peer review is to verify that the findings are clear of any researcher bias, which is addressed below.

Trustworthiness

Throughout the qualitative research process, I frequently evaluated credibility, transferability, dependability, and confirmability. Prior to data collection, I performed checks and balances to ensure validity and data quality. Having a validity strategy to enhance and ensure the accuracy of the research is vital (Creswell, 2018). Reliability and validity reinforce the credibility, transferability, and confirmability of the research.

One strategy to ensure reliability is triangulation (Ravitch and Carl, 2016), using literature review, in-depth interviews, and documentation and artifact analysis. Dependability is also achieved in the documentation process of the research and further supported through retention of all documentation. As indicated previously in this chapter, I secured all documentation and data related to the interviews to ensure dependability as well as confirmability. Furthermore, consistency in data collection and interactions with participants was supported by using specific research protocols.

Dependability, which depends on the strength of the qualitative data, is critical to the integrity of research (Ravitch & Carl, 2016; Al-Qahmouss & Almakadmeh, 2022). To this end, I performed member checking in a two-fold manner. First, after completing transcription, I summarized each interview question by asking the participant if they agreed with my interpretation to ensure accuracy. Second, I scheduled a second meeting with each participant to review the completed transcripts in order to improve accuracy through verification. Member checking is the first step in minimizing errors in research, presenting participants with the researcher's interpretations to confirm and increase accuracy (Zairul, 2021). I also conducted verification through robustly detailed narrative descriptions of the findings.

Validity is another critical aspect of the research process. Ensuring validity throughout the process is essential to the integrity of the study (Creswell, 2018). One strategy addressing threats to validity is to look for signs of personal bias among the participants, including body language, tone of voice, and nervousness. In-depth questioning techniques may also provide clarity to questions, thus helping to maintain validity (Rose & Johnson, 2020). Content validity ensures that participant responses are coded according to whether they are relevant to the research question.

Credibility is the "researcher's ability to take into account all of the complexities that present themselves in a study and to deal with patterns that are not easily explained" (Ravitch & Carl, 2016, p. 188). Credibility is related to the design of the study, the researcher's instruments, and the data (Ravitch and Carl, 2016). To ensure credibility in the present study, I used member checking by summarizing responses during interviews

and scheduling additional meetings with participants to review my interpretations of their responses for accuracy.

An external audit was also conducted to maintain credibility. Before the data analysis phase, participants checked the accuracy of their responses through a coordinated review of their audio-recorded verbatim transcripts, as transcript accuracy contributes to the credibility of the study (Creswell, 2018). I also used methodological triangulation, another means of strengthening a study's credibility, to collate themes, personal notes, and archival work documents. I compared the collected data, searching for similarities and new ideas. During methodological triangulation, detailed notes confirmed the completeness of the collected data.

Data used in methodological triangulation consists of research questions, interview questions, research notes, memos, participants' job documents, and the literature review, which together are essential in maintaining the integrity of the study (Billups, 2019). The researcher uses information from the collation of data sources to extract common and new information that may close gaps in the research.

Transferability is another important part of research in that it allows future researchers to expand upon a study. Transferable data mean that similar results can be achieved over time because of the commonalities in the thought processes of the next wave of researchers. A complete explanation of the study's focus includes research assumptions, allowing future researchers to ascertain whether the results of a study are transferable. Thick and rich descriptions include the origin of the context, with data examples helping researchers to form individual interpretations (Aldiabat & Le Navenec,

2018). Transferability assists the reader in capturing the meaning of the research and provides the basis for further studies. Research data results can change as data are transferred to the next generation of researchers (Wise, 2020).

Confirmability, meanwhile, is the neutrality of the findings based on the participants' responses and not the researcher's bias (Kyngas & Kaariainen, 2020). While conducting the current study, I used a reflective journal to convey my preconceived thoughts and assumptions, identifying such notes in brackets. The reflective journal kept me focused on the emerging data to ensure that the findings came from participants only.

Confirmation of data is a tool for the resolution of contradictory data that may convolute the study. Confirmation and verification are necessary from the beginning stages of data collection to the final product in order to maintain continuity throughout the research process (Hancock et al., 2021). Data saturation in research occurs when new data ceases to emerge, and data from new participants repeat information previously shared. The present study ensured data saturation through conducting interviews with participants that met the research study criteria until responses and themes repeated with no new data.

Summary

This chapter illustrated the purpose of the study, my role as researcher, and the selection criteria for participants, all defined in a logical process according to the study's methodology and design. This chapter also provided an in-depth roadmap of the actions used to collect data and perform data analysis. The described methods and approaches ensured reliability and validity throughout the study. The rationale for conducting a

qualitative study was also detailed. In addition, this chapter outlined the research design and case study methodology, case selection criteria, research question, consent, ethical protections, data collection procedures, data analysis procedures, and validity. The data obtained through the procedures outlined in this chapter are evaluated and further discussed in Chapter 4.

