EXAMINATION OF POPULATION DEMOGRAPHICS, CRIME RATES, AND HOSPITAL WPV INCIDENTS

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Abstract

Healthcare is the second highest industry for workplace violence (WPV), and it is on the rise in the US. Public health, healthcare leadership, and security administrators are researching why this phenomenon continues to rise even with the numerous interventions developed and implemented. This research explored the interplay between population demographics, crime rates, and their impact on hospital patients and workplace violence. By analyzing publicly available data, the study established a foundational understanding of relationships between these variables and provided a basis for future investigations. The research examined the relationships between the United States (US) population and the US hospital patient demographics, investigated the association between US population demographics and the demographics of the local community surrounding the sample hospitals, explored the relationship between US crime rates and the sample hospital's national CAP Index scores, and investigated these relationships between US crime rates and the demographics of perpetrators involved in workplace violence incidents at the sample hospital.

The study employed social learning, social cognitive, and social disorganization theories to comprehend the transfer of behaviors from individuals to public spaces, particularly healthcare facilities. This descriptive quantitative study collected cross-sectional data from various reputable sources, including the US Census Bureau, US FBI Crime Data, Definitive Healthcare, the Centers for Disease Control's hospital patient data (including staffed beds, patient days, emergency department visits, and behavioral health diagnoses), and CAP Index community data (comprising crime index scores, population statistics, gender distribution, and age demographics).

Keywords: *US, hospital or healthcare, crime, workplace violence, and type II violence*

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CHAPTER ONE: INTRODUCTION

On July 22, 2023, just before 11 a.m., shots were fired on the fifth floor at a Portland, Oregon hospital killing one security guard and injuring another clinician. On June 12, 2023, at approximately 8 p.m., at a New Hampshire emergency department, a nurse was stabbed by her patient. Additionally, on June 1, 2022, at approximately 4:30 p.m., gunshots were fired at a physician's office in Tulsa, Oklahoma killing four. Would you be shocked if I told you that in the United States (US), healthcare is the second highest industry, after law enforcement, with the highest rate of workplace violence injuries?

Healthcare workplace violence (WPV) is on the rise in the US and public health, healthcare leadership, and security administrators are researching why this phenomenon is on the rise. The healthcare industry is the second highest industry in WPV events with injuries (US Bureau of Labor Statistics, 2020). Between 2011 and 2020, the US BLS Census of Fatal Occupational Injuries, reported at least 80 hospital workers died because of violence in their workplaces. The healthcare industry has been the second highest industry with events and injuries for the past decade regardless of the state, federal, and facility programs and laws that were put into place.

Historically, research has been conducted to examine the impacts of healthcare providers and hospitals, resulting in the development of general overarching programs. Over time, more specific research studies and interventions were developed to mitigate risks associated with WPV. This progression led to a shift in focus towards understanding specific perpetrator demographics, community risks, and the development of targeted initiatives and risk profiles.

The purpose of this research is to build upon the latest studies in this field by identifying perpetrator and population demographics and describe similarities and differences between hospital, community, and US population demographics and the rates of crime or healthcare WPV.

This chapter will introduce the study, starting with an overview of the historical background of WPV. It will then present the research problem, followed by the research aims, objectives, and research

questions. Additionally, the chapter will discuss the significance of the study and outline its limitations. By examining the relationship between demographics and rates of WPV, this research aims to contribute to a deeper understanding of the factors that influence such incidents. This knowledge can inform the development of targeted interventions and strategies to mitigate risks and improve safety in healthcare settings.

Background

Late in the 1960s, the US WPV was in turmoil as labor unions began strikes and riots due to a surging rate of incidents. As a result, the US president signed into law the Occupational Safety and Health Act ("The Act") of 1970. The Act was the start of an amazing turn of events in healthcare after some bumps and hurdles. Between 2000-2020, there were significant strides in research as healthcare WPV began to significantly increase. Healthcare WPV is now the second highest industry reported for having the most injuries and illnesses.

The healthcare industry launched its quality and safety programs in the 1990s which consisted of policies, training, risk assessments, and incident tracking. During this time the Occupational Safety and Health Administration (OSHA) included in its recordkeeping requirements, events related to WPV. One pivotal moment in healthcare was In 2000; the Institute of Medicine published *To Err is Human: Building a Safer Health System,* which focuses on safe practices and systems (Corrigan et al., 2000). In 2001, the American Medical Association, Emergency Nurses Association, and American Hospital Association started publishing standards, guidelines, and program elements to help identify incidents.

Also, during this time, OSHA started to define WPV as any act or threat of verbal and physical violence (Occupational Safety and Health Administration [OSHA], 2016). In addition, researchers found that employees experience a variety of violent perpetrators ranging from clients/patients, visitors, co-workers, and domestic violence. In 2001, the University of Iowa Injury Prevention Research Center examined issues related to WPV and developed research strategies (Loveless, 2001). The study found

four specific types of WPV: (a) the perpetrator has no association, (b) the perpetrator is a customer or client, (c) the perpetrator is a former employee, and (d) the perpetrator has a personal relationship with the victim (Loveless, 2001). These four types are now supported and utilized by OSHA amongst other federal and state agencies. The healthcare industry introduced its incident data collection efforts into high gear and began to track not only patient incident data but also employee incident data since often both were interconnected. As a result, between 2000-2010, healthcare incident data skyrocketed and surpassed other industries. What is more shocking is that some studies claim that WPV numbers are significantly underreported (Claudius et al., 2017; Kaeser et al., 2018; Nikathil et al., 2017; Thomas et al., 2022; Turgut et al., 2021, Arnetz et al., 2015; Chesire et al., 2022; Phillips, 2016; Wolf et al., 2014).

The tracking and benchmarking of healthcare WPV remains a phenomenon as there is a lack of centralized tracking of incidents of occurrences. While OSHA does require reporting of incidents resulting, or potentially resulting in employee injuries, there is no centralized database to track incidents themselves. OSHA and other regulatory and leading industry agencies have finally agreed upon a definition of violence. The International Association of Healthcare Security and Safety (IAHSS) recently published guidelines in 2023 for security incident reports and the framework for incident reporting (*Healthcare Security Industry Guidelines*, 2023). Tracking and benchmarking WPV incidents in healthcare also plays a vital role in public health.

Public health plays a vital role for people that live and work in communities. The public health discipline looks at protecting and improving community and population health such as food, housing, jobs, health, and safety (*What Is Public Health?*, 2023). In particular, healthcare and hospitals played an integral part in public health's mission after 2000. For example, in 2007, Donald Berwick launched the Institute for Healthcare Improvement (IHI) program called the "Triple Aim" which focused on improving patient experiences, better health for populations, and lower per-capita costs for healthcare (Mery et al., 2017). In 2017, Kollar and Sumner, in collaboration with the Centers for Disease Control (CDC),

launched a US based Cardiff study and eventually developed a toolkit to align healthcare providers, law enforcement, and community stakeholders to share violence data to gain a better understanding of violent incidents (Mercer Kollar et al., 2020). Furthermore, I believe this study utilized public health researchers to investigate and link social cognitive theory, social learning theory, and social disorganization theory with violence and repeated violence when individuals are placed in stressful and unfamiliar situations.

Theoretical Underpinnings

To gain a comprehensive understanding and effectively address WPV, it is crucial to draw insights from various theoretical frameworks. This section delves into the alignment between three philosophical theories -- social cognitive theory, social learning theory, and social disorganization theory -- and their implications for public health in relation to WPV.

Social Learning Theory

The social learning theory, initially developed in the 1960s by Ronald Akers and Robert Burgess, suggests that criminal behavior is a result of regular learning processes (Simons & Burt, 2011). Building upon this theory, Archer and Flexon (2021) further explain that individuals model behaviors and social norms that they are exposed to in their social environment, such as their families, schools, friends, and community, particularly during their formative years. Essentially, behaviors that are observed are often replicated.

This concept may be applicable to healthcare violence, as patients who witness aggressive or violent behavior from another patient may imitate this behavior, perpetuating a chain of similar actions. For instance, in settings like the emergency department or behavioral health units, where patients are often in open units or bays, one patient's aggressive behavior can be observed by others, who may later imitate that behavior.

In summary, the social learning theory suggests that individuals learn and adopt behaviors through observation and imitation, particularly from their social environment. This theory can be applied to healthcare violence, where patients witnessing aggressive behavior may reproduce it themselves, creating a cycle of similar actions.

Social Cognitive Theory

The social cognitive theory (SCT), developed by Albert Bandura in the 1960s, goes beyond the concept of SLT by examining how individuals regulate their behaviors based on their perceptions and learned experiences of what is successful in achieving their goals (Bandura, 2011). According to Bandura, self-regulation or controlled behavior reflects past experiences and the outcomes they have produced, whether positive or negative.

In the context of healthcare WPV, SCT suggests that individuals who have received positive outcomes from negative actions such as yelling, threatening, or physical violence in the community may seek similar outcomes in the healthcare environment. If there are no repercussions for continuously assaulting healthcare workers, these individuals are likely to continue such behaviors until they face consequences for their actions.

SCT is crucial for public health, as it aligns with the principles of community policing and law enforcement in mitigating future criminal activities, including violence. When individual perpetrators realize that they will not be punished for their actions, they tend to repeat similar acts in the future, expecting no consequences. Moreover, victims of such crimes may feel helpless and frustrated, leading them to refrain from seeking punishment in future events.

Currently, in the healthcare industry, patients who commit WPV against healthcare workers are rarely punished for their actions. As a result, healthcare workers experience frustration and helplessness, leading them to underreport such events and refrain from acting against the perpetrators.

Therefore, it is evident that social learning plays a significant role in healthcare and is closely related to healthcare WPV.

Social Disorganization Theory

The social disorganization theory was initially developed by Robert Park and Ernest Burgess in 1925, based on their study of immigrants and criminal activity. Over time, other researchers expanded on the theory by incorporating socioeconomic factors and residential stability (Regoeczi & Jarvis, 2013). Regoeczi and Jarvis (2013) further explained that social disorganization theory utilizes spatial analysis to identify factors related to public health. They emphasized the importance of collective efficacy, street justice, and fear of retaliation in reducing community criminal activity. While I agree that these factors may be effective in regulating communities, they are less applicable to hospitals unless the employee is a known member of the community.

Ta et al. (2009) suggested that area-based socioeconomic characteristics contribute to workplace violence based on social determinants, social processes, and proximate factors. Basically, if there is higher population density, lower poverty levels, diminished social controls, and opportunity, the business has a higher potential for violence. Furthermore, they suggest that neighborhoods that are in the middle of transition, or regentrification, are at higher risk due to lack of guardianship and instability within the community itself.

Continuing with environmental, community, or spatial demographics impacting criminal activity has become more prevalent over the past decade. For example, the CAP Index utilizes a CRIMECAST scoring system to analyze environmental and spatial data as well as reported crimes to determine a CAP score based on strong relationships between a neighborhood (CAP Index, 2020).

Research Problem

Despite efforts to address WPV in healthcare, the rates of incidents remain high, and there is a lack of progress in reducing them. This persistent problem has severe consequences, including increased

employee turnover, workers' compensation lawsuits, damage to the facility's reputation, staffing shortages, lost workdays, and potential violations of patients' rights due to improper restraints.

Healthcare leaders recognize the need for comprehensive and detailed data to understand the root causes of WPV and develop effective strategies. However, many facilities face challenges in obtaining this data. Underreporting is a significant issue, leading to incomplete information even when data are available.

Multiple agencies and public health researchers have conducted studies to gain a deeper understanding of WPV and its impact on healthcare facilities, employees, and patients. These studies consistently highlight the underreporting of incidents while identifying various trends. Facilities with a lower safety culture tend to experience higher rates of violence, resulting in negative outcomes such as increased employee turnover, workers' compensation lawsuits, and damage to the facility's reputation. Employees who have suffered from WPV often experience post-traumatic stress, leading to high turnover rates, reduced staffing resources, increased days away from work, and concerns about loyalty. Patients' rights can also be compromised, as they may face unwarranted legal holds or restraints and longer hospital stays. Researchers have also gathered secondary data on the characteristics of perpetrators and events, revealing insights into age, gender, financial profile, diagnosis, event times, and locations.

Despite the existence of current programs and adherence to OSHA guidelines, the rates of WPV in healthcare continue to be a significant issue with little to no improvement observed. This highlights a critical gap and the ineffectiveness of broad interventions in minimizing WPV events. To address this problem, there is a pressing need to develop a standardized and centralized database specifically tailored for healthcare. Such a database would enable the identification of risks and benchmarking of hospitals regarding WPV incidents. By establishing a benchmark, hospitals can implement targeted

interventions that effectively mitigate these risks and improve overall safety for both employees and patients.

Key Terms

- *Healthcare Facility* – A place that provides health or medical treatment such as a hospital, clinic, ambulatory surgery center, outpatient center, and medical office. Healthcare workers or employees are considered anyone working in the healthcare facility such as physicians, nurses, technicians, patient care assistants, and security (Occupational Safety and Health Administration, 2016).
- *Workplace Violence* – Any act or threat of verbal and physical violence, harassment, intimidation, or other threatening disruptive behavior that occurs at the worksite. It ranges from threats and verbal abuse to the physical assaults and even homicide (Occupational Safety and Health Administration, 2016).

Research Aims, Objectives, Questions, and Data

This research aims to assess relationships between US demographics, community factors, and hospital characteristics (sex, gender, ethnicity) to offer an initial step towards utilizing objective data for measuring and understanding WPV incidents in hospital settings. The goal is to explore and understand relationships between population, crime, and healthcare workplace violence as a preliminary effort to a national benchmark database and risk profiles. This research will look at three categories: age, gender, and ethnicity within the US population, US crime rates, US hospital patient population, hospital community population, hospital patient demographics, and hospital WPV perpetrators, to answer the research questions.

This research has two main objectives: Objective 1: to gain a better understanding of US, community and hospital population and demographics, and Objective 2: to examine the relationships or coincidences of population and crime statistics. By achieving these objectives, the research aims to contribute to a deeper understanding of the relationship between national, community, and hospital

demographics. The findings could provide valuable insights for hospitals to develop targeted strategies and interventions that address their specific risks for WPV incidents.

For this research, I have developed four research questions:

Q1 - What are the associations and correlations between US population and sample community population demographics?

Q2 – What are the associations and correlations between sample community demographics and hospital demographics?

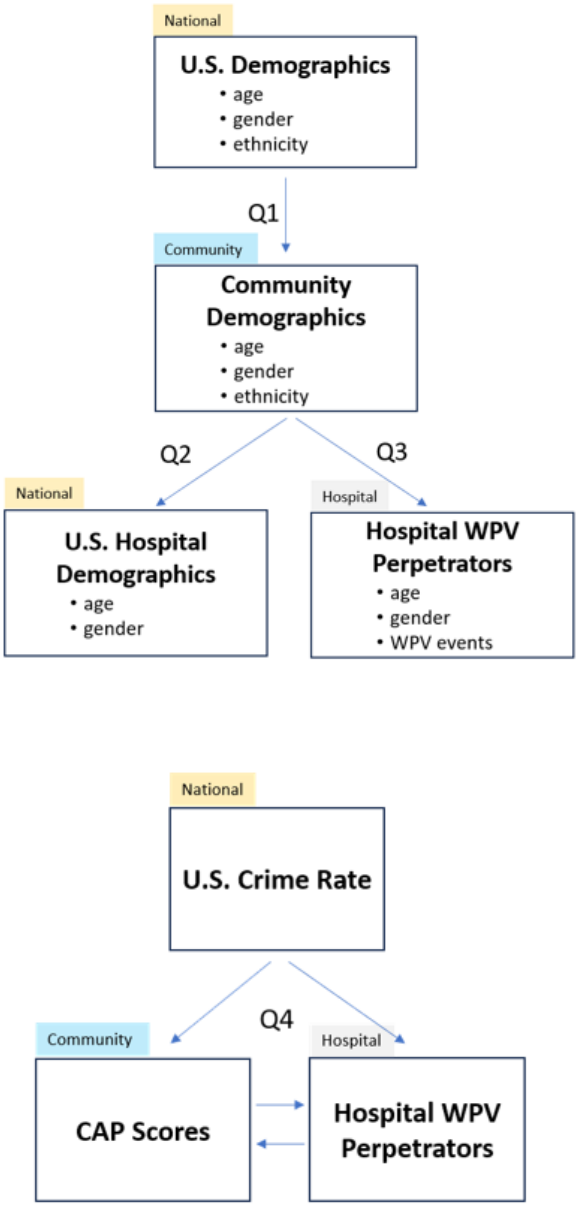
Q3 – What are the associations of the community demographics and previous research hospital studies?

Q4 – What are the associations and correlations between crime rates/ CAP scores related to population demographics?

The questions start broad and at a high level exploring national US demographics and community demographics, then they start exploring hospital demographics. A visual of the data sets to research questions can be found in Figure 1.

Figure 1

Research Questions Data Mapping



Significance/ Justification

The significance of this research is its potential to improve our understanding of population risks and their impact on hospitals, specifically regarding WPV. The goal is to analyze population demographics alongside crime rates in order to identify high-risk populations and assess the potential

risks that hospitals may face. This understanding is crucial for hospitals to develop effective interventions and allocate resources strategically, addressing the specific needs of these high-risk populations and reducing WPV incidents. The research findings aim to contribute to the development of a national database that hospitals can use to benchmark their facility's performance.

This research addresses the current lack of research and knowledge in this field by exploring populations and perpetrator demographics. The findings aim to provide valuable insights and understanding for hospitals to enhance their standard WPV programs and customize them to their specific community and patient population risks. It is important to recognize that different hospitals have unique programs and serve diverse populations. Therefore, having tailored programs that align with the population demographics will greatly assist hospitals in mitigating WPV incidents and improving the overall effectiveness of their programs.

By filling the knowledge gap and providing hospitals with specific insights into their community and patient demographics, this research empowers healthcare organizations to implement targeted strategies and interventions. This, in turn, can contribute to the prevention and reduction of WPV, ultimately creating safer environments for both employees and patients.

Limitations

It is important to acknowledge several limitations of this research design such as limitations in terms of data validity, generalizability, and selection bias. Data validity is a concern in this study as the data were gathered from several different publicly available sources, each with potentially different data measures and definitions. However, these data sets were chosen because they have been collecting data consistently over multiple years, and the definitions and collection methods have been standardized among themselves, allowing for future replication of the data. Additionally, these data sets may not capture the entirety of population or events. For example, it is known that crime events may

be misclassified and/or not all crime is reported to law enforcement and not all law enforcement agencies report into the FBI CDE database.

Second, the study was conducted on a limited scope of community short-term acute care hospitals in the US, excluding other hospital types such as children's hospitals, critical access hospitals, department of defense hospitals, long-term care acute care hospitals, psychiatric hospitals, rehabilitation hospitals, religious non-medical healthcare institutions, and veterans' affairs hospitals. Third, hospitals with less than 50 staffed beds or those that did not report staffed beds were also excluded. Therefore, it is important to avoid making assumptions about other populations due to the limited sample size. The inclusion and exclusion criteria were implemented to ensure representation of the most common short-term acute care hospitals in the US However, it is essential to note that the sample data of 130 hospitals only represents approximately five percent of general short-term acute care hospitals.

In addition, the data sources captured data from different years, although an attempt was made to gather as much information as possible during the same time period. For example, US Census and FBI CDE data captured demographics from 2020, CAP Index data captured data from 2022, hospital data collected hospital demographics from 2023, and hospital workplace violence studies were gathered over a 10-year period based on published date.

Moreover, the COVID-19 pandemic had a significant impact on both the community population and hospital patient demographics from 2020 to 2021. In 2022, hospitals were still slightly affected by the consequences of the pandemic, including nurse staffing shortages, budget cuts, and higher operational expenses. However, patient days and length of patient stays increased. In addition, crime rates may have been impacted during the pandemic due to community and business lockdowns, extreme health stress/ concerns, and the change in social behavioral patterns.

Finally, it is important to acknowledge the potential limitation of my experience as the researcher. While I have conducted previous studies, none have been as complex or in-depth as this research. It is possible that other research studies and publications in the field may not have been included in this paper or literature search. I made efforts to gather historical and current studies to establish a comprehensive foundation of current knowledge through Google Scholar searches and the Fielding Library. However, there is a possibility that some relevant studies may have been inadvertently omitted.

Overview of the Structure and Chapters

In Chapter 1, the study's context is introduced, including the research objective and questions. The significance and value of the research are also argued. Additionally, the limitations of the study are discussed. Moving on to Chapter 2, the focus shifts to reviewing the existing literature to identify key research and program development approaches and strategies within the context of healthcare WPV. This chapter provides a comprehensive overview of the relevant literature, highlighting key findings and establishing the foundation for the research. In Chapter 3, the theoretical framework is presented. The justification for adopting a qualitative, abductive research approach is provided, and the broader research design is discussed, including its limitations. This chapter outlines the theoretical underpinnings that guide the research methodology. Chapter 4 is dedicated to presenting the research data and results in relation to the research questions. The findings are presented and analyzed, providing insights, and addressing the research objectives. This chapter offers a detailed exploration and interpretation of the collected data. Finally, in Chapter 5, a summary of the entire study is provided. This chapter includes an analysis of the findings, recommendations based on the research outcomes, and suggestions for future research. It serves as a conclusion to the study, offering a comprehensive overview of the research process and outcomes.

CHAPTER TWO: LITERATURE REVIEW

Introduction

This chapter offers a comprehensive literature review focusing on healthcare WPV programs in the US It explores the evolution of these programs, delving into the research that supports them and the actions that have been taken thus far to address this issue. Moreover, the chapter highlights program development approaches, shedding light on how research continues to advance the knowledge in this area and bridge previous historical research gaps.

In the latter part of this chapter, specific attention is given to healthcare WPV strategies and the existing gaps in this field. The research examines three different populations: the US population, community-specific factors, and hospital-specific variables. The primary focus is to determine if there is a relationship between these populations and the occurrence of WPV incidents. Additionally, the research intends to assess the strength of this relationship by examining three core variables: population, age, and crime.

By conducting a comprehensive analysis of the literature, this research seeks to contribute to the understanding of healthcare WPV programs and strategies. Through the examination of different populations and variables, this study provides insight into the relationships and potential impact on WPV incidents.

Literature Search

Literature search was conducted in Fielding Graduate University's online library and Google Scholar utilizing keywords to initiate the search. I included PubMed, PubMed Central, Research Library, EBSCO, and Wiley Online databases. Keywords included US, hospital or healthcare, WPV, and Type II violence. Type II violence is violence between employee and customer. I refined the search to scholarly peer-reviewed open access and full text online. Content type included journal articles, peer reviews, book chapters, dissertation/ thesis, government documents, and reports published within the past 10

years. I then filtered by discipline selecting business, government, law, medicine, nursing, public health, social science, social welfare and social work, and sociology and social history. Next, I filtered for articles published in English only. This resulted in 183 references. I then began reading through the reference abstracts and eliminated them if they were not seminal or pertinent to this research. I then began a snowball search based on 22 articles that I found pertinent.

Healthcare WPV, as defined by the National Institute for Occupational Safety and Health (NIOSH), is any violent act, including physical assault and threat of assault, directed toward a person at work or on duty. Within the healthcare sector, healthcare professionals such as nurses, licensed practical nurses, technicians, nurse practitioners, and physicians are often the targets of such violence. Recent studies have revealed alarming statistics regarding the prevalence of healthcare WPV. These studies indicate that approximately one in ten healthcare employees has experienced some form of violence in their workplace, surpassing the rates observed in any other industry. Moreover, there is evidence to suggest that incidents of healthcare WPV are increasing in frequency, highlighting the urgent need for effective preventive measures and interventions.

Key Research

Historical Look into Healthcare WPV

The Occupational Safety and Health Act (the "OSH Act") was signed into law in 1970 giving the federal government the authority to set and enforce workplace safety standards. The Act was developed in response to union strikes due to numerous injuries, illnesses, and deaths occurring in the labor workforce. Part of the Act included the General Duty Clause which demanded each employee "a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees" (*Occupational Safety and Health Administration*, n.d.). When the OSH Act became effective in April 1971, the Secretary of Health and Human Services created OSHA, a regulatory agency to enforce workplace health and safety standards. OSHA is aligned with various

government agencies such as the U. S. BLS, the American National Standards Institute (ANSI), and NIOSH. Each agency played a vital role in OSHA to ensure workplaces were safe from hazards for employees.

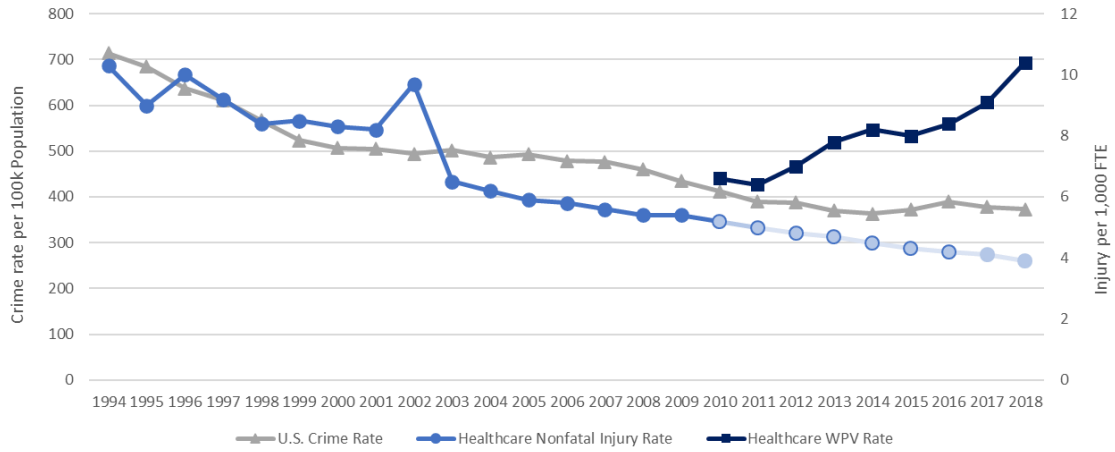
OSHA and the BLS aligned with ANSI to begin collecting industry illness and injury incident reports. After the first year of data submission, thousands of incidents were reported. As a result, OSHA revised and clarified their standards and reporting requirements. They also revised the injury and illness reporting logs and required an independent analysis of the data to ensure validity. These revisions could account for some of the initial decrease in reports. However, little if anything has been modified since those initial revisions.

In the 1990s, the healthcare industry implemented quality and safety programs which consisted of policies, training, risk assessments, and incident tracking. A significant milestone was the publication of the Institute of Medicine published *To Err is Human: Building a Safer Health System* which emphasized the importance of safe practices and systems in healthcare (Corrigan et al., 2000). Professional organizations like the American Medical Association, Emergency Nurses Association, and American Hospital Association also published standards, guidelines, and program elements to identify incidents. The healthcare industry intensified its efforts to collect incident data, encompassing both patient and employee incidents. Due to active tracking the overall healthcare and hospital injury and illness rates per 10,000 employees began to decline according to the U. S. BLS (see Figure 2).

Between 1994 and 2018, there has been a consistent decrease in US crime rates (per 100,000 population) and healthcare non-fatal injury rates (per 1,000 FTEs). However, there was a slight increase in crime rates in 2015. This trend between the two data sets appear to relate to some degree. In 2010, OSHA began tracking healthcare WPV rates separately. This separation of data revealed a significant and concerning trend. Despite the ongoing decline in healthcare non-fatal injury rates, the incidents of WPV events showed a dramatic increase year over year.

Figure 2

1994 – 2022 Healthcare Non-Fatal Injury and Illness Rate and US Crime Rate



In 2013, a study conducted by the Government Accountability Office (GAO) found that healthcare workers were eight times more likely to experience WPV compared to workers in other professions (US Government Accountability Office, 2016). In response, NIOSH published *Guidelines for Preventing WPV for Healthcare and Social Service Workers* (Occupational Safety and Health Administration, 2016) outlining a comprehensive violence prevention program with multiple elements to enhance healthcare programs to decrease risk and injury. The guidelines identify that the violence prevention program consists of five elements: management commitment and worker participation, worksite analysis and hazard identification, hazard prevention and control, safety and health training, recordkeeping, and program evaluation.

In 2017, California OSHA implemented a mandate requiring hospitals to develop a prevention plan and report incidents involving healthcare worker injuries. A study conducted in 2018 revealed that healthcare workers are now 10 times more likely to experience WPV compared to other professions, excluding law enforcement (US Bureau of Labor Statistics, 2020). As a response to this concerning trend, in 2019, Courtney presented the *WPV Prevention in Healthcare and Social Services Act HR.1195* ("HR.1195") to the House of Representatives which passed (H.R.1195, 2021). Subsequently, HR.1195

was introduced to the Senate as S.1176 (2023), but it has not yet been voted upon. Therefore, the bill was reintroduced and passed by the House in February 2021 and in May 2022 at the Senate and is currently waiting for the Senate vote.

These reports and guidelines prompted regulatory agencies such as OSHA, Centers for Medicare and Medicaid (CMS), Det Norske Veritas (DNV), and The Joint Commission (TJC) to implement additional guidelines and standards to support employee safety and rights. These agencies now require healthcare facilities to implement a WPV prevention program. Failure to comply with these guidelines and standards may result in fines, suspension, or revocation of the facility's license. Additionally, 38 states have made it either a misdemeanor or felony to assault a healthcare worker (*Advocacy Toolkit,* 2022).

Despite these regulatory revisions and interventions, incidents of WPV continue to rise. This alarming trend raises serious concerns about the effectiveness of current interventions and safety measures in preventing and addressing WPV in healthcare settings. Although non-fatal injury rates have been decreasing overall, the persistent increase in WPV incidents highlights the need for specific strategies and targeted interventions to address this unique challenge. It is crucial for healthcare organizations to prioritize and address the issue of WPV to ensure the safety and well-being of both healthcare workers and patients.

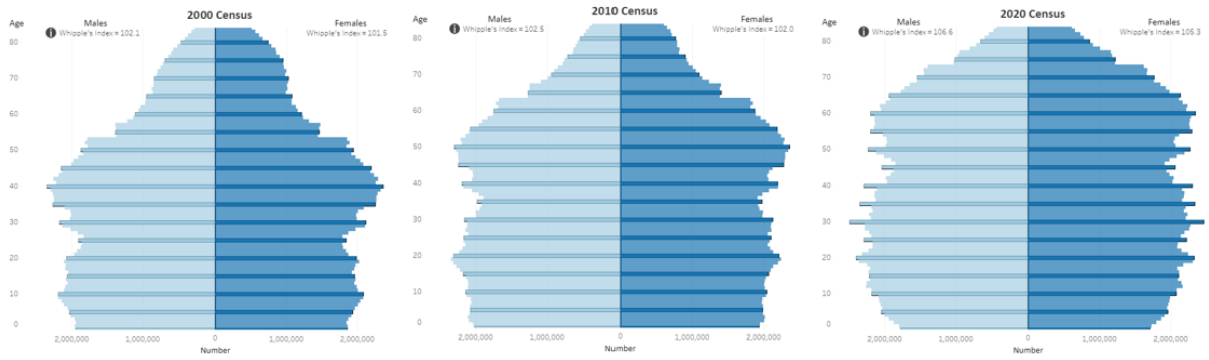
Key Literature Findings

In the past three decades, the US has experienced a gradual shift in its demographic composition towards an older population (see Figure 3). This trend can be attributed to the lower birth rates following the baby boomer generation. Blakeslee et al. (2023) emphasized that the number of people aged 65 years and above is steadily increasing, primarily due to a decline in the number of children being born from the previous generations. While the population in the US has continued to climb over the past five decades, it is at a much slower rate ranging from 7.4% to 13.2% (United States Census Bureau, 2021). This shift in demographics has significant implications for the country and

necessitates a thorough understanding and proactive approach to address the evolving needs of the aging population. Several factors contribute to the changes in the population of the US economic challenges such as infertility, diseases, or a combination of these factors all play a role in shaping the overall demographic landscape of the country (Blakeslee et al, 2023).

Figure 3

US Population Pyramids for 2000, 2010, and 2020



Note: From US Census Bureau (United States Census Bureau, 2023)

Interestingly, during this time of demographic change, the crime rate in the US, as reported by the FBI National Incident-Based Reporting System (NIBRS), has experienced a significant decrease. The FBI has consistently observed a decline in serious crime rates over the past few decades (Federal Bureau of Investigation, n.d.). Specifically, from 2000 to 2021, the crime rate decreased from 506.5 to 369.8 per 100,000 population.