Chapter 4 presents the research findings, consisting of themes derived from the qualitative interviews. Recommendations and applications for professional practices are then drawn from these findings. Along with professional applications, the findings may affect social change by providing improved leadership strategies for public health services. Recommendations identify who should focus on the results and what areas need further study to improve practices. Finally, Chapter 4 reflects on my experiences and provides final thoughts about conducting the research.

Chapter 4: Results

Introduction

Chapter 4 presents the research findings, which consist of themes derived from the qualitative interviews. In this chapter, I also reflect on my experiences as a researcher and provide final thoughts about conducting the research. The purpose of this case study was to explore fire department personnel's work experiences with community members who frequently make calls to the EMS system and utilize emergence department. The research aimed to understand the work experiences of fire department staff to gain valuable knowledge and insight into high utilizers in the current emergency response healthcare system. Fire department staff in the United States are frequently on the front lines when assisting the vulnerable population who tend to use the EMS system the most often.

This study examined fire department staff experiences to address the following research question: What interventions are helpful in reducing EMS calls and preventable ED visits? The research question allowed for in-depth analysis of the perspectives of fire department staff regarding their experiences working with high utilizers in their communities. This chapter includes a description of the study setting and demographics, data collection methods, data analysis procedures, trustworthiness and credibility, and results of the study.

Study Setting and Demographics

Data collection took place from June through August 2023. Study participants resided in single county in Washington State. Participant identity was protected by

labeling interviewees Participant 1 to Participant 10, and by maintaining interview data on a fingerprint-enabled hard drive. While two participants requested to reschedule the initial appointment due to a conflict with another obligation, no participants withdrew from the study. All 10 participants were front-line fire department employees, 80% of whom identified as male, and 20% as female. Regarding experience, 30% had over 20 years of experience in the field, and 90% had five years of experience or more. To protect participant identities, demographic information related to age and race was not collected.

Data Collection

After receiving approval from Walden University's IRB (approval number 10-17-22-0682441), data collection was initiated. A recruitment email was sent to fire department staff with a link to schedule an interview through my calendar. After eight weeks, 10 participants had completed the interview. A purposive qualitative study involves at least 10 participants who respond to open-ended questions exploring the concepts of the study (Peterson, 2019). Interviewing subject-matter experts working in fire service aligned with the scope and content of the study. The first part of the interview consisted of a brief introduction, explanation of the study's purpose, and review of the informed consent form. Participants provided informed consent and answered questions during the interviews, which were recorded in an Excel spreadsheet prior to being coded and transcribed in NVivo.

Each interview followed the interview protocol (Appendix A) to maintain consistency across interviews. Following an interview protocol during the process is essential to maintaining the integrity of a study, as it ensures that each interview is

conducted the same way (Billups, 2019). Thus, I used the same questions with each participant to maintain consistency and ensure reliability. Conducting individual interviews allowed me to focus on the individual's experiences and perspectives related to a specific phenomenon (Saldana, 2016), as interviews invite participants to provide as much information as possible for the study. After the interviews, I transcribed the recordings into a Word document with all identifiable information removed from the transcript. This process resulted in no significant changes to the responses identified by the participants, and there were no discrepancies in data procedures. Given the small sample size, and the fact that all participants were from one fire department, the study did not collect demographic characteristics to maintain as much confidentiality as possible. I used NVivo 14 software to store the Word and Excel documents for each interview.

Data Analysis

For data analysis, I used a combination approach, working both manually and by utilizing NVivo 14. After transcribing the interviews verbatim, I conducted member checks to verify transcription accuracy. Interview data were stored on a fingerprint-protected hard drive. Then, I coded the interview transcripts using the NVivo software package. Next, I read the transcripts eight times to obtain a good understanding of the data. Utilizing a comprehensive data analysis process ensures that the interview responses are descriptive enough to provide a rich context and usable data. The inductive approach includes data reduction, or transformation of the data, which entails coding the raw data gathered in interviews, and then organizing those codes into categories and themes

(Williams & Moser, 2019). Coding is a process of organizing data to develop theories that can be further researched (Bingham & Witkowsky, 2021).

Selective coding breaks data into themes that are pertinent to the research questions (Qureshi & Ünlü, 2020). The final step in the data analysis process is to categorize the data, which involves looking for a collection of instances in the data that form issue-relevant meanings and patterns. Using these methods, emerging themes and patterns are extrapolated that can then answer the research question at hand. These themes were intended to provide fire departments, county government, and other stakeholders with knowledge to better understand what fire department staff experience when addressing the needs of high utilizers, as well as ideas and solutions to better assist fire departments and other stakeholders to improve policies and resources for high utilizers.