The decline in serious crime rates can be attributed to various factors. Levitt (2004) provided valuable insights into the reasons behind this decrease, which include a strong economy, shifting demographics towards an aging population, improved policing strategies, changes in gun control laws, an increase in capital punishment, a larger police force, and a decrease in the drug epidemic. Researchers believe that measures such as increasing the number of law enforcement personnel,

stricter enforcement of laws, and the implementation of more severe penalties have played a significant role in reducing crime rates over years.

Moreover, the NIBRS data not only indicate a decline in overall crime rates but provide valuable insights into the demographics of both offenders and victims. Analyzing the data from 2018 to 2022, it is evident that many offenders fall within the age range of 20 to 40 and are predominantly male. Additionally, they are primarily identified as either White or Black, as depicted in Table 1. As the population continues to age, it is expected that crime rates will continue to decrease.

Table 1

2018 – 2022 US Criminal Offender Demographics Medians

	2018	2019	2020	2021	2022
Offender Age					
0 – 19	17%	17%	14%	14%	15%
20 – 29	30%	29%	29%	28%	26%
30 – 39	20%	20%	21%	22%	22%
40 – 49	10%	10%	11%	11%	12%
50 – 59	7%	7%	6%	7%	7%
60 +	2%	2%	4%	4%	4%
Unknown	14%	15%	15%	14%	14%
Sex					
Male	78%	78%	77%	77%	77%
Female	17%	17%	17%	17%	18%
Unknown	5%	5%	6%	5%	5%
Ethnicity					
White	46%	45%	44%	44%	44%
Black	43%	56%	44%	44%	43%
Hispanic	14%	14%	14%	15%	17%
Other/ Unknown	10%	11%	11%	13%	12%

In the field of public health, similar to crime analysis, healthcare organizations analyze hospital demographic data, such as patient days, admissions, and emergency department (ED) visits, to gain insights into population health and resource needs. From 2000 to 2022, there has been a steady decrease in the number of hospital inpatient days from 682 to 563 per 1,000 population. In contrast, the number of ED visits has steadily increased, rising from 366 to 383 per 1,000 population.

So what does this mean? A study conducted by Turgut et al. (2021) found that there is an increase in ED visits after normal business hours, which can be attributed to individuals seeking medical care when physician offices are typically closed. These visits often involve receiving treatment from a clinician for non-emergency conditions that can be resolved without hospitalization. Therefore, it is expected that there would be a spike in patient volume and WPV incidents after normal business hours.

Over the past few decades, researchers and agencies have conducted numerous studies to investigate the causes and impacts of healthcare WPV on facilities, employees, and patients. Initially, in the 1980s to 1990s, researchers focused on violence in psychiatric or behavioral health units. They examined various aspects of healthcare WPV, including facility type, employee age and sex, and the impacts on patients.

Subsequent research expanded to explore the impacts on staff and hospitals, hospital culture, incident reporting, risk assessment, and characteristics of perpetrators and events. Many studies have centered their investigations on the impacts on healthcare workers, such as high turnover rates, legal claims, staffing ratios, and emotional stress. For instance, Blando et al. (2013), Lipscomb et al. (2007), McPhaul et al. (2013), Phillips (2016), and Schmidt et al. (2019) argue that hospitals experiencing high levels of WPV without effective programs face severe financial consequences, including negative culture, high turnover rates, lost work time, claims, and low productivity and customer satisfaction.

Numerous studies emphasize the significance of incident reporting and taking action to support victims. According to Cain et al. (2019) and Schmidt et al. (2019), healthcare employees feel safer when they report incidents and receive support from their supervisors, management, or security. Conversely, when facilities fail to take appropriate action, victims may become disengaged and suffer physical and psychological trauma.

Spector et al. (2007) conducted research on the impact of management actions on the perceived violence climate and developed the Violence Prevention Climate (VPC) tool. This tool assesses

work safety, physical strain, and psychological strain, and its findings suggest that management plays a direct role in shaping the WPV program and safety culture of a facility.

Building upon Spector et al.'s VPC tool, Kessler et al. (2008) and Hamblin (2016) measured employee perspectives on the violence climate and managers' response to safety concerns. Hamblin confirmed a strong positive correlation between the VPC and the Manager Support for Safety Climate (MSC). Therefore, utilizing the VPC tool enables managers to assess compliance with WPV programs, safety culture, and zero-tolerance policies, empowering them to make necessary adjustments.

However, research indicates significant under reporting of WPV incidents. Factors contributing to under reporting include limited actions or responses to reports, lack of accountability, and the time-consuming nature of reporting (Claudius et al., 2017; Kaeser et al., 2018; Nikathil et al., 2017; Thomas et al., 2022; Turgut et al., 2021). Organizational culture and the belief that violence is not intentional or is considered part of the job also contribute to under reporting (Arnetz et al., 2015; Chesire et al., 2022; Phillips, 2016; Wolf et al., 2014). Culture and accountability play a significant role in addressing this issue.

To effectively measure healthcare WPV variables, Arnetz (1998) developed a comprehensive violence incident form (VIF) consisting of 14 questions. This form captures various data, including event time, location, preceding activity, type of event, actions taken, results, characteristics of aggressors and victims, among others. The VIF has been utilized in numerous research studies and validated as an effective instrument. However, its utilization is not widespread in many US hospitals. Standardizing and implementing the VIF across healthcare facilities would be advantageous as it is concise, includes hospital and patient demographics, and enables easy tracking and measurement over time.

Initially, incident reporting policies in hospitals primarily focused on adverse patient outcomes, neglecting to address patient perpetrators. However, as incidents of violence involving employees

escalated, hospitals recognized the need to revise their policies and incident reporting systems to include patients and other individuals as potential perpetrators.

According to Arnetz et al. (2011) a centralized database is recommended for tracking security incidents in order to gain valuable insights. Tracking incidents provides information on trends, event locations, timing, and perpetrator characteristics. Arnetz et al. suggest that compared to event debriefs, tracking incidents would yield richer and more accurate data.

Analyzing the collected data allows for important insights into the nature and consequences of WPV. It also facilitates the identification of at-risk professional groups and hospital departments. Additionally, trends in violence reporting over time can be observed, providing a dynamic perspective on WPV occurrence. To accurately measure the occurrence of WPV, incidence rates based on the population at risk are utilized. These rates consider hospital-specific data and the type of violence experienced. This approach offers a more reliable and accurate measure compared to studying individual events on a case-by-case basis. Establishing violence surveillance systems, such as the one described, is crucial in hospital settings. These systems enable the identification of areas where WPV intervention programs are most needed. By developing, implementing, and evaluating targeted intervention programs, appropriate measures can be taken to address WPV and mitigate its impact.

The Christie (2015) study highlighted that despite the implementation of zero-tolerance policies, employees felt that managers did not adhere to the policy. Patient investigations were either not conducted or were deemed insufficient. Moreover, there was a lack of support for employee victims, and a perceived failure to provide a safe environment due to the involvement of patients. Clinicians started viewing patient violence as an inherent part of their job, often attributing it to patients' diminished mental capacity caused by medical conditions or medications.

In their study, Blando et al. (2013) observed that management took steps to enhance the safety of the healthcare environment by investing in security and law enforcement resources. However,

despite the additional resources, the study found that the occurrence of violence did not decrease, and injuries still occurred. Interestingly, the study also revealed that employee satisfaction increased when security responded promptly and effectively, thereby limiting the severity of the injuries.

A separate study conducted by the National Institute for Occupational Safety and Health (NIOSH, 2002) assessed the physical and social environment of healthcare workplaces and the contributing factors to WPV. The NIOSH study identified several factors associated with higher incidents of violence, including understaffing, long wait times, limited training, and inadequate internal and external support.

Findorff et al. (2005) conducted a study to identify the individual and employment characteristics associated with the reporting of violent and non-violent incidents by healthcare workers. The results indicated that individuals were more willing to report incidents of physical violence compared to non-physical violence.

Program Development Approaches

Interventions

As research studies on healthcare WPV have been published and reviewed, hospitals have gradually started adopting interventions such as training programs, specialized teams, and risk assessment tools. However, the effectiveness of these interventions remains a topic of debate among researchers. Some researchers argue that many of the studies evaluating these interventions have flawed experimental designs, leading to inconclusive results (Johnsen et al., 2020; Phillips, 2016; Thomas et al., 2022). Other researchers point out issues such as incomplete data, bias, or inconclusive findings in the studies (Ayranci et al., 2006; Claudius et al., 2017; Ferri et al., 2016; Kaeser et al., 2018; Pompeii et al., 2013; Ramacciati et al., 2016; Speroni et al., 2014; Thomas et al., 2022; Vezyridis et al., 2015). Despite the lack of consensus, it is important for researchers to continue gathering data on these interventions to validate their effectiveness over time. It is through these successes, failures, and

ongoing research that potential viable risk interventions may emerge, addressing public health and social concerns related to WPV.

Both healthcare employees and leadership recognize the importance of WPV training in preventing incidents, despite the associated costs. A study by Wray (2018) revealed that healthcare organizations spent over $280 million on employee training to enhance knowledge and awareness of identifying signs of agitation, which can be indicators of violence, and to instill confidence in managing such situations. However, there are mixed perceptions regarding the effectiveness of specific training programs. For example, a nurse study cited by Christie (2015) found that nurses considered CPI (Crisis Prevention Institute) training to be ineffective. Additionally, research suggests that staff de-escalation training can improve staff perception of safety but may not be effective in preventing WPV.

A nurse study supports training for security and law enforcement; however, "all [nurses] said that the CPI training was ineffective" (Christie, 2015, p.34). Furthermore, based on current research, staff de-escalation training is effective in improving staff perception of safety and not effective in preventing WPV (Hallett et al., 2016; Price et al., 2015; Somani et al., 2021). While de-escalation training provided self-awareness and knowledge around agitation and the violence escalation cycle, nurses may have also believed that they could manage escalating patients on their own. While de-escalation training was an initial intervention, it resulted in the development of behavioral emergency response teams or agitation response codes (Gillespie et al., 2014; Roppolo et al., 2020; Wong et al., 2020). Behavioral emergency response teams were also initially thought to be an effective risk mitigation intervention. Initial studies found that they reduced restraint use and injuries; however, subsequent research suggested that the presence of multiple individuals intervening, or the involvement of security personnel may have further provoked perpetrators into engaging in physical violent acts (Parker et al., 2020; Wong et al., 2022).

The introduction of de-escalation training has resulted in the establishment of behavioral emergency response teams (BERT) or agitation response codes in certain healthcare settings. BERT teams are primarily deployed in behavioral health or inpatient settings and have demonstrated effectiveness in preventing escalating events from becoming physical confrontations (Parker et al., 2020). These teams have been recognized as effective clinical risk mitigation interventions, as initial studies have indicated a reduction in the use of restraints and a decrease in injuries. However, it is unfortunate to note that BERT teams are seldom activated in emergency departments (EDs), even though many violent incidents occur in general medical surgical hospitals. The underutilization of BERT teams in EDs highlights a potential gap in addressing violence within these settings. Efforts should be made to enhance the implementation and activation of BERT teams in EDs to ensure the safety of both healthcare providers and patients in these high-risk environments.

Trauma-informed care (TIC) is a clinical intervention that has been developed based on research conducted by Gillespie et al. (2014) on risk factors for WPV. TIC originates from the field of public health and focuses on effectively managing individuals who have experienced trauma. TIC involves a patient-centered approach that creates a sense of connection, value, information, and empowerment for patients. Additionally, staff members are trained to be mindful of triggers that may escalate patient agitation, ensuring a safe and supportive environment ((Muskett, 2014). Research conducted by Muskett regarding TIC has demonstrated positive psychological outcomes for both patients and staff. This highlights the effectiveness of implementing TIC strategies in emergency departments, as it not only benefits patients who have experienced trauma but also contributes to the well-being and satisfaction of healthcare providers. By incorporating TIC principles into emergency department practices, healthcare facilities can create a more compassionate and supportive environment for patients while also promoting the mental health and resilience of their staff.

The utilization of assessment tools for identifying potentially violent individuals and ensuring incident reporting compliance in hospitals across the US is sporadic and often underutilized. Researchers have explored various assessment tools in this regard. In a study conducted by Campbell et al. (2015), the effectiveness of specific assessment tools, such as Broset, SOAS, and STAMP, was investigated by assessing their reliability and validity. Additionally, subsequent research identified a total of 16 different assessment tools, with 13 primarily utilized in psychiatric settings and two, namely SOAS-RE and STAMP, implemented in the emergency department (Cowling et al., 2007). Luck et al. (2007) introduced the STAMP (staring and eye contact, tone/volume of voice, anxiety, mumbling, and pacing) violent assessment form, which showed promise as an effective tool in a limited study involving 20 participants. However, despite its potential, widespread adoption of the STAMP tool has yet to occur in many healthcare facilities.

Given the inconsistent and underutilized nature of these assessment tools, researchers recommend further research to validate their effectiveness or potentially eliminate ineffective tools. This highlights the need for more comprehensive studies to determine the reliability, validity, and practicality of assessment tools in the specific context of healthcare WPV prevention. Conducting additional research will enable healthcare organizations to make informed decisions regarding the selection and implementation of assessment tools, ultimately leading to more effective mitigation and management of WPV incidents.

Strategies and Existing Gaps

Recent Research Strategies

Limited empirical research has been conducted on the event and perpetrator characteristics and trends in WPV incidents, but recent studies have started to focus on these areas. By examining the annual reports of the National Hospital Ambulatory Medical Care Survey (NHAMCS), consistent patient characteristics such as age, gender, and insurance have been observed over the past 20 years (see Table

1). However, between 2016 and 2021, the NHAMCS reports indicate a significant increase in the number of patients seen by a clinician within 15 minutes, whereas prior to 2008, patients were typically seen between 15 and 59 minutes. This increased wait time for emergency patients to be seen by a clinician could potentially contribute to additional stress. Proponents also suggest that factors such as patient overcrowding or a high nurse-to-patient ratio may hinder timely care and communication (Chan et al., 2010; Phillips, 2016). The decrease in wait time for patients to be seen by a clinician could potentially account for the decrease in WPV incidents during this period.

Table 2

2016 – 2021 Average US Annual Emergency Department Patient Demographics

	2016	2017	2018	2019	2020	2021
Age						
0-17 years	22%	23%	23%	23%	16%	20%
18-44 years	39%	39%	37%	36%	31%	40%
45-64 years	24%	22%	23%	22%	24%	23%
65-74 years	18%	17%	18%	19%	20%	17%
Sex						
Male	45%	44%	44%	45%	47%	46%
Female	55%	56%	56%	55%	53%	54%
Ethnicity						
White	73%	70%	68%	72%	21%	57%
Black	23%	26%	27%	24%	58%	24%
Hispanic or Latino	16%	16%	17%	17%	16%	16%
Payment Source						
Medicaid, CHIP, or state programs	37%	40%	37%	37%	37%	39%
Private	32%	31%	31%	29%	30%	33%
Medicare	18%	19%	19%	20%	22%	21%
Uninsured/ Self-pay	9%	6%	9%	10%	8%	7%
Other (e.g., Workers Comp.)	4%	4%	3%	4%	0%	1%
Time Spent Waiting to See Doctor						
< 15 min	39%	40%	44%	42%	51%	42%
15-59 min	32%	33%	31%	27%	27%	31%
1 hr - 2 hrs	10%	9%	9%	8%	6%	9%
2 hr - 3 hrs	3%	3%	3%	3%	2%	3%
3 hr - 4 hrs	1%	1%	1%	1%	1%	1%
4 hr - 6 hrs	1%	1%	1%	1%	1%	1%
6 hrs or more	1%	1%	1%	1%	1%	0%
Not seen	3%	3%	3%	2%	3%	3%
Blank	11%	10%	9%	14%	11%	10%
Time Spent Waiting in the Emergency Department						
Less than 1 hr	12%	--	9%	10%	9%	8%
1 hr - 2 hrs	23%	--	21%	21%	20%	17%
2 hrs - 4 hrs	34%	--	35%	35%	34%	35%
4 hrs - 6 hrs	15%	--	16%	15%	16%	18%
6 hrs - 10 hrs	8%	--	8%	8%	9%	11%
10 hrs - 14 hrs	2%	--	2%	2%	2%	2%
14 hrs - 23 hrs	2%	--	2%	2%	2%	2%
24 hrs or more	1%	--	1%	2%	1%	2%
Blank	5%	--	6%	7%	--	4%

On the other hand, the findings from the Centers for Disease Control and Prevention (CDC) and the Bureau of Labor Statistics (BLS) challenge a recent study by Press Ganey, which claimed that nurses are assaulted on an hourly basis (*On Average, Two Nurses Are Assaulted Every Hour, New Press Ganey Analysis Finds*, 2022). One possible explanation for Press Ganey's findings is that the documented violent events may not have resulted in employee injuries beyond first aid, thus not being reported to OSHA. Another explanation, as mentioned in earlier research, is that employees may still be hesitant to report incidents and resulting injuries.