Trustworthiness and Credibility

I established credibility by following all procedures outlined in the IRB packet when meeting with participants during the data collection process. Each study participant provided full consent to participate in the study according to the data collection methods. I adhered to the interview guide (Appendix A) to ensure that the questions related to the overarching research question.

Regarding transferability, I established transferability protocols such that other researchers could adopt my approach to conduct further studies examining fire department perspectives on high utilizers. Participants agreed to interviews with open-ended questions to capture their experiences with members in the community who utilize

the EMS system frequently. After completing this research, I plan to disseminate the information from the study to fire departments along with county and local government agencies.

Confirmation of data is a tool for resolving contradictory data that may convolute the study. I ensured that the participants met the research study criteria and that responses and themes repeated with no new data. To achieve data saturation—i.e., when new data cease to emerge and data from new participants repeat previous data—I capped the participants at 10 because recurrent themes began emerging after 10 interviews.

Dependability is critical to the integrity of research (Al-Qahmouss & Almakadmeh, 2022). I performed member checking in a two-fold manner. First, after completing transcription, I summarized each interview question and asked the participant if they agreed with my interpretation to ensure accuracy. Dependability and confirmability were also achieved in the documentation process by retaining all documentation, and by securing all data related to the interviews. Additionally, I carefully examined and reviewed the data in a systematic process to reduce any unnecessary clutter and to enable dependable coding of the data.

Validity is another critical aspect of the research process. Ensuring validity throughout the process is essential to the integrity of the study (Creswell, 2018). During the interviews, I attempted to pay attention to any signs of personal bias among the participants, including body language, tone of voice, and nervousness. I also utilized in-depth questioning techniques to make the questions clear, thus helping to maintain validity (Rose & Johnson, 2020). For content validity, I ensured that participant

responses were coded according to their relevance to the research question. For confirmability, I used strategies to ensure that the outcomes would reflect the participants' responses without bias on my part as the researcher.

Results of the Study

One key concept from the perspective of the interviewed fire department staff involves interventions currently being implemented, as well as recommended interventions to reduce high utilization among citizens. Another key concept is the need to better understand the population of high utilizers of the EMS system. Figure 2 summarizes the thematic results, outlining the top three themes that aligned with the research question. The first major theme is access to health care, including access to medical care and behavioral health care; access to mental health beds, inpatient beds, and/or rehab beds; and access to healthcare insurance or benefits. The second major theme is providing the right care using different models, preventive care, community resource paramedics and nurse practitioners, mobile clinics, and medication/support visits. The third major theme is programs and resources, including the need for more community resources for social determinants of health (SDOH), additional housing programs, outreach programs to provide resources related to SDOH, and educational programs.