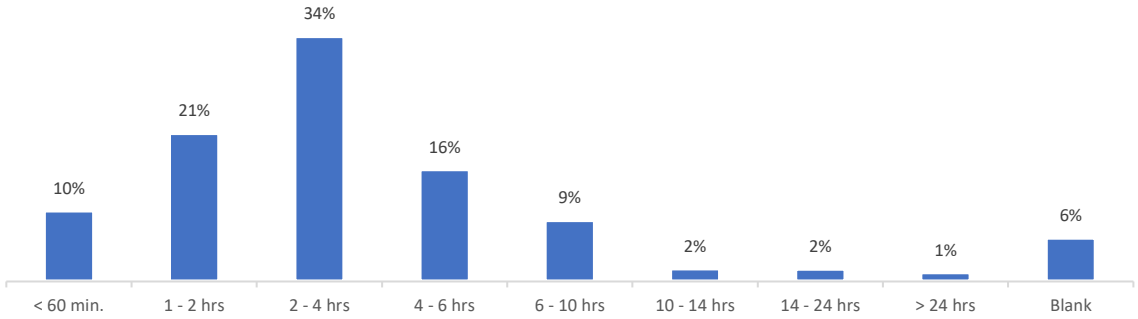
When examining the characteristics of perpetrators involved in US hospital Type II workplace violent events (patient against employee) between 2012 and 2022, it was found that most violent events occurred in behavioral health units or the emergency department (Ferri et al., 2016; Thomas et al., 2022; Vezyridis et al., 2015). Verbal violence was more prevalent than physical violence, although the impact on the worker was more significant in cases of physical violence (Ferri et al., 2016; Kaeser et al., 2018; Speroni et al., 2014; Thomas et al., 2022; Turgut et al., 2021). Additionally, the majority of perpetrators were male patients aged between 20 and 40 years, often encountered in the waiting room, triage, or patient rooms (Johnsen et al., 2020; Kaeser et al., 2018; Speroni et al., 2014; Turgut et al., 2021; Vezyridis et al., 2015). Moreover, violent events were more likely to occur within the first 60 minutes of a patient's arrival during the second shift (1600 – 2400); (Thomas et al., 2022; Turgut et al., 2021).

According to the National Hospital Ambulatory Medical Care Survey (NHAMCS), the average time a patient spent in the EDs was less than 4 hours (see Figure 4). Several studies have examined the duration of time individuals spent in the ED before experiencing a WPV event (Ayranci et al., 2006; Thomas et al., 2022; Turgut et al., 2021). These studies have consistently found that 90% of WPV events occur within the first 4 hours of a patient's arrival. Additionally, a study by Cairns and Kang (2022) revealed that 79% of patients spent less than 6 hours in the emergency department. The typical profile

of these patients included being between 18 and 44 years old, female (53.4%), and White (72.7%). Approximately 36.6% of these patients had Medicaid or state-based program insurance.

Figure 4

2015 - 2021 Average Time Patients Spent in the Emergency Department

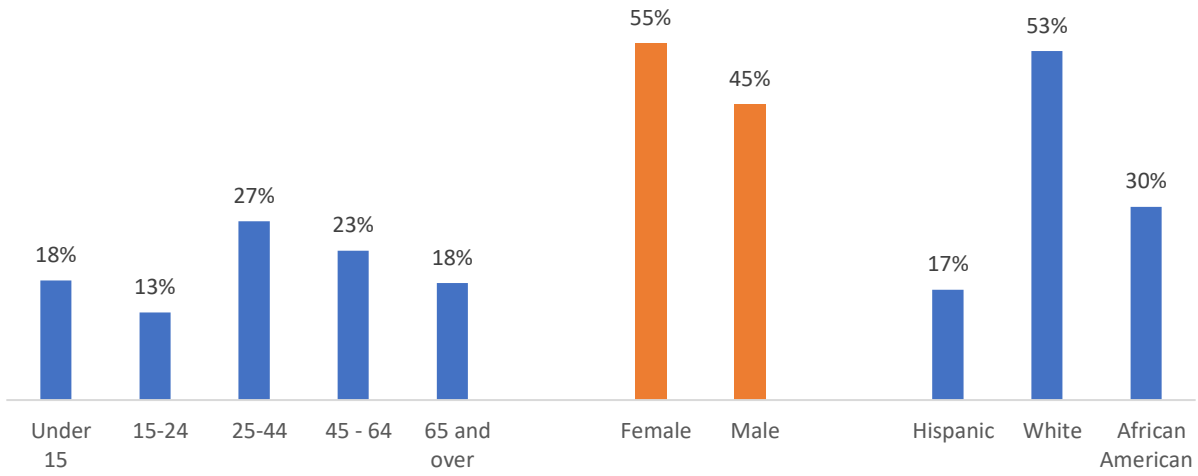


One particularly interesting finding from the research conducted by Turgut et al. (2021) is that 60.5% of violent events occurred within the first 15 minutes of a patient's arrival in the emergency department. This finding supports the theories put forth by researchers that WPV is often triggered by factors such as wait times, inadequate communication, or perceived substandard treatment methods.

Perpetrator age is an important characteristic that aligns with the overall age distribution of emergency department patient volume. According to the NHAMCS annual reports, approximately 50% of emergency department patients fall within the age range of 25 to 64 years old (see Figure 5). Researchers have found that the typical age range of perpetrators involved in WPV incidents aligns closely with this demographic, ranging from 20 to 45 years of age (Johnsen et al., 2020; Kaeser et al., 2018; Thomas et al., 2022; Turgut et al., 2021).

Figure 5

2015 – 2021 Average Emergency Department Visits by Patient Age, Sex, and Ethnicity



However, it is worth noting that a study by Nikathil et al. (2018) discovered that 21.1% of perpetrators were geriatric patients. These individuals exhibited altered mental states, often associated with conditions such as Alzheimer's disease and sundown syndrome, which contributed to their involvement in violent incidents. This finding highlights the importance of considering age-related factors and specific mental health conditions when examining the characteristics of perpetrators in the context of WPV incidents.

When patients visit EDs for acute injuries or illnesses, they often find themselves in a stressful and unfamiliar situation. Research has shown that emergency department patients are more likely to contribute to healthcare WPV compared to other locations, excluding behavioral health units (Arnetz et al., 2015; Pekar & Gillespie, 2013; Turgut et al., 2021). Several factors have been identified as triggers for WPV in healthcare settings. Early studies have found that violence is typically sparked by a lack of communication, long wait times, disagreements with treatment, anxiety, and certain medical conditions (Blando et al., 2013; Claudius et al., 2017; Ferri et al., 2016; Johnsen et al., 2020; Turgut et al., 2021).

In the realm of healthcare, there are different types of violence, namely verbal and physical, which are now being classified separately. Research has consistently shown that verbal violence is more

prevalent compared to physical violence (Ferri et al., 2016; Johnsen et al., 2020; Thomas et al., 2022; Turgut et al., 2021; Vezyridis et al., 2015). Verbal violence is often considered a precursor to physical violence and can stem from stress, fear, or agitation (Liu et al., 2013). In the context of healthcare, verbal violence in emergency departments is commonly associated with dissatisfaction from family members and visitors regarding wait times and communication from clinicians (Ferri et al., 2016; Pompeii et al., 2013; Turgut et al., 2021). However, it is worth noting that verbal violence is often under-reported by clinicians due to factors such as the absence of physical injury, fear of retaliation, feelings of shame, reporting processes, or considering it as part of the job (Claudius et al., 2017; Ferri et al., 2016; Thomas et al., 2022).

On the other hand, physical violence is more clearly defined and reported, often involving patient management or treatment incidents that require police intervention, use of restraints, or result in sustained injuries (Ferri et al., 2016; Kaeser et al., 2018). Patients may engage in physical violence due to clinical conditions, unmet needs, dissatisfaction with care, fear, or prolonged stays (Claudius et al., 2017; Ferri et al., 2016; Johnsen et al., 2020; Thomas et al., 2022; Turgut et al., 2021).

The location of WPV events in healthcare settings has been a topic of debate. Some research argues that psychiatric/behavioral health units have the highest number of events (Claudius et al., 2017; Ferri et al., 2016), while others contend that the majority of incidents occur in the emergency department (Gerberich et al., 2005). There are also debates about whether events occur more frequently in medical surgical units, geriatric units, neurological units, or surgical units (Ayranci et al., 2006; J. C. Campbell et al., 2011). It is challenging to determine a definitive answer to this debate as research in this area has been limited in scope, size, and focus. However, a study by Gerberich et al. (2005) conducted in collaboration with the Minnesota Hospital Association found that emergency department personnel reported more incidents compared to other units.

Further research specific to the ED has identified specific locations within the department where violence is more likely to occur. For example, Turgut et al. (2021) and other studies have found that violence mostly occurs in the waiting area or triage area, while others have reported that it predominantly occurs in patient rooms (Claudius et al., 2017; Doehring et al., 2023; Nikathil et al., 2018; Thomas et al., 2022; Turgut et al., 2021; Vezyridis et al., 2015). The Ferri et al. (2016) study, for instance, found that 57.8% of events occurred in patient or treatment rooms, while the Thomas et al. (2022) study reported that 41% of incidents occurred in both the waiting room or triage area and the patient or treatment room. Until a standardized and agreed-upon definition and subcategories are adopted, this debate regarding the location of WPV events is likely to continue.

When examining the time of day when WPV events occur, studies have three typical work shifts. The occurrence of events for all three shifts varied from 18% to 51%. Specifically, three studies (Johnsen et al., 2020; Thomas et al., 2022; Turgut et al., 2021) reported that WPV events were more likely to happen during the afternoon shift. Among these studies, Turgut et al. (2021) found that most events were caused by family members, which aligns with the visiting hours for families in the facility.

Furthermore, the studies examined the clinical diagnosis of the perpetrators as a potential cause for WPV events. Two of the articles (Claudius et al., 2017; Thomas et al., 2022) found that mental/behavioral disorders were the main contributing factors to these events. Two other studies (Kaeser et al., 2018; Nikathil et al., 2018) identified drugs and alcohol as significant contributors. However, two additional studies (Ferri et al., 2016; Turgut et al., 2021) concluded that neither mental/behavioral health disorders nor drugs and alcohol played a major role in the events. The Ferri et al. (2016) study was conducted hospital-wide and relied on staff surveys of the most serious WPV events over the past year. The Turgut et al. (2021) study specifically excluded patients with alcohol/drug abuse issues and those who were unable to provide consent to participate, such as individuals with mental/behavioral health conditions.

Current Existing Gaps

Until last year, there was no standardized incident reporting framework in place, making it difficult to collect data on healthcare security incidents. However, IAHSS has released guidelines that address this issue. These guidelines introduce a framework and definitions to promote the adoption of standardized practices in healthcare facilities. The goal of this framework is to enable healthcare facilities to track security incidents consistently and compare their performance with other facilities (International Association for Healthcare Security & Safety, 2022b).

In addition to the guidelines, the IAHSS Healthcare Security Industry Guideline, 01.05.02 Incident Categories and Data Analysis, provides practical examples of how to calculate security incidents (International Association for Healthcare Security & Safety, 2022a). This guideline offers valuable guidance to healthcare facilities in understanding and implementing effective data analysis methods to assess security incidents. By following these guidelines, healthcare organizations can improve their incident tracking and analysis capabilities, leading to enhanced security measures and overall safety within their facilities.

Accountability at the regulatory level has also been lacking in the healthcare industry. However, on November 28, 2022, CMS issued a memorandum to healthcare facilities regarding the enforcement of regulatory expectations (Centers for Medicare and Medicaid Services, 2022). The memorandum emphasizes the importance of conducting risk assessments for patients, employees, and the community within hospitals. It also highlights the need for staff to receive appropriate training on identifying patients at risk, identifying environmental factors that may pose patient safety risks, and implementing effective mitigation strategies. By enforcing these expectations, CMS aims to enhance patient safety and promote a culture of proactive risk management within healthcare facilities.

When it comes to identifying patient risks, OSHA guidelines (2016) recommend the use of flagging patients' charts if they have a history of past violence, drug abuse, or criminal activity. The

purpose of this flag is to alert caregivers to the potential risk associated with these patients. However, research in this area has produced mixed results. The study conducted by (Ferron et al., 2022) identified several challenges related to patient stigmatization, patient privacy, worker safety, and gaps in flagging policies and procedures. These findings suggest that there are limitations and issues associated with the current practice of flagging patients' charts. Furthermore, once a patient is flagged, clinicians often implement a "safety contract" where the patient agrees not to engage in violent behavior. However, the Ferron et al. study also found that clinicians feel that flagging a patient is generally ineffective beyond improving communication between healthcare providers. These findings highlight the complexities and limitations of using patient flagging as a risk identification strategy. It is essential for healthcare organizations to carefully consider the potential stigmatization, privacy concerns, and efficacy of flagging policies when implementing such practices. Alternative approaches and additional strategies may be necessary to effectively address patient risks in healthcare settings.

Another notable gap in the healthcare industry is the absence of a national incident benchmarking database specifically for healthcare WPV. Existing data from the Bureau of Justice Statistics (BJS) provides annual statistics on WPV but does not specifically focus on healthcare or hospital incidents. The FBI Crime Data Explorer provides information on violent crime in the US, but it also does not collect data specifically for healthcare or hospitals. However, IAHSS is currently developing a benchmarking database that will include various healthcare security and safety incidents. This database is expected to be released in 2024 (International Association for Healthcare Security & Safety, n.d.). While there are threat intelligence software systems available for facilities to compare their incidents to national crime rates, there is currently no option to compare incidents between different healthcare facilities.

The development of a national benchmarking database for healthcare security incidents, specifically WPV, would be a significant step forward. Such a database would align with other clinical

benchmarking databases, such as CMS Hospital Compare, AHRQ Quality Indicators, ORYX, CAHPS, Leapfrog, and the Department of Health, allowing healthcare facilities to assess their performance, such as nosocomial infections, and identify areas for improvement.

Literature Review Summary

This chapter offers a thorough examination of healthcare WPV programs in the US, encompassing the evolution of these programs, program development approaches, and past research on the impacts of WPV on healthcare workers and hospitals. From 2000 to 2020, research on healthcare WPV experienced significant advancements as its incidence increased notably. During this period, the healthcare industry, alongside other sectors, implemented quality and safety programs to track incidents. Towards the end of this timeframe, healthcare began leveraging big data, data modeling, and forecasting techniques, resulting in the emergence of valuable research and data that revealed trends in innovative interventions and efforts to enhance public health. Research indicates that higher rates of WPV are influenced by various environmental and behavioral factors, both from patients and employees.

The chapter also sheds light on various aspects of healthcare WPV programs, including policies, training, staffing, reporting, and interventions such as staffing improvements, de-escalation training, and patient risk assessment tools, all aimed at mitigating WPV risks. While hospitals have adopted various interventions to address healthcare WPV, ongoing research and debate surround their effectiveness. Continued research is necessary to validate and refine these interventions and explore novel approaches to identifying and mitigating WPV in healthcare settings.

Particular attention is given to healthcare WPV strategies and existing gaps in this field. The literature highlights four specific areas where gaps exist: the standardization of security incident reporting frameworks, hospital accountability, patient risk identification, and the absence of a national incident benchmarking database.

The release of guidelines by the International Association for Healthcare Security & Safety (IAHSS) has introduced a standardized incident reporting framework, enabling healthcare facilities to track security incidents consistently and compare their performance with other facilities. The accompanying healthcare security industry guideline provides practical examples and guidance on data analysis methods, empowering healthcare organizations to improve incident tracking and analysis capabilities.

Furthermore, accountability at the regulatory level has been reinforced by the memorandum issued by the Centers for Medicare and Medicaid Services (CMS). This memorandum emphasizes the importance of conducting risk assessments, providing appropriate training, and implementing effective mitigation strategies to enhance patient safety and proactive risk management within healthcare facilities.

However, the practice of flagging patients' charts to identify risks has shown mixed results. Research has highlighted limitations and challenges related to patient stigmatization, privacy concerns, worker safety, and gaps in flagging policies and procedures. Healthcare organizations need to carefully consider the efficacy and potential issues associated with patient flagging, exploring alternative approaches and strategies to effectively address patient risks.

Another notable gap in the healthcare industry is the absence of a national benchmarking database specifically for healthcare workplace violence incidents. While existing data sources provide information on violence, they do not focus specifically on healthcare or hospital incidents. The ongoing development of a benchmarking database by IAHSS will fill this gap, allowing healthcare facilities to assess their performance and identify areas for improvement.

The establishment of a national benchmarking database for healthcare security incidents, particularly workplace violence, would be a significant advancement. This database would align with

existing clinical benchmarking databases, enabling healthcare facilities to benchmark their performance and drive improvements in patient safety and overall security measures.

Overall, these developments signify progress in enhancing incident reporting, regulatory compliance, patient risk identification, and benchmarking capabilities within the healthcare industry. By implementing these guidelines and databases, healthcare organizations can promote a culture of safety, improve patient outcomes, and continually strive for excellence in security practices.

CHAPTER THREE: RESEARCH METHODOLOGY AND DESIGN

Introduction

The objective of this research is to gain a better understanding of US, community and hospital population and crime demographics to contribute to the development of a national database which hospitals can utilize to benchmark their facility with others. Specifically, the study aims to identify correlations between national, community demographics and hospital data related to gender, sex, and ethnicity.

To conduct this research, a Category 4 Exemption IRB study was granted approval on March 27, 2023 (IRB No 23-0316); (see Appendix A). The study utilizes secondary data from publicly available sources, including the BLS, US Census, OSHA, NIOSH, FBI, Definitive Healthcare, and CAP Index. These sources provide comprehensive data that contribute to a thorough analysis of the relationship between community demographics and hospital violence. The findings from this study could provide valuable insights for hospitals to develop targeted strategies and interventions that address their specific risks for WPV incidents.

The research methods utilized to analyze the data include descriptive and inferential. I have developed four research questions:

Q1 - What are the associations and correlations between US population and sample community population demographics?

Q2 – What are the associations and correlations between sample community demographics and hospital demographics?

Q3 – What are the associations of the community demographics and previous research hospital studies?

Q4 – What are the associations and correlations between crime rates/ CAP scores related to population demographics?

This chapter is separated into three major sections. First, I will outline my philosophical research approach, then outline specific research methodology design and finish with highlighting the limitations of the research. Potential risks and threats and research evaluation is also addressed.

Research Design

Research Philosophy

The research foundation of this study is rooted in a positivist approach, with some elements overlapping into a pragmatist perspective. The positivist approach focuses on identifying causal relationships, understanding how variables influence one another, and to what extent. This approach is based on both ontology, which relates to the nature of reality, and epistemology, which pertains to the nature of knowledge.

According to Park et al. (2020), a positivist research strengthens and refines data by utilizing objective evidence-based truth, which aligns with the foundation of this study. The use of retrospective cross-sectional quantitative data from both community and hospital sources aims to correlate multiple variables and identify connections.

Furthermore, the study also incorporates a pragmatist approach to examine the objectivity and replicability of the data for future forecasting. The pragmatist approach allows for a flexible and practical application of the research findings to identify risks in a diverse context. Berkman and Wilson (2021) describe the practical theory as taking actionable steps to solve real-world problems in a specific context. The practical theory focuses on understanding the reasons behind phenomena, who it affects, when it occurs, and what interventions can reduce its likelihood. This approach heavily relies on high-quality descriptive data.

By combining both positivist and pragmatist perspectives, this research aims to provide valuable insights into the relationship between community demographics, hospital demographics, and healthcare

WPV. It seeks to not only contribute to the existing body of knowledge but also examines potential similarities which could express the opportunity for additional research to find answers.

Research Strategy

This research utilizes both descriptive and inferential research approaches to thoroughly analyze and gain a comprehensive understanding of the population under study. Descriptive research aims to provide an accurate and detailed account of the characteristics, behaviors, or phenomena of a specific population or group. It focuses on describing and documenting what exists or occurs, employing various data collection methods such as surveys or existing records. Emphasizing quantitative data collection, descriptive research involves numerical measurements and statistical analysis using descriptive statistics like mean, median, mode, and standard deviation. These statistics help identify patterns, trends, and relationships within the dataset (McCombes, 2019). Descriptive research is particularly useful for comparing outcomes across different groups and identifying patterns and trends, serving as a foundation for further research.

(Singpurwalla, 2013) explains that descriptive statistics describe data using numerical and graphical methods. For this research, the choice of a descriptive research design was driven by its flexibility in numerically and graphically comparing data from various papers and databases, involving different populations and data collection techniques. The descriptive research design allows for the exploration and comparison of data from different sources and simplifies the analysis of large datasets.

In contrast, inferential research focuses on making inferences about a larger population based on sample data. It involves collecting data to obtain a representative sample from the population of interest (Hanneman et al., 2012). The collected data are then analyzed using inferential statistics, such as hypothesis testing, confidence intervals, regression analysis, or ANOVA, to draw broader conclusions and generalize the findings to the population. The main purpose of inferential research is to test hypotheses or make broader inferences beyond the specific sample studied.

Descriptive research aims to provide in-depth insights into the specific sample or context under investigation, while inferential research aims to apply the findings from the sample to the entire population, allowing for predictions and generalizations about their characteristics or behaviors (Asenahabi, 2019). It is important to consider the ethical implications of assuming generalizability and the ability to predict future outcomes based on quantitative inferential statistics (Zyphur & Pierides, 2017).

Both descriptive and inferential research involve systematic data collection and analysis, contributing to the existing body of knowledge. They require careful planning and execution to ensure the validity and reliability of the results. However, they differ in their goals, scope of generalization, and the specific data analysis techniques employed.

In this research, a cautious approach will be adopted to avoid assuming generalizability and the predictive power of the outcomes. By employing a combination of descriptive and inferential research approaches, this study will uncover relationships, patterns, and trends within the data, leading to meaningful insights and statistical outcomes. The findings from this research will contribute to the existing body of knowledge and provide a comprehensive understanding of the population under investigation.

Research Type

For this research, an abductive research approach was employed. According to Brandt and Timmermans (2021), advancements in technology and the availability of information in the digital world have opened up new possibilities for researchers to identify previously unknown findings. The ability to combine data into larger datasets or utilize large-scale data allows for the discovery of correlations that may have been too subtle or isolated to be identified before. This abductive research approach aligns with the pragmatist philosophy mentioned earlier.

To conduct this study, various quantitative data sources were utilized. These sources include publicly available secondary data from trade publications, research articles, state and government research, and public and private websites. The topic of healthcare WPV has been extensively studied by researchers over several decades. As a result, state and government agencies have been tracking data annually to measure progress and identify areas for improvement. This research study will leverage the data collected over the past 5 years to develop correlations based on the available variables, contributing to the knowledge, and understanding of this issue within the community.

Sampling Strategy

Singpurwalla (2013) discussed two main types of sampling methods: probability and non-probability. One form of non-probability sampling is stratified sampling, which involves dividing the population into different subgroups based on one or more characteristics and then selecting samples from each subgroup. To ensure that the research represents a diverse range of communities and hospitals across the US, a non-probability stratified sampling strategy was employed. The goal was to include various community populations as well as acute care hospitals of different sizes within those communities. Stratified sampling was chosen to ensure that the sample included hospitals of all sizes, representing different locations and community types in the US.

To implement this strategy, a multiple-stage cluster sampling approach was adopted. The first step involved obtaining a list of hospitals in the US from the Definitive database. The sample was then filtered to include only community-based hospitals, which make up 84% of all hospitals in the country. Community hospitals are defined as non-federal, short-term general, and other special hospitals. The stratified sampling process helped to ensure that the sample represented a wide range of hospitals across the US.

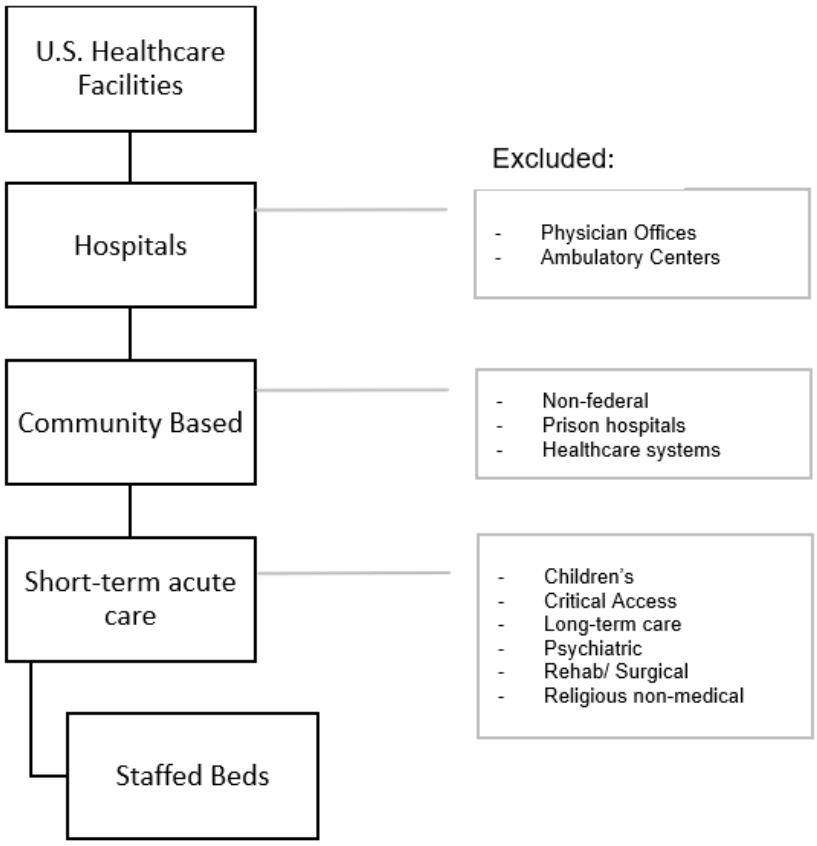
Short-term acute care hospitals were selected as they make up 52.8% of all hospitals in the US (Definitive Healthcare, 2023b). This filtering resulted in a total count of 2,237 hospitals. To ensure

statistical validity, a sampling calculator was employed. A confidence level of 95% was set for the population size of 2,327 hospitals, with a margin of error set at +/- 10%. The calculated ideal sample size [1.96^2*0.5*(1-0.5)/ (0.10^/2,237] for this research was determined to be 138. By employing this non-probability multiple-stage cluster sampling strategy, the research aims to provide a representative sample of community-based acute care hospitals across the US, considering both population size and geographic diversity.

The hospital list was sorted based on the number of staffed beds. The sites were then grouped into clusters of 100 staffed beds, for example, Group 1 included hospitals from zero to 100 staffed beds, Group 2 included hospitals with 101 to 200 staffed beds, and so forth to achieve a total of 13 groups. Ten hospitals were randomly selected from each group, leading to a final sample size of 130 hospitals.

Figure 6

Research Sampling Strategy



Data Collection Method

Data collection for this study involved multiple methods to gather comprehensive information. First, a comprehensive list of active short-term acute care hospitals in the US was obtained from the Definitive Healthcare database (*Definitive Healthcare*, 2023a). This list was generated based on the research sampling strategy using filters, inclusions, and exclusions. The collected data from this source included essential hospital information such as address, city, state, staffed bed size, acute patient days, emergency department visits, patients with behavioral health diagnosis, and the number of employees.

Subsequently, state-level population demographic data were collected from the US Census dataset. This dataset provided valuable information about state population, population density (per square mile), sex distribution, age group distribution, and ethnicity. Additionally, to obtain more

detailed data for each facility, similar demographic data were retrieved based on the respective zip codes. This approach of collecting both state and zip code population data from the same dataset allowed for a more comprehensive analysis of the relationships within the data.

To supplement the hospital data, CAP Index reports were gathered for the selected sample of 130 hospitals. These reports provided information such as the national, state, city, and 6-mile radius crime index scores, total population, population breakdown by age groups (0-14 years, 15-17 years, 18-24 years, 25-44 years, 45-64 years, and over 65), and gender. CAP Index utilized US Census population data in their calculations ("CrimeStats Release Notes," 2024).

State-level data on violent crime incidents were collected using the FBI Crime Data Explorer (CDE) tool (*FBI Crime Data Explorer*, 2023). The CDE tool is widely recognized and used as the standard for measuring crime by law enforcement agencies, media outlets, citizens, and researchers. The utilization of the CDE tool was justified by its reliance on US Census population data as the denominator for determining crime rates. The consistency of US Census population data was confirmed by comparing population numbers from each dataset.

The CDE dataset provided reliable statistics sourced from thousands of law enforcement agencies across the United States, enabling the analysis of trends in violent crime across multiple states and over time. The availability of detailed incident information facilitated data aggregation and analysis specific to geographic areas. By integrating crime incident data with other sources, such as census data, a more comprehensive analysis was conducted. The combination of these diverse datasets resulted in a deeper understanding of crime patterns and trends.

Finally, hospital workplace violence perpetrator demographics were obtained from two peer-reviewed journal articles that took place in the US within the past decade (Claudius et al., 2017; Speroni et al., 2014). These studies provided a large sample size of 854 events and specific perpetrator demographics for sex and age group.

Methods of Analysis

To analyze the collected data, a wide range of data analysis techniques were employed, each with their own unique contributions. The research variables were initially imported into separate Microsoft Power BI databases to ensure consistency in field identifiers across spreadsheets. Duplicates in the data were identified and removed, ensuring data integrity. Relationships between the spreadsheets were established using facility name, state, or city as keys, facilitating the integration of data from different sources. These steps resulted in the creation of a master spreadsheet, which served as the foundation for further analysis using SPSS Statistics 29.0.1.0.

In SPSS, a series of tests were conducted to assess correlation assumptions and examine the relationships between variables. One of the key techniques employed was Pearson's correlation analysis. Pearson's correlation coefficient calculates a coefficient that quantifies the strength and direction of a linear relationship between two continuous variables (Laierd Statistics, 2015). This analysis was utilized to determine the strength and direction of any linear relationships between the variables under investigation.

Exploratory factor analysis was another valuable technique utilized in this study. Factor analysis aims to identify underlying factors or dimensions within a dataset by assessing correlations between multiple variables. By reducing the dimensionality of the data, factor analysis aids in understanding the underlying structure and relationships between variables (Tavakol & Wetzel, 2020). Ta et al. (2009) and Tavakol and Wetzel (2020) suggest that factor analysis is often utilized in uncovering latent factors and providing insights into complex datasets. Furthermore, they indicated that a factor analysis greater than 0.30 signified a moderate correlation between the factors. In this study, I utilized factor analysis with varimax rotation for all US, community, hospital, US crime rate, and CAP scores, all continuous variables, to determine factors that were grouped.

K-means clustering analysis was employed to group similar cases together based on selected variables. This technique allows for the identification of distinct clusters or groups within the data, aiding in the identification of patterns or similarities between data points (De Amorim & Hennig, 2015). De Amorim and Henning tested the application of K-Cluster analysis in various domains utilizing various percentages of noise (variation) and highlighted its effectiveness in segmenting data into meaningful groups.

In the present study, a one-way ANOVA (analysis of variance) test was employed to assess significant differences between group means. This statistical technique is particularly valuable when multiple variables are compared, allowing for insights into the differences among these variables for the group under study (Laierd Statistics, 2015). The one-way ANOVA compares the means of one group to independent variables, determining whether there are significant differences among them. The one-way ANOVA test was used in this study to examine the differences between CAP score groups and the characteristics of the US, community, and hospital populations. By analyzing the variance between groups, the one-way ANOVA allows for the identification of any significant variations in the variables of interest across different CAP score groups.