Figure 2

Thematic Results of Interviews with Fire Department Staff: Major Themes

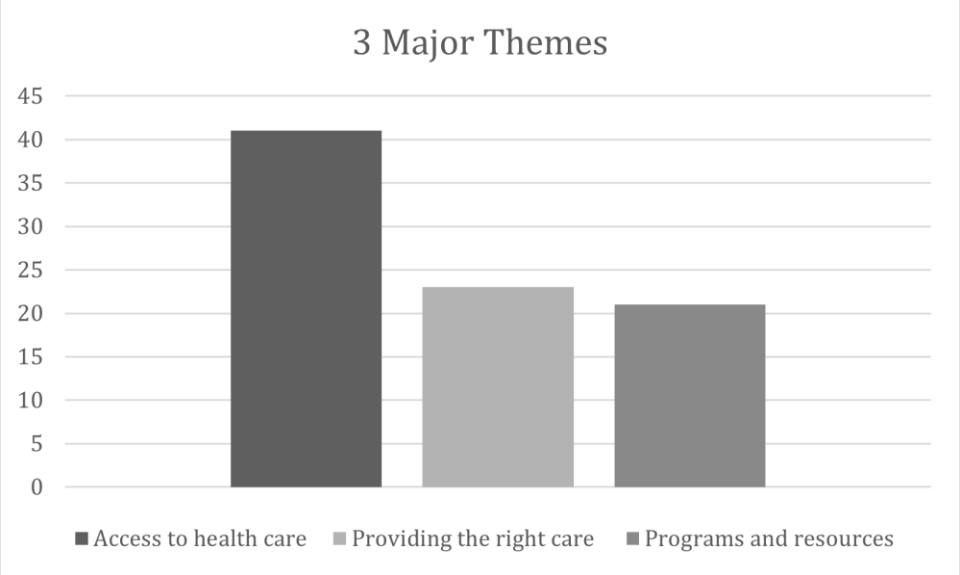


Figure 3

Thematic Results of Interviews with Fire Department Staff: Access to Health Care

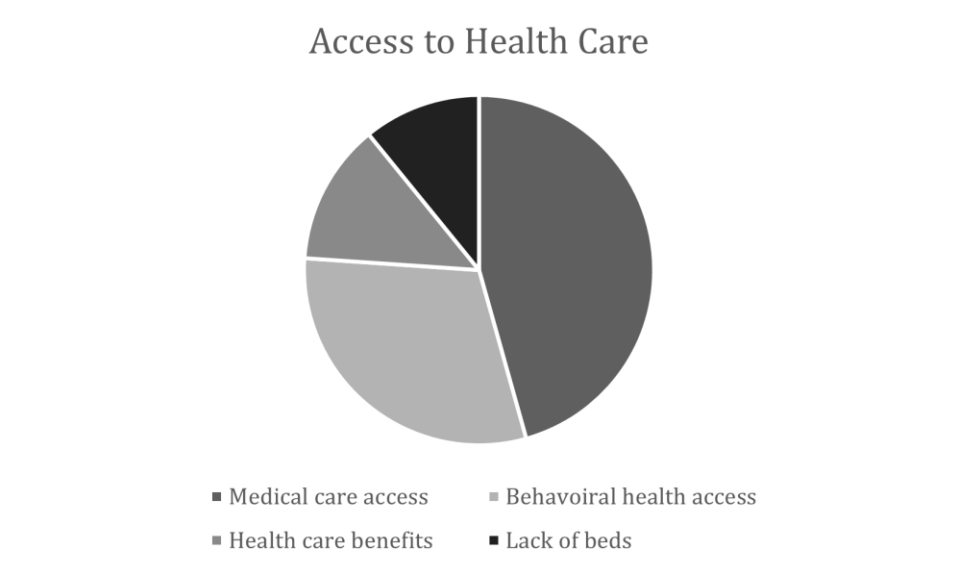


Figure 4

Thematic Results of Interviews with Fire Department Staff: Providing the Right Care

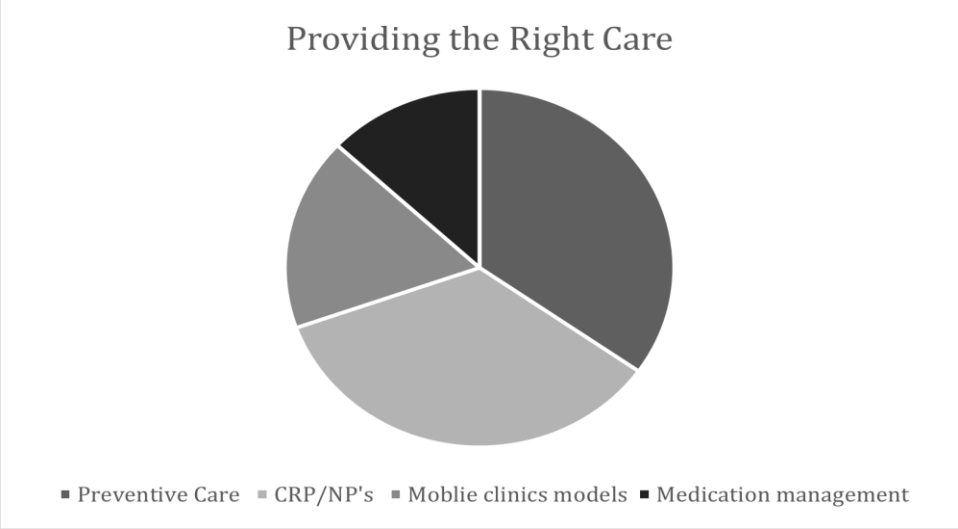
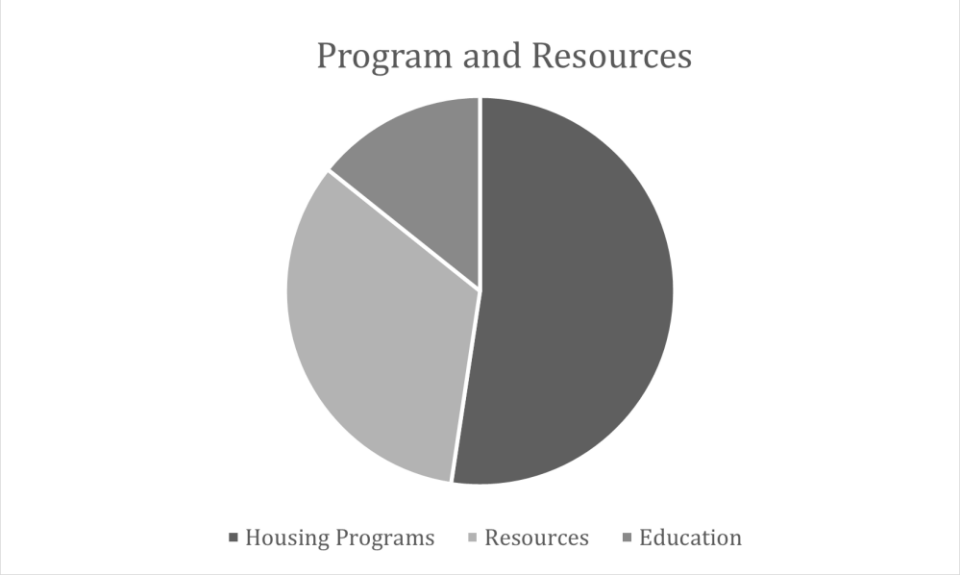