In addition to the one-way ANOVA, the eta squared (η2) test was employed as a measure of effect size. Eta squared quantifies the proportion of variance in the dependent variable that can be attributed to the independent variable (Cohen, 2009). Eta squared provided valuable information about the strength of the relationship between variables, indicating the percentage of variance in the dependent variable explained by the independent variable. The utilization of the eta squared test in this study allowed for a comprehensive understanding of the extent to which the independent variable (CAP score group) accounted for the variability in the dependent variables (characteristics of the US, community, and hospital populations). By analyzing the percentage of variance explained by the CAP

score group, I was attempting to gain insights into the impact and importance of this variable on the outcomes of interest.

Overall, the combination of the one-way ANOVA and eta squared tests in this study provided a robust statistical framework for examining the differences between CAP score groups and evaluating the extent to which these groups influenced the characteristics of the US, community, and hospital populations.

By employing these data analysis techniques, a comprehensive understanding of the relationships and patterns within the data was obtained. These methods allowed for the identification of significant correlations, descriptive statistics, and comparisons between variables, contributing to the overall findings of the study. The utilization of recent peer-reviewed journal articles in referencing these techniques ensures that the analysis is grounded in current research and best practices in the field.

Concluding Summary

The research design aimed to examine the relationship between community demographics and hospital demographic data in relation to population and crime. The primary objective was to determine the extent to which these variables are related and to identify causal relationships and the impact of certain variables on others. To achieve this, four research questions were formulated to explore the relationships between US, community, and hospital factors.

The research design is grounded in a positivist approach, which emphasizes the objective observation and measurement of phenomena. However, there is also a slight crossover towards a pragmatist approach, which acknowledges the importance of practical application and the ability to use the data for future development of a benchmark database. The study is characterized as a descriptive cross-sectional research design and utilized secondary publicly reported data. Non-probability sampling was employed using a multiple-stage clustering sample strategy. This strategy ensured representation of

different community populations as well as different-sized acute care hospitals within those communities.

Several tests were conducted to assess correlations and examine relationships between variables. Pearson's correlation analysis was used to determine the strength and direction of linear relationships, while exploratory factor analysis identified underlying factors within the dataset. K-means clustering analysis was employed to group similar cases together based on selected variables. Additionally, a one-way ANOVA test was used to examine significant differences between group means, and the eta squared test measured the effect size. Overall, these data analysis techniques provided a robust framework for understanding the relationships, patterns, and differences within the data.

CHAPTER FOUR: RESEARCH RESULTS/ FINDINGS

Review Objectives and Questions

This research aims to examine the relationship between three different populations: the US population, community populations, and hospital populations. The focus is on investigating if a relationship exists and, if so, determining the strength of the relationship. The study specifically looks at three core variables: population, age, and crime.

The chapter will begin by presenting the sample demographic data to gain an understanding of the composition and representativeness of the sample. This analysis will provide insights into the characteristics of the population under study. Next, the data from the US population, community populations, and hospital populations will be analyzed. Understanding the distribution and relationships of the data will contribute to a comprehensive understanding of the research objectives. Finally, the chapter will address the four research questions that guide this study. These research questions are designed to explore and provide insights into the relationships between the populations, the core variables, and the strength of these relationships.

Overview of Sample Demographics

In March 2023, the study received approval from the Institutional Review Board (IRB) for a Category 4 - exemption archival data study. This study utilized publicly available data sources, including US Census data, FBI Crime Data Explorer from the National Incident Based Reporting System (NIBRS), and CAP Index. These data sources were chosen based on their reliability, recency, and comprehensiveness to ensure that the study had access to the most up-to-date and relevant information for the selected sample.

The stratified sample was carefully designed in attempt to gather generalizability of the results. The selection process involved several steps to identify hospitals that would be representative of the broader population. Initially, the sample was filtered to include community-based hospitals, which

accounted for 84% of all hospitals in the US These community hospitals were defined as non-federal, short-term general, and other special hospitals as they constituted 52.8% of all hospitals in the US, according to (Definitive Healthcare, 2023b). This filtering process narrowed down the sample to a total of 2,237 hospitals.

To create manageable groups within the sample, the remaining hospitals were sorted based on the number of staffed beds. They were then clustered into groups of 100 staffed beds (e.g., Group 1 was 0-100 staffed beds, Group 2 was 101-200 staffed beds, etc.), resulting in 13 groups. From each group, a semi-random selection of 10 hospitals was made ensuring that facilities were from different zip codes, resulting in a final sample size of 130 hospitals. This sample size represents approximately 5% of the total population within the subset of hospitals under consideration. To ensure statistical validity, a sampling calculator was employed. A confidence level of 95% was chosen, with a margin of error set at +/-10%. This approach allowed for a sufficient level of confidence in the findings while maintaining a manageable sample size. To gather the research data, the following continuous/ nominal variables were collected.

The data were initially transcribed into a Microsoft Excel spreadsheet. Subsequently, the Excel spreadsheet was imported into SPSS for further analysis. After importing the data, a comprehensive descriptive analysis was conducted to identify outliers and summarize the key characteristics. Following the descriptive analysis, several data analysis techniques were employed to compare the relationships between the variables and address the four research questions.

Descriptive Analysis

Table 3 provides a comprehensive overview of the demographic distributions in the US population, community population, and hospital patient population. The data are categorized by age, sex, and ethnicity, revealing significant similarities among these groups.

When considering age groups, it is observed that individuals aged 0-17 constitute 25% of the US population and 22% of the community population. Furthermore, they represent 20% of the annual hospital ED visits. The 18-44 age group accounts for 33% of the US population and 39% of the community population. Additionally, they make up 40% of the annual hospital ED visits. The 45+ age group represents 41% of the US population and 39% of the community population, with a corresponding 40% share of the annual hospital ED visits.

In terms of sex, males comprise 49% of the US population and 48% of the community population. They account for 46% of the annual hospital ED visits. On the other hand, females constitute 50% of the US population and 51% of the community population. They make up 54% of the annual hospital ED visits.

Examining ethnicity, the White population represents 59% of both the US population and the community population. They account for 57% of the annual hospital ED visits. The Black population makes up 12% of the US population and 14% of the community population. Additionally, they represent 24% of the annual hospital ED visits. The Hispanic population accounts for 19% of the US population and 18% of the community population, making up 16% of the annual hospital ED visits.

Additionally, further descriptive analysis, including means, medians, standard deviations, and confidence intervals, was performed on the data variables (see Appendix D). The consistent distributions observed in age, sex, and ethnicity between the US population, community population, and hospital patient population provide valuable insights for research studies, policy-making, and resource allocation. Understanding the demographic composition of both the US population and specific communities within the country is essential for informed decision-making.

Table 3

Distribution of Study Characteristics

	US Population No. (%)	Community Population No. (%)	Annual Hospital ED Visits (%)
Age (years)			
0-17	82,852,622 (25)	808,674 (22)	(20)
18-44	109,065,427 (33)	1,416,405 (39)	(40)
45+	135,654,278 (41)	1,400,204 (39)	(40)
Sex			
Male	162,881,125 (49)	1,768,125 (48)	(46)
Female	166,161,202 (50)	1,861,302 (51)	(54)
Ethnicity			
White	196,177,283 (59)	3,153,151 (59)	(57)
Black	40,507,947 (12)	753,316 (14)	(24)
Hispanic	61,589,929 (19)	937,848 (18)	(16)

Inferential Statistical Analysis

Tests for Normality

After completing the descriptive analysis, normality tests were conducted using several methods, including the Kolmogorov-Smirnov test, Shapiro-Wilk test, Q-Q plots, and histograms. Detailed tables presenting the results of the Kolmogorov-Smirnov test and Shapiro-Wilk test, along with corresponding figures, are provided in Appendix D. The Shapiro-Wilk tests indicated a significant departure from normality for all variables (p values ranged from $p = .029$ to $p < .001$). Due to the results of the normality tests, additional inferential analysis was limited to rely upon Pearson's correlation analysis.

Pearson's Correlations Analysis

Next, Pearson's correlation analysis was conducted on the US demographic variables for population, age, ethnicity, and crime to analyze the relationship between these variables. The analysis in Table 4 revealed a mixture of strong, moderate, and weak correlations. The correlation analysis revealed several significant associations among the variables. The US crime rate was negatively correlated with total population per square mile ($r = -.348$, $p < .01$), indicating that areas with higher

population density tended to have lower crime scores. Age 0-17 showed a positive correlation with age 18-44; (r = .557, p < .01) and a negative correlation with age 45+; (r = -.540, p < .01). This suggests that areas with a higher proportion of individuals in the 0 to 17 age group tend to have a higher proportion of individuals in the 18 to 44 age group and a lower proportion of individuals in the 45 and above age group. Gender (male) was positively correlated with age 18-44; (r = .494, p < .01) and negatively correlated with age 45+; (r = -.264, p < .01). This indicates that areas with a higher proportion of males tend to have a higher proportion of individuals in the 18 to 44 age group and a lower proportion of individuals in the 45 and above age group. Ethnicity showed significant correlations as well. White ethnicity was negatively correlated with age 45+; (r = -.413, p < .01), while Black ethnicity was negatively correlated with age 18-44; (r = -.164, p < .01). Hispanic ethnicity was positively correlated with age 18-44; (r = .472, p < .01). These findings suggest variations in age distribution among different ethnic groups.

Table 4

Pearson's Correlation – US Demographics

	US Crime Rate	Age (0-17)	Age (18-44)	Age (45+)	Male	Female	White	Black	Hispanic
US Crime Rate	--								
Age (0-17)	.129	--							
Age (18-44)	.339	.557	--						
Age (45+)	-.010	-.540	-.488	--					
Male	.072	.309	.494	-.264	--				
Female	-.072	-.309	-.494	.264	-1.00	--			
White	-.196	-.060	-.413	.152	.108	-.108	--		
Black	.054	.116	-.164	.038	-.737	.737	-.346	--	
Hispanic	.172	.012	.472	-.194	.429	-.429	-.615	-.370	--

Table 5 provides the Pearson's correlation coefficients for community demographic variables. The correlation analysis revealed significant relationships among the variables investigated in the study. Age distribution exhibited significant associations with other variables. The proportion of individuals in

the age range 0 to 17 showed a moderate negative correlation with the proportion of individuals in the age range 18 to 44 (r = -.457, p < .01) and the age range 45+ (r = -.093, p < .01). This implies that areas with a higher proportion of children and adolescents tend to have a lower proportion of individuals in the age ranges 18 to 44 and 45 and above. Moreover, the proportion of individuals in the age range 45 and above showed a strong negative correlation with the proportion of individuals in the age range 18 to 44 (r = -.843, p < .01), indicating that areas with a higher proportion of older adults tend to have a lower proportion of individuals in the age range 18 to 44.

Gender analysis revealed significant associations between male and female proportions. The proportion of males showed a moderate negative correlation with the proportion of females (r = -.204, p < .01), indicating that areas with a higher proportion of males tend to have a lower proportion of females, and vice versa. These findings suggest that gender composition varies across different population densities and age ranges.

Furthermore, ethnicity analysis demonstrated significant correlations between different ethnic groups. White ethnicity showed a moderate negative correlation with Black ethnicity (r = -.656, p < .01) and a small positive correlation with Hispanic ethnicity (r = .101, p < .01). These results suggest that areas with a higher proportion of individuals identifying as White tend to have a lower proportion of individuals identifying as Black and a slightly higher proportion of individuals identifying as Hispanic.

Table 5

Pearson's Correlation – Community Demographics

	Age (0-17)	Age (18-44)	Age (45+)	Male	Female	White	Black	Hispanic
Age (0-17)	--							
Age (18-44)	-.457	--						
Age (45+)	-.093	-.843	--					
Male	-.050	.212	-.204	--				
Female	.050	-.212	.20*	-1.00	--			
White	-.171	.002	.101	.055	-.055	--		
Black	.161	.013	-.110	-.168	.168	-.656	--	
Hispanic	.177	.009	-.119	.130	-.130	-.222	-.064	--
CAP Score	-.197*	.442	-.378	.152	-.152	-.303	.291	.282

Finally, a Pearson's correlation analysis was conducted on five hospital demographic variables for each facility in the sample obtained from the Definitive Healthcare database, see Table 6.

Table 6

Pearson's Correlation – Hospital Demographics

	Pt Days	ED Visits	Staffed Beds	Staff FTEs	BH Dx
Pt Days	--				
ED Visits	.710	--			
Staffed Beds	.703	.673	--		
Staff FTEs	.890	.837	.755	--	
BH Dx	.581	.342	.578	.431	--

The analysis shows a strong positive correlation between patient days and both ED visits (r = .710, $p < .001$) and the number of staffed beds (r = .703, $p < .001$). This suggests that as the number of patient days increases, there is a corresponding increase in both ED visits and the need for staffed beds. Furthermore, the data indicate a strong positive correlation between the number of staff full-time equivalents (FTEs) and patient days (r = .890, $p < .001$) as well as ED visits (r = .837, $p < .001$). This implies that as the number of staff FTEs increases, there is a corresponding rise in both patient days and ED visits. In addition, there is a strong positive correlation between staff FTEs and the number of staffed

beds (r = .755, p < .001). This suggests that an increase in staff FTEs is associated with a higher number of staffed beds, indicating the need for adequate staffing to meet patient demand.

Lastly, moderate positive correlations are observed between behavioral health diagnoses (BH Dx) and patient days (r = .581, p <.001), staffed beds (r = .578, p <.001), and staff FTEs (r = .431, p <.001). These findings suggest that as the number of behavioral health diagnoses increases, there is a corresponding rise in patient days, the need for staffed beds, and the requirement for staff FTEs. These findings emphasize the interconnectedness of various factors in a healthcare environment. Understanding these correlations can assist in resource allocation, capacity planning, and the effective management of patient care.

Partial Eta Squared

The partial eta squared was conducted using the CAP score groups and all the community and hospital demographics (see Appendix D11). The analysis reveals significant differences among the CAP score groups for several variables. For instance, the variable "Comm. Total Pop" shows a significant F-value of 3.878 (p < .001), indicating that there are statistically significant differences in total population across the CAP score groups. The effect size, measured by partial eta squared, is .286, suggesting that approximately 28.6% of the variance in the dependent variable (CAP scores) can be explained by the differences in community total population.

Research Questions

After conducting an individual analysis of each demographic dataset, my research aims to explore the interrelationships among these datasets to uncover additional potential associations and connections. By comparing the different datasets, I intend to investigate the relationships between variables and identify any significant correlations or patterns that may emerge. This comprehensive approach will provide a more holistic understanding of the demographic data and offer valuable insights into the potential interplay between different factors.

Research Question 1 asked, "*What are the associations and correlations between US population and sample community population demographics?*" To address this, I ran a Pearson's correlation to show the relationships between US population and community demographics (see Table 7). This includes variables such as total population, US crime rate, age groups, and ethnicity. The correlation coefficients reveal the strength and direction of the relationships between the variables. Notably, several correlations stand out as being moderate to strong.

For instance, there is a moderate positive relationship between US total population and Community total population (r = .444). This indicates that as the US total population increases, the community total population tends to increase as well. Furthermore, there are moderate positive correlations between US total population and US male (r = .437), US female (r = .434), US White (r = .365), and US Hispanic (r = .398). In other words, as the US total population rises, there is a tendency for an increase in these specific demographic populations. Conversely, there is a moderate negative correlation between US total population and US Black (r = -.474). This suggests that as the US total population increases, there tends to be a decrease in the US Black population.

Moving on to the US crime rate, there are weak positive correlations with US total population (r = .290), US age 0-17 (r = .424), US age 45+ (r = .382), US male (r = .437), US female (r = .434), US White (r = .365), and US Hispanic (r = .398). While these correlations are weaker than the previous ones, they still indicate a tendency for certain demographic populations to increase as the US crime rate rises.

Table 7

Pearson's Correlation for US Population and Hospital Community Demographics

	US Total Pop	US Crime Rate	US Age (0-17)	US Age (18-44)	US Age (45+)	US Male	US Female	US White	US Black	US Hispanic
Comm. Total Pop	.444**	.290	.424*	.449**	.382*	.437**	.434**	.365*	.398*	.567**
Comm. Age - (0-17)	-.164	-.053	-.150	-.155	-.118	-.159	-.176	-.237	-.328	.048
Comm. Age - (18-44)	-.044	-.091	-.039	-.027	-.006	-.046	-.046	-.197	-.187	.175
Comm. Age - (45+)	-.050	-.031	-.039	-.041	-.010	-.045	-.067	-.080	-.243	.191
Comm. Male	-.074	-.099	-.063	-.062	-.032	-.071	-.087	-.168	-.284	.178
Comm. Female	-.090	-.075	-.079	-.078	-.048	-.087	-.103	-.192	-.264	.168
Comm. White	-.256	-.215	-.255	-.241	-.283	-.245	-.274	-.317	-.474**	.049
Comm. Black	-.101	-.043	-.097	-.112	-.092	-.111	-.101	-.298	.166	-.099
Comm. Hispanic	.138	-.012	.135	.148	.104	.148	.115	.041	-.156	.488**
CAP Score	.308	.048	.302	.295	.236	.295	.313	.242	.440**	.335*

Research Question 2 asked, "*What are the associations and correlations between community demographics and hospital demographics*?" To analyze the relationship between the community population and hospital demographics see Table 8. The table includes variables such as community total population, community age 0-17, community age 18-44, community age 45+, community male, community female, community White, community Black, community Hispanic, and CAP Score.

Several moderate and strong correlations are evident in the table. For instance, there is a strong positive correlation between community total population and hospital patient days (r = .444**). This suggests that as the community's total population increases, there is a corresponding increase in the number of patient days in the hospital. Similarly, there are strong positive correlations between community total population and other hospital metrics such as hospital ED visits (r = .311**), hospital patient encounters (r = .433**), hospital beds (r = .460**), and hospital FTEs (r = .429**). These correlations indicate that as the community's population grows, there tends to be an increase in hospital utilization and resources.

Moderate correlations can be observed between certain variables as well. For example, there is a moderate negative correlation between community age (0-17) and hospital BH diagnosis (*r* = -.271**), suggesting that as the proportion of the community's population in the age range of 0-17 increases, there is a decrease in behavioral health diagnoses in the hospital. Additionally, there is a moderate positive correlation between community Black population and hospital Black population (*r* = .257**), indicating that as the community's Black population increases, there tends to be a corresponding increase in the number of Black patients in the hospital.

Table 8

Pearson's Correlation for Community Population and Hospital Demographics

	Comm. Total Pop	Comm. Age (0-17)	Comm. Age (18-44)	Comm. Age (45+)	Comm. Male	Comm. Female	Comm. White	Comm. Black	Comm. Hispanic	CAP Score
Hosp. Pt Days	.444**	-.086	.071	-.076	-.044	-.013	-.075	.128	.057	.311**
Hosp. ED Visits	.311**	.097	.114	.110	.122	.119	-.022	.257**	.197*	.185*
Hosp. Pt Encounters	.433**	-.033	.088	-.021	.006	.028	-.062	.176	.105	.293**
Hosp. Beds	.460**	-.077	.031	-.006	-.006	.001	-.060	.137	.101	.383**
Hosp. FTEs	.429**	.023	.147	.046	.082	.090	-.015	.231*	.158	.272**
Hosp. BH Dx	.298**	-.271**	-.145	-.214*	-.224*	-.214*	-.017	.040	.002	.202*

Research Question 3 asked, "*What are the associations of the community demographics and previous research hospital studies?"* To analyze these associations, I utilized descriptive statistics and compared characteristic means of the community population and hospital research studies. Table 9 includes variables such as Sex (male and female), Age (0-19, 20-40, and 40+), and ethnicity (White, Black, and Hispanic).

In terms of sex and age group distribution, both the community population and hospital research studies have an equal representation of males and females, with males comprising 49% and females comprising 51% in both cases. This indicates a balanced gender distribution in both the community and the research studies. Regarding age distribution, the community population shows that 21% fall within the 0-19 age range, 39% fall within the 20-40 age range, and 40% are aged 40 or above.

Similarly, the hospital research studies exhibit a similar age distribution, with 20% falling within the 0-19 age range, 40% falling within the 20-40 age range, and 40% aged 40 or above. These findings suggest that the age distribution of the research studies closely mirrors that of the community population.

In terms of ethnicity, there are notable differences between the community population and the hospital research studies. The community population consists of 19% White individuals, 5% Black individuals, and 4% Hispanic individuals. In contrast, the hospital research studies have a higher representation of White individuals (57%), followed by Black individuals (24%), and Hispanic individuals (16%). These disparities indicate that the hospital research studies may have a disproportionately higher representation of White individuals compared to the community population.

Table 9

Community and Hospital Research Studies Characteristic Means

Characteristics	Community Population	Hospital Research Studies
Sex		
Male	49%	50%
Female	51%	50%
Age (years)		
0-19	21%	20%
20-40	39%	40%
40+	40%	40%
Ethnicity		
White	19%	57%
Black	5%	24%
Hispanic	4%	16%

Lastly, research Question 4 asked, "*What are the associations and correlations between crime rates/ CAP scores related to population demographics?"* For this question, I utilized several different descriptive and inferential statistics to include Pearson's correlation, ANOVA, and partial eta squared.

First, I explored the descriptive statistics between US crime rates and CAP scores related to various population demographics (see Table 10). The table provides the average percentages of US crime rate and hospital research study's demographics. The table includes variables such as sex, age (0-19, 20-40, and 40+), and ethnicity. Notable outliers include the significantly higher percentage of males

in the US crime rate (82%) compared to the hospital research studies (50%), as well as the disparity in ethnic representation with a higher percentage of White individuals in the hospital research studies (57%) compared to the US crime rate (43%).

Table 10

Means of US Crime Rate and Hospital Research Study's Demographics

	US Crime Rate	Hospital Research Studies
Sex		
Male	82%	50%
Female	18%	50%
Age (years)		
0-19	17%	20%
20-40	58%	40%
40+	24%	40%
Ethnicity		
White	43%	57%
Black	15%	24%
Hispanic	11%	16%

Next, I assessed the standard deviation, skewness, and kurtosis for both the US crime rate and CAP score. Table 11 provides the descriptive statistics for US crime rate and CAP score. The table includes measures such as *N* (sample size), mean, standard deviation (SD), skewness, and kurtosis. For the US crime rate, the sample size was *N* = 130, the mean was M = 386.30, and the standard deviation was SD = 112.39. The skewness statistic was .373, indicating a slightly right-skewed distribution. Additionally, the kurtosis statistic of -.405 indicated negative kurtosis, suggesting a distribution with thinner tails compared to a normal distribution.

Similarly, for the CAP score, the sample size was *N* = 130, the mean was M = 350.52, and the standard deviation was SD = 175.78. The skewness statistic of .345 suggested a slightly right-skewed distribution. Moreover, the kurtosis statistic of -.474 indicated negative kurtosis, suggesting thinner tails compared to a normal distribution.

Table 11

Descriptive Statistics for US Crime Rate and Hospital National CAP Index Score

Variables	*N*	Mean	SD	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
US Crime Rate	130	386.30	112.39	.373	.212	-.405	.422
CAP Score	130	350.52	175.78	.345	.212	-.474	.422

Then, I assessed the correlations between US crime rate and CAP score with the US, community, and hospital demographics (see Table 12). In terms of US demographics, there are positive correlations between US crime rate and variables such as US total population (*r* = .135), US age groups (0-17: *r* = .158, 18-44: *r* = .162), US male (*r* = .138), and US female (*r* = .133). These correlations suggest a weak positive relationship between US crime rate and these demographic factors.

Regarding ethnicity, there is a positive correlation between US crime rate and US White population (*r* = .043), indicating a weak positive association. On the other hand, there is a negative correlation between US crime rate and US Black population (*r* = -.028), suggesting a weak negative relationship. The correlation between US crime rate and US Hispanic population stands out with a stronger positive correlation (*r* = .207*), indicating a moderate positive association.

When comparing US crime rate and CAP score, the later appears more sensitive to correlations. There is a weak positive correlation between US crime rate and community total population (*r* = .161). However, the CAP score appears more sensitive to show a stronger correlation to community total population (*r* = .492**). Similarly, CAP scores show a stronger correlation with community age group 45+; (*r* = -.324**), community male (*r* = -.180*), and community female (*r* = -.203*) compared to US crime rates (age group 45+, *r* = .143, community male *r* = .109, and community female *r* = .127).

In terms of hospital-related factors, there are various correlations with CAP score. For instance, there is a positive correlation between CAP score and variables such as hospital patient days (*r* = .311**), hospital ED visits (*r* = .185*), hospital patient encounters (*r* = .293**), hospital staffed beds (*r* =

.383**), hospital FTEs (*r* = .272**), and hospital BH diagnosis (*r* = .202*). These correlations suggest a moderate positive relationship between CAP score and these hospital-related factors.

Table 12

Pearson's Correlations of US Crime Rate and CAP Score (US, Community, and Hospital Demographics)

	US crime rate	CAP Score
US Total Pop	.135	.019
US Age (0-17)	.158	.010
US Age (18-44)	.162	.012
US by Age (45+)	.102	.026
US Male	.138	.017
US Female	.133	.019
US White	.043	.064
US Black	-.028	.039
US Hispanic	.207*	-.006
Comm. Total Pop	.161	.492**
Comm. Age - (0-17)	.106	-.210*
Comm. Age - (18-44)	.049	.010
Comm. Age - (45+)	.143	-.324**
Comm. Male	.109	-.180*
Comm. Female	.127	-.203*
Comm. White	-.011	.131
Comm. Black	-.106	.224*
Comm. Hispanic	.035	.158
Hosp. Pt Days	-.040	.311**
Hosp. ED Visits	-.088	.185*
Hosp. Pt Encounters	-.057	.293**
Hosp. Staffed Beds	-.071	.383**
Hosp. FTEs	-.124	.272**
Hosp. BH Dx	-.103	.202*

Conclusion Summary

In this research, the primary objective was to explore the interrelationships among different sets of data, including US population demographics, hospital community population demographics, US crime rates, and sample hospital national CAP Index scores. By delving into these relationships, I aimed to gain

a more comprehensive understanding of demographic data and uncover valuable insights into the complex interplay between various factors.

Research Question 1 examined the associations and correlations between US population and sample community population demographics. The findings revealed moderate to strong correlations, indicating relationships between variables such as US total population, community total population, US male, US female, US White, US Hispanic, and US Black. These correlations provided insights into how changes in the US population relate to changes in the community population and specific demographic groups.

Research Question 2 focused on the associations and correlations between community demographics and hospital demographics. Strong positive correlations were observed between community total population and various hospital metrics, suggesting that as the community population grows, there is an increase in hospital utilization and resources. Moderate correlations were found between other demographic variables, further highlighting the interplay between community and hospital demographics.

Research Question 3 explored the associations between community demographics and previous hospital research studies. The analysis revealed a balanced gender distribution in both the community population and research studies. The age distribution of the research studies closely mirrored that of the community population. However, there were notable differences in ethnicity, with the research studies having a higher representation of White individuals compared to the community population.

Lastly, Research Question 4 investigated the associations and correlations between crime rates/CAP scores and population demographics. Descriptive and inferential statistics provided insights into the relationships between US crime rates, CAP scores, and demographic variables. Positive and negative correlations were observed between US crime rate and variables such as US total population,

US age groups, US male, US female, US White, US Black, and US Hispanic. These correlations shed light on the relationships between crime rates, population demographics, and ethnic representation.

Overall, this research provided a comprehensive understanding of the interrelationships among demographic datasets. The findings contribute to our knowledge of associations and correlations between various demographic factors, informing future research and decision-making processes.

CHAPTER FIVE: DISCUSSION

Introduction

The primary objective of this research was to expand the existing knowledge base on healthcare WPV by investigating the interplay between national, community, and hospital population demographics, specifically focusing on age, gender, and ethnicity. The goal was to generate insights that would aid in the establishment of a comprehensive national database, enabling hospitals to benchmark their facilities effectively. This study pursued two key objectives: firstly, to enhance our comprehension of the demographics of the US population, communities, and hospitals, and secondly, to explore the correlations and coincidences between population characteristics and crime statistics. By accomplishing these objectives, the research aimed to contribute to a deeper understanding of the intricate relationships between national, community, and hospital demographics.

Chapters Summary

This research paper delved into the history of healthcare WPV, focusing on public health factors, and specifically examining characteristics of perpetrators and events. The study utilized scholarly peer reviewed articles published between 2012 and 2022, supplemented by gray literature from governmental agencies. It is important to note that the studies acknowledged several limitations, including generalizability, selection bias, data validity, limited scope, and researcher experience. While these individual studies cannot be generalized to represent the entire population, when considered collectively, they reveal numerous generalized to most acute care short-term hospitals across the US.

This paper proposes that a better understanding of both public health violence and healthcare WPV incident prevalence can be achieved through the lens of social cognitive theory, social learning theory, and social disorganization theory. According to these theories, when patients find themselves in unfamiliar and stressful environments with unmet needs, they may exhibit behaviors they have observed, learned, or found successful in similar situations. These behaviors often manifest as verbal or

physical violence and are directed towards healthcare workers. Similarly, healthcare workers observe and learn acceptable and unacceptable behaviors and practices within their professional environment. They may become accustomed to a culture where violence is considered part of the job or where underreporting is deemed acceptable. Additionally, trauma facilities, often located in densely populated areas, may serve communities with lower socioeconomic status. Social disorganization theory supports the notion that individual behavior is influenced by learned or observed behavior within their community and accepted social norms. If violence, retaliation, or agitation is supported or accepted, individuals facing stressors or unfamiliar situations are more likely to resort to these actions.

The literature review, Chapter 2, identified a few common trends in perpetrator and event characteristics, providing a foundation for healthcare facilities to identify individuals at risk of engaging in violence. The previous research revealed several trends, such as Type II WPV verbal events primarily involving dissatisfied female family members expressing concerns about communication, treatment, and long wait times. These events tend to occur between 16:00 and 24:00. Physical WPV events, on the other hand, are often instigated by White male patients between 20 and 40 years of age, with behavioral/mental health or substance abuse diagnoses. These incidents typically occur between 16:00 and 07:00, within the first hour of the patient's arrival at the facility, and within the patient or treatment room. Furthermore, events tend to occur in the waiting room, triage area, or patient rooms. Verbal violence is more likely to occur during afternoon shifts, while physical violence is prevalent during both afternoon and night shifts.

Key Research Findings

Over the past decade, there has been a marginal increase of 7.4% in the population, which represents the lowest growth rate on record (United States Census Bureau, 2021). However, despite this modest population increase, crime rates have consistently declined. This intriguing trend can be attributed to the phenomenon of the baby boomer and Generation X cohorts that have aged out or are

aging out of the 18 to 44-year age group, which is historically associated with a higher prevalence of criminal activity, as supported by US FBI crime statistics (*FBI Crime Data Explorer*, 2023). The transition of these cohorts out of the prime age range for criminal behavior has likely contributed to the sustained decrease in crime rates, even in the face of a relatively small population increase. Consequently, if the population continues to decline for this age group, it is reasonable to anticipate a further reduction in overall criminal activity.

On the other hand, healthcare WPV reports have shown a sharp upward trajectory from 2010 to 2020 (see Figure 2). One factor that could contribute to the rise in healthcare WPV rates could be the concerted efforts of healthcare facilities to raise awareness about these incidents. This includes implementing policies, providing training, conducting interventions, and establishing incident tracking systems. For example, since the publication of the OSHA guidelines in 2016, healthcare facilities have begun separating WPV events from other occurrences such as illnesses or injuries resulting from different causes.

To further explore the topic, it would be beneficial to explore the potential reasons behind the observed increase in healthcare WPV rates. Factors such as changes in societal norms, stressors in the healthcare industry, patient demographics, and organizational factors within healthcare facilities can all contribute to the rise in WPV incidents. Examining these factors in more detail would provide a comprehensive understanding of the complex dynamics involved in healthcare workplace violence.

Additionally, it would be valuable to explore the impact of interventions, policies, and training programs implemented by healthcare facilities to address workplace violence. Understanding the effectiveness of these measures in mitigating WPV incidents and their potential influence on the observed trends would offer insights into strategies for reducing WPV rates in the future.