Figure 5

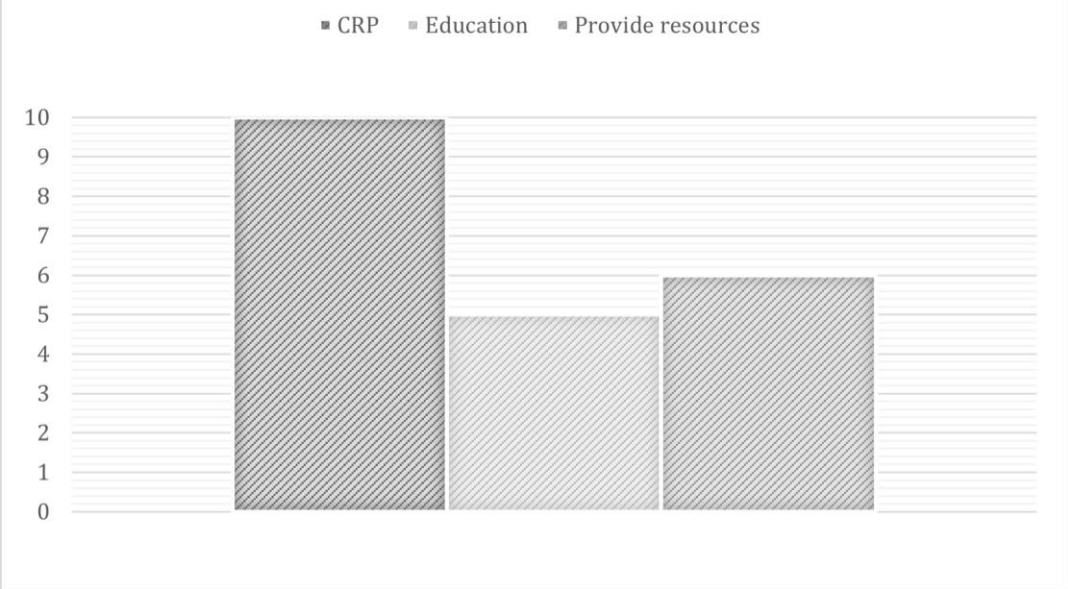
Thematic Results of Interviews with Fire Department Staff: Program and Resources



One intervention that participants described as effective was the use of the community paramedic program (CRP) to reduce utilization. Every participant in the study noted that the program was helpful in addressing longer-term issues and providing support and resource linkages to other community agencies. As for other interventions, 60% of participants reported providing resources, and 50% reported providing education to help reduce utilization.

Figure 6

Currently Used Fire Service Interventions to Reduce Utilization

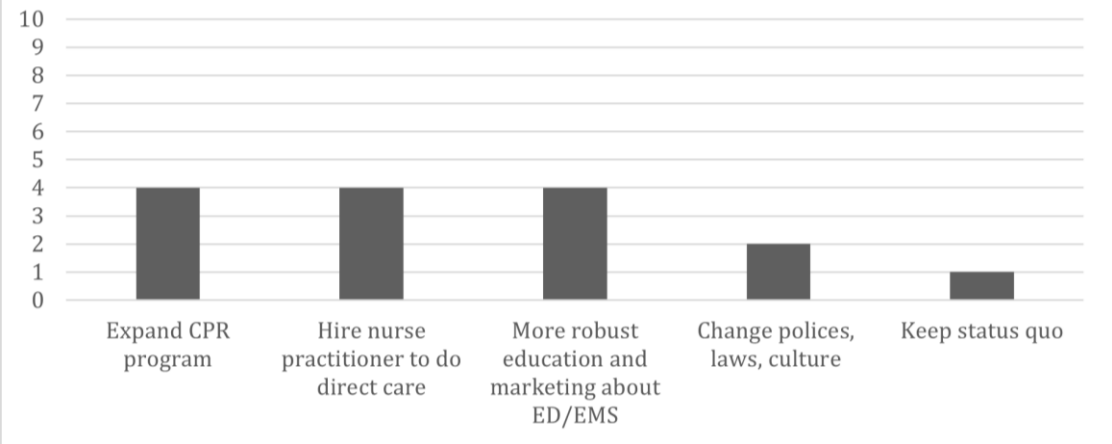


Interventions that the fire service could implement to prevent and reduce utilization varied among participants. According to 40% of participants, it would be beneficial to add more staff and budget to the CRP or focus on longer-term interventions, as opposed to the standard shorter-term interventions that the fire department usually implements. Meanwhile, 40% of participants raised the idea of hiring a nurse practitioner

to provide direct care instead of having to transport patients to the ED, an intervention that would expand the fire service to play a more direct role in health care. In addition, 40% of participants suggested engaging in more education and marketing about the EMS and healthcare systems, for instance when and how to access primary care, urgent care, and emergency care. Two interventions were suggested by 20% of participants each: the need to change laws to help reduce the inappropriate use of EDs, and the creation of a preventive-oriented culture within the fire service. Only one participant (10%) stated that they felt no future interventions were needed from the fire service.

Figure 7

Recommended Fire Service Interventions to Reduce Utilization

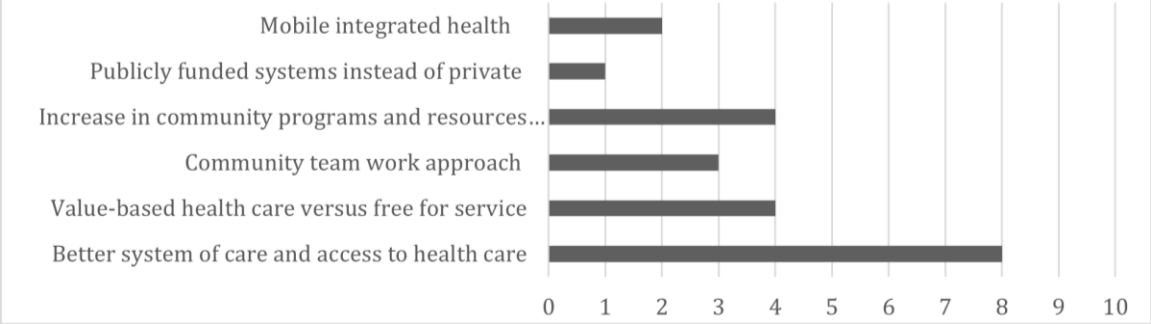


Interventions that could be implemented by the community, including private, government, and non-profit entities, also varied among the participants. The need for better access to care and better healthcare benefits were the most common community interventions, proposed by 80% of participants. In addition, 40% of participants discussed the need to change the billing and funding process of the healthcare system so that it

focuses on preventive care and value-based care, rather than fee-for-service care, which increases the likelihood of utilization. Another common community intervention, mentioned by 40% of participants, was to increase community programs, resources, and funding to address SDOH among high utilizers. Moreover, 30% of participants stated that a multi-agency team approach was needed where organizations worked together to target this population. Community implementation of a mobile integrated health system was proposed by 20% of participants. One participant (10%) stated that a publicly funded socialized medicine system would reduce the frequency of community members using the EMS and ED systems.

Figure 8

Recommended Community Interventions to Reduce Utilization



Of the 70% of participants who had worked outside of single county that the study was conducted, all of them stated that the high utilizers population did not differ and were remarkably similar in nature to other geographic areas. The only difference they noted were the resources and programs available from one area to the next (see Table 2). The example that two participants (20%) provided was the difference among resources in a rural versus urban community. Also of note is that 20% of participants brought up

COVID-19 and how it reduced high utilization of the ED and EMS system during that time due to community members' fear of going to the ED. The participants shared that this reduction in use has stopped, with utilization levels post-pandemic back to where they were, if not higher.

Table 2

Perceptions of Fire Department Staff Who Had Worked in Other Areas

Perceptions	Percentages
High utilizers population did not differ and was remarkably similar in nature	100%
Resources are different in urban and rural communities	20%
COVID-19 reduced high utilization of the ED and EMS system during that time due to community members' fear of going to the ED	20%

Regarding participants' perspectives on behavioral health, 70% noted that high utilizers tend to have both medical and behavioral health conditions. Two participants (20%) noted the challenges of understanding the underlying medical issue due to dual diagnosis of behavioral health conditions. Ninety percent of participants noted the importance of assessing and treating individuals' behavioral health condition the same as they would a medical condition. Participants' experiences working with the behavioral health of high utilizers varied in terms of the underlying reasons, although many causes were related to housing, resources, and access to medical, behavioral health, and SUD care.

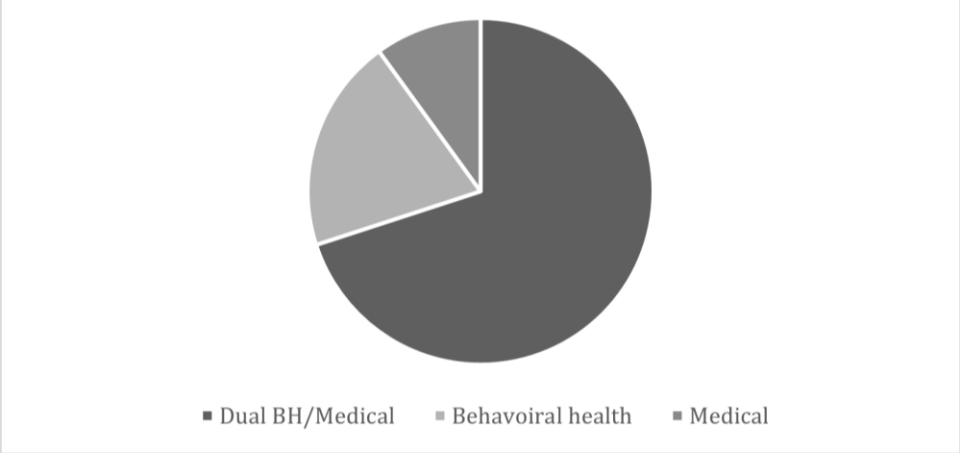
Table 3

Fire Department Staff Perspectives on Behavioral Health

Perceptions	Percentages
High utilizers with dual diagnosis	70%
Challenges for fire service to understand the underlying medical issue due to dual diagnosis of behavioral health conditions	20%
Importance of assessing and treating individuals' behavioral health condition the same as they would a medical condition	90%

Figure 9

Fire Department Staff Perspectives on Causes of EMS/ED Use



Summary

I opted for a case study qualitative method of inquiry because there is limited qualitative research that attempts to understand high utilizers through the experiences of fire department personnel and what interventions might reduce utilization. This chapter presented the results of the analysis of the interview responses. The interviews yielded three major themes: access to health care, providing the right care, and programs and resources. Chapter 5 describes implications for social change and for practice, as well as recommendations for further research.

Chapter 5: Conclusions and Recommendations

Introduction

The purpose of this qualitative study was to explore and identify interventions that could help prevent avoidable EMS calls and ED visits, focusing on the knowledge and lived experience of fire department staff serving high utilizers. The findings noted that according to fire department staff, interventions that could decrease the number of high EMS and ED utilizers include access to health care, providing the right care, and addressing SDOH through programs and resources in the community.

This chapter includes the interpretation of the findings, the limitations of the study, and recommendations for further study, as well as the social change impact anticipated from the research findings. Additionally, this chapter includes the implications of changing the status quo and implementing more interventions in the community to reduce high utilizers, and to positively affect fire departments and local communities.

Interpretation of the Findings

The results indicated that interventions that could decrease the number of high EMS and ED utilizers are related to access to health care, providing the right care, and addressing SDOH through programs and resources in the community. Based on the key findings, it is recommended that fire departments partner with city, county, state, and federal legislators to implement new policies and interventions targeted at increasing health access in their communities, improving healthcare systems to provide the right care at the right time, and addressing SDOH among its community. All the participants

who had worked outside of single county in Washington noted that high utilization among the population was similar in other geographic areas, which suggests the importance of national and/or state funding, policies, and interventions to address high utilization throughout Washington State and the United States.

Limitations of the Study

There were several limitations in the present study. Limitations related to the design of the study included researcher time constraints, purposive sampling, and self-reported data. Due to only having three months to collect data, I was only able to conduct the study with one fire district. This limits the generalizability of the research results. Furthermore, the study used a purposive sampling technique, which can be prone to researcher bias and can make it difficult to achieve a representative sample or a sample fit for a larger population. There are also limitations associated with using self-reported data, including selective memory (i.e., a participant may or may not remember an experience), the possibility of participants exaggerating, the possibility of participants attributing positive outcomes to an experience, and the possibility of the reported event differing from the actual event. In addition, the study's generalizability is limited due to the small sample size of 10 participants, which may not be representative of the views of all fire departments across single county in Washington State. There are many variations of fire and EMS service delivery in the United States; thus, congruity is not possible in this study.

In qualitative research, it is difficult to ensure reliability and validity, which limits the potential applicability of findings (Ravitch & Carl, 2016). This limitation affects

generalizability as well. Accordingly, the themes evident in this study may not be transferable, as qualitative studies are often difficult to generalize. In essence, the results of this study are applicable in terms of the codes, categories, and themes related to the lived experience of participants.

Recommendations for Further Study

Although this study was limited in scope, it attempted to present new understanding of high utilization through the lens of front-line fire departments workers. The study results indicate that fire service staff members did not notice a difference among high utilizers in single county of study compared to other areas where they had worked. Thus, it would be beneficial to conduct studies in other counties, states, or countries to gain a better prescriptive of the experiences of fire department staff and their current and recommended interventions to prevent avoidable EMS calls and ED visits. In addition, studies exploring correlations between healthcare access, health programs focused on providing the right care, access to housing, and other SDOH and their impacts on high utilization would be valuable for administrators and policymakers in implementing effective funding, policies, and programs to increase overall quality of life while decreasing unnecessary utilization of the EMS and ED systems (National Academies of Sciences, Engineering, and Medicine, 2021). Moreover, it would be interesting to study attempts to shift the culture and role of the fire service in providing care and treating medical conditions, such as with the use of nurse practitioners or mobile medical units in the community, to reduce unnecessary utilization.

Social Change

Walden University defines positive social change as a process of creating and implementing ideas followed by actions that promote the worth, dignity, and development of communities, organizations, and cultures (Walden, 2020). Thus, positive social change results from a positive vision and a strength-based approach. This study aimed to gain knowledge through a targeted population—fire department staff—to better understand the behaviors of high utilizers and to generate possible interventions for improving these individuals' quality of life. The results from this study will aid fire department staff, healthcare administrators, and policymakers in implementing social change by understanding the underlying issues associated with the high utilizer population. The findings may also contribute to safer communities and help reduce the cost of high utilizers, who depend on the fire department to respond in a timely manner with sufficient personnel to mitigate emergencies, as well as connect individuals with the appropriate services and resources.

Furthermore, these findings may contribute to future research and motivate other professionals to explore other predictors of high utilization through the lens of different populations. Findings from this study could lead to positive social change by exploring different ways to address the underlying causes of EMS calls and ED requests. As research focusing on the experiences and knowledge of front-line fire department staff across the United States is lacking, this study fosters positive social change by conducting research with a marginalized population (Davis et al., 2020). Therefore, the results of this study have the potential to effect positive social change by encouraging fire department,

healthcare, and government leaders to implement effective policies, programs, funding, and interventions when working with this population.

Conclusion

Understanding the behavior of high utilizers through multiple lenses is important to implement more effective and cost-effective interventions, policies, and systems to improve quality of life and reduce over-utilization of the EMS and ED systems in the Unites States. This study's goal was to gain knowledge from the perspectives of front-line fire department staff based on their experiences with high utilizers, as well as their current and recommended interventions to reduce utilization.

Based on the finding, it is recommended that fire departments partner with city, county, state, and federal legislators to implement new policies and interventions targeted at increasing health access in their communities, improving healthcare systems to provide the right care at the right time in a cost-effective manner, and addressing SDOH among the community members. Other recommendations would be to explore, and possibly expand, the role of the fire department, specifically regarding patient treatment in order to reduce over-utilization. Because the sample size was small, it is also recommended that scholars conduct further research in fire service departments throughout the United States and beyond to assist in creating better interventions, policies, and laws to reduce high utilization and prevent the use of unnecessary, high-cost interventions (Andrade, 2020).

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Appendix A: Interview Questions

1. Tell me about your experiences with high utilizers in your community.
2. Tell me about your experience with high utilizers specifically with suspected or confirmed mental health or substance use conditions in your community.
3. What are your thoughts about the major contributing factors that lead community members to be high utilizers of EMS?
4. What interventions have you or the fire department conducted to prevent or reduce high utilization in your community?
5. What interventions or ideas do you have that the fire department could implement to prevent or reduce high utilization?
6. What interventions or ideas do you think the community, including private, government, and non-profit organizations, could implement in order to prevent or reduce high utilization?
7. What agencies or community members have you collaborated with to address issues with high utilizers?
8. Have you worked outside of our current county and if so, how has your experience with high utilizers differed?
9. Extra questions:
10. What interventions or ideas could you or the fire department implement in order to prevent or reduce high utilization?
11. Are there any major differences with contributing factors that lead community members to be high utilizers of EMS?

12. Are there any specific interventions or services that the fire department or community is lacking in your county?
13. Are there any other thoughts, feelings, or suggestions that could help us understand high utilizers and the prevention and reduction of EMS calls and ED visits in your county?

Appendix B: Invitation Letter

Hello,

I hope this email finds you well.

I am in the Walden Ph.D. program. As part of my coursework, I am conducting research on Fire Department perspectives on avoidable emergency medical services calls and emergency department visits. I'm seeking fire department staff that have worked citizens that live within your County. Would you be interested in assisting?

The practice will include completing an Informed Consent statement (I will e-mail this to you); and allowing me to interview you for a period of 30-45 mins. The whole process should take no more than 60-75 minutes of your time.

Please let me know if you would like to participate.

You can contact me by phone , e-mail if you have any questions.

Best to you,

Nathanial Render