Next, the study's examination of correlations among sex, age groups, ethnicity, and WPV rates provides a better understanding of the demographic factors that contribute to WPV incidents. Of

particular interest is the stronger correlation observed between community demographics and hospital demographic population. This finding suggests that community demographics play a crucial role in shaping the dynamics of WPV within healthcare settings. By analyzing the demographic composition of the community surrounding a hospital, healthcare facilities can gain valuable insights into the potential risk factors and patterns of WPV incidents. Understanding these demographic influences can inform targeted prevention and intervention strategies to address WPV.

Additionally, the study revealed stronger correlations and effect sizes between crime against persons (CAP) scores and hospital WPV events compared to US crime rates and WPV events. CAP scores take into account various public health demographic factors such as household income, household size, unemployment, and the types of businesses operating within the community. This comprehensive assessment of community demographics provides a more sensitive and accurate understanding of the underlying factors that influence WPV rates within healthcare settings. Utilizing CAP data when designing a healthcare WPV benchmark would be advantageous in capturing the nuances of community demographics and their impact on WPV incidents. This approach enables healthcare organizations to tailor their prevention and intervention efforts to address the specific risk factors identified within their communities.

Building on the anticipated decline in WPV rates as the 20 to 40-year age group continues to age out, it is crucial to consider the role of preventive measures, training programs, and organizational policies in reducing workplace violence within healthcare facilities. Exploring specific strategies and interventions that have proven successful in mitigating WPV incidents would provide practical insights for healthcare organizations to enhance workplace safety. These strategies may include implementing comprehensive violence prevention programs, enhancing security measures, promoting a culture of safety and respect, providing de-escalation training for staff, and establishing clear reporting and response protocols for incidents of workplace violence.

Furthermore, conducting further research on the long-term effects of demographic changes on WPV rates and the evolving dynamics between community demographics, population trends, and WPV incidents would contribute to a deeper understanding of the complex relationship between demographic factors and WPV within the healthcare sector. This research could involve longitudinal studies to track changes in WPV rates over time and analyze the impact of demographic shifts on the occurrence and patterns of workplace violence. Additionally, exploring the influence of other contextual factors, such as socioeconomic conditions, community resources, and access to healthcare services, would provide a more comprehensive understanding of the multifaceted nature of WPV within healthcare settings.

In summary, while the population has witnessed a minimal increase and crime rates have continued to decline, healthcare WPV reports have indicated an upward trend. The relationship between population and US crime rates exhibits only a slight correlation, whereas a stronger correlation is observed between the specific age group of 20 to 40-year-olds and WPV rates. These insights emphasize the importance of considering demographic factors, such as age group composition, when examining trends in crime rates and workplace violence. Furthermore, the study's findings emphasize the importance of considering community demographics and utilizing CAP scores when analyzing WPV rates within healthcare settings. Understanding the correlations between population, demographics, and WPV rates provides valuable insights into the dynamics of workplace violence. Anticipated declines in WPV rates align with the aging out of cohorts historically associated with higher criminal activity. To enhance workplace safety, healthcare organizations should explore specific strategies, interventions, and preventive measures tailored to their communities. Further research on the long-term effects of demographic changes and contextual factors would contribute to a deeper understanding of WPV within the healthcare sector and inform targeted interventions to address this critical issue.

Research Contributions to Practice

This study made three contributions to current practice. First, it shed light on the similarities between US demographics, community demographics, and hospital demographics in relation to healthcare workplace violence. In the absence of a national database to track hospital security incidents, hospitals can utilize publicly available demographic data to benchmark their risks and exposure.

Secondly, the study underscored the need for a national benchmark database to track workplace incidents beyond the scope of the OSHA employee injury and illness reporting system. Currently, this system only captured incidents resulting in injury and failed to track the full range of workplace incidents. With the increasing number of incidents and patient encounters, measuring the effectiveness of interventions became challenging. Moreover, other clinical patient measures, such as nosocomial infections, were already tracked and publicly reported. Therefore, including violence as a tracked parameter was necessary if clinicians believed that agitation and behavior were associated with clinical care.

Finally, the study emphasized the importance of hospitals adhering to OSHA guidelines, which recommended assessing, recording, and developing action plans to minimize risk. The establishment of a national database for reporting and measuring WPV incidents would greatly assist hospitals in meeting these recommendations. It would enable hospitals to determine whether their WPV incidents and reporting levels were above, below, or at normal levels compared to their peers. Additionally, it would serve as a valuable alert if hospitals were under reporting incidents.

IAHSS had already developed standardized incident categories and definitions through their incident category framework. Furthermore, they were currently working on developing a security incident database for benchmarking purposes. Once this benchmark database was completed, hospitals would be able to input their data and generate reports to track, trend, and compare their facility with similar ones. This would enable facilities to assess their risk levels and develop action plans to mitigate

those risks. They could also choose specific interventions based on factors such as location, event, or perpetrator characteristics.

By bridging the knowledge gap and providing hospitals with specific insights into their community and patient demographics, this research empowered healthcare organizations to implement targeted strategies and interventions. Ultimately, these efforts contributed to the prevention and reduction of workplace violence, creating safer environments for both employees and patients.

Limitations

The study yielded valuable insights into the occurrence and factors associated with WPV incidents. However, it is important to acknowledge the limitations inherent in the study design and data collection process. Firstly, the study relied on publicly available data sources, such as the FBI Crime Data Explorer Database and CAP Index. While these datasets utilized US Census data for measuring population, it is important to note that they were not specifically collected for the purposes of this study. Consequently, this introduces limitations in terms of data accuracy and relevance, and the findings should be interpreted with caution, taking into account the limitations of these secondary data sources.

Another limitation of the study is the generalizability of the findings. The sample size was relatively small, consisting of only 130 participants. This limited sample size may impact the ability to generalize the results to larger populations. It is crucial to recognize that the findings may be more applicable to the specific population and settings included in the study, rather than being representative of the entire population. Additionally, the observed effect size of 14.7% between CAP score groups and the age group of 20 to 40 years raises concerns about generalizability.

Selection bias and sampling errors are additional limitations in this study. The sample selection was based on community-based, short-term care sites, and bed size, which may introduce biases and limit the representativeness of the sample. It is important to consider the potential impact of these

biases when interpreting the results. Additionally, sampling errors may have occurred, which could affect the accuracy of the findings.

Time constraints also posed a limitation in this study. The US Census and FBI Crime Data Explorer data used were pulled for 2020, while the CAP Index and hospital patient days/visits data were from 2023. This time discrepancy could have influenced the accuracy and relevance of the findings, particularly if there were significant changes in the variables of interest during this timeframe. Future studies should aim to use more up-to-date data to minimize this limitation.

Furthermore, the data in this study were non-parametric, meaning that the data did not adhere to all of the assumptions of a normal distribution with equal variances. This could have impacted the statistical analyses conducted and the interpretation of the results. Future studies should consider using parametric data analysis techniques to enhance the robustness of the statistical analyses.

Lastly, it is important to acknowledge that the researchers' level of experience could have introduced limitations. This study was conducted as part of a PhD dissertation and represented my first study of this scope and magnitude. While efforts were made to ensure rigor and validity, my level of experience may have influenced the execution and interpretation of the study. Future studies conducted by more experienced researchers may provide further insights.

Considering these limitations is crucial for accurately assessing the implications of the research and informing future studies on WPV prevention and mitigation. Future research should aim to address these limitations by conducting studies with larger sample sizes, more diverse settings, and longitudinal data to enhance the understanding of workplace violence in healthcare and inform effective strategies for prevention and mitigation.

Future Research

The findings of this study have important implications and suggest potential avenues for future research in the field of workplace violence (WPV) in healthcare settings. A preliminary exploration of US,

community, and hospital demographics has provided insights that can be inferred in the absence of a national database for tracking hospital WPV security incidents. Building on this, future research can further investigate and expand on these insights.

One potential direction for future research is to explore the development of a national security database specifically designed to track security incidents, including workplace violence, within hospitals. If such a database is developed, it would be crucial to conduct research to validate the output and assess the effectiveness of submitting and benchmarking data within hospitals. This would ensure the reliability and accuracy of the database, providing a robust foundation for tracking and analyzing WPV incidents. Additionally, future studies can explore how the database can track not only the risk levels but also the culture of safety and compliance with hospital policies regarding incident reporting. These aspects align with the important areas discussed in the OSHA guidelines and can contribute to a comprehensive understanding of WPV in healthcare settings.

Furthermore, future research should aim to correlate actual hospital security incident data to US and community demographics. While this research excluded such data due to the scope of the approved Institutional Review Board (IRB) study, it is an important area to explore. By incorporating hospital security incident reports into the analysis, researchers can establish a stronger relationship between US crime rates and the hospital national CAP score weighted with population and patient encounters. This would provide valuable insights into the impact of community demographics on WPV incidents within healthcare settings.

By addressing these implications and exploring the suggested future directions, researchers can enhance our understanding of workplace violence in healthcare settings. This research can contribute to the development of effective strategies for prevention and mitigation, ultimately creating safer environments for healthcare professionals and patients alike.

Conclusion

The purpose of this study was to fill the research gap regarding the relationship between community demographics, patient demographic data, and healthcare WPV. The study aimed to assess relationships between US demographics, community factors, and hospital characteristics (sex, gender, ethnicity) to offer an initial step towards utilizing objective data for measuring and understanding WPV incidents in hospital settings. The research first examined the extent to which US Census demographics data relate to the demographic data captured by the hospital's CAP Index. It then examined the relationships or coincidences of population and crime statistics.

The findings revealed moderate to strong correlations between US population and sample community population demographics indicating relationships between variables such as US total population, community total population, US male, US female, US White, US Hispanic, and US Black. These correlations provided insights into how changes in the US population relate to changes in the community population and specific demographic groups. The study also found a strong positive correlation between community total population and various hospital metrics, suggesting that as the community population grows, there is an increase in hospital utilization and resources. Moderate correlations were found between other demographic variables, further highlighting the interplay between community and hospital demographics.

Further analysis revealed a balanced gender distribution in both the community population and research studies. The age distribution of the research studies closely mirrored that of the community population. However, there were notable differences in ethnicity, with the research studies having a higher representation of White individuals compared to the community population.

Additionally, the descriptive and inferential statistics provided insights into the relationships between US crime rates, CAP scores, and demographic variables. Positive and negative correlations were observed between US crime rate and variables such as US total population, US age groups, US

male, US female, US White, US Black, and US Hispanic. These correlations shed light on the relationships between crime rates, population demographics, and ethnic representation.

While the population has witnessed a minimal increase and crime rates have continued to decline, healthcare WPV reports have indicated an upward trend. The relationship between population and US crime rates exhibits only a slight correlation, whereas a stronger correlation is observed between the specific age group of 20 to 40 year old age group and WPV rates. This emphasizes the importance of considering demographic factors, such as age group composition, when examining trends in crime rates and workplace violence.

Furthermore, the study's findings emphasize the importance of considering community demographics and utilizing CAP scores when analyzing WPV rates within healthcare settings. Understanding the correlations between population, demographics, and WPV rates provides valuable insights into the dynamics of workplace violence. Anticipated declines in WPV rates align with the aging out of cohorts historically associated with higher criminal activity. To enhance workplace safety, healthcare organizations should explore specific strategies, interventions, and preventive measures tailored to their communities. Further research on the long-term effects of demographic changes and contextual factors would contribute to a deeper understanding of WPV within the healthcare sector and inform targeted interventions to address this critical issue.

In conclusion, this study contributes to the limited existing literature by examining the relationships between community demographics, patient demographic data, and healthcare WPV. The findings provided valuable insights into the correlations between population, demographics, and WPV rates, emphasizing the need to consider demographic factors when analyzing workplace violence trends. By understanding these dynamics and conducting further research, healthcare organizations can develop and implement effective strategies to prevent and mitigate WPV incidents, ultimately creating safer environments for healthcare professionals and patients.

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Appendix A

IRB Approval Letter

FGU Institutional Review Board | (805) 898-4034 | IRB@Fielding.edu

FIELDING GRADUATE UNIVERSITY

March 27, 2023

Katarina Kemper-Kelly
Cc: Dorothy Agger-Gupta

RE: IRB No. 23-0316 (Dissertation) "Utilizing normalized statistics to determine U.S. hospital workplace violence risks" by Katarina Kemper-Kelly

Dear Katarina,

Thank you for your submission requesting consideration for EXEMPT status. The Institutional Review Board has reviewed your Exemption Request and determined that your research qualifies for the following exemption category:

EXEMPTION: Category 4 - Archival Data

Therefore, IRB review is not required for your project and your request for EXEMPT status is approved.

STUDY ID:	23-0316 KEMPER-KELLY Katarina (SLS-HOD Mar 2023)
TYPE:	Exemption Request
DETERMINATION:	APPROVED - EXEMPT (3/27/2023)

PLEASE NOTE that exempt status ONLY applies to your study "as submitted" and is not transferable or eligible for revision. If you anticipate changes to your study, please contact the IRB Office to see if this will impact your exempt status.

Thank you for your careful attention to the requirements of research ethics and good luck with your project!

Best wishes,

Annabelle Nelson, PhD
Institutional Review Board Chair
Fielding Graduate University

Appendix B

Abbreviations

AI	Artificial Intelligence
ANSI	American National Standards Institute
ASHRM	American Society for Healthcare Risk Management
BJS	Bureau of Justice Statistics
BLS	Bureau of Labor Statistics
CAP Index	Crimes Against Persons
CDC	Center for Disease Control
CDE	Crime Data Explorer
CMS	Centers for Medicare and Medicaid
CPI	Crisis Prevention Institute
CPTED	Crime Prevention Through Environmental Design
DNV	Det Norske Veritas
ED	Emergency Department
FBI	Federal Bureau of Investigation
FTE	Full Time Employee
GAO	Government Accountability Office
IAHSS	International Association of Healthcare Security and Safety
IHI	Institute of Healthcare Improvement
IRB	Institutional Review Board
MSC	Manager Safety Climate
NHAMCS	National Hospital Ambulatory Medical Care Survey
NIBRS	National Incident Based Reporting System
NIOSH	National Institute for Occupational Safety and Health
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
SCT	Social Cognitive Theory
SLT	Social Learning Theory
STAMP	Staring and Eye Contact, Tone/ Volume of voice, Anxiety, Mumbling, and Pacing
TIC	Trauma Informed Care
TJC	The Joint Commission
UCR	Unified Crime Report
US	United States of America
VIF	Violence Incident Form
VPC	Violence Prevention Climate

Appendix C

Table C1

Data Variables, Description, and Data Sources

Data Category	Description	Data Source
US State Demographics	Variable data based on the 50 Continental states	
Pop. By Age (0-17)	Population between 0 to 17 years old	US Census
Pop. By Age (18-44)	Population between 18 to 44 years old	US Census
Pop. By Age (45+)	Population older than 45 years old	US Census
Sex (M-F)	Sex Male to Female	US Census
White	White only ethnicity	US Census
Black	Black or African American ethnicity	US Census
Hispanic	Hispanic or Latino ethnicity	US Census
US Crime Rate	The number of violent crimes per 100k individuals	FBI Crime Data Explorer
Violent Crime	Violent crime (homicide, Rape, Robbery, Aggravated Assault) reported	FBI Crime Data Explorer
Crime Age	Violent crime perpetrator age at time of crime	FBI Crime Data Explorer
Crime Sex	Violent crime perpetrator sex coded	FBI Crime Data Explorer
Crime Ethnicity	Violent crime perpetrator ethnicity coded	FBI Crime Data Explorer
Community Demographics	Variable data based on hospital zip code or 6-mile radius around the hospital	
Total Population	Total population count within 6-miles of hospital	CAP Index Report
Pop. By Age (0-17)	Population between 0 to 17 years old within 6-miles of hospital	CAP Index Report
Pop. By Age (18-44)	Population between 18 to 44 years old within 6-miles of hospital	CAP Index Report
Pop. By Age (45+)	Population older than 45 years within 6-miles of hospital	CAP Index Report
Female	Percent of females within 6-miles of hospital	CAP Index Report
Male	Percent of males within 6-miles of hospital	
White	White only ethnicity within hospital zip code	US Census
Black	Black or African American ethnicity within hospital zip code	US Census
Hispanic	Hispanic or Latino ethnicity within hospital zip code	US Census
CAP Score	Current national CAP score based on hospital address (6-mile radius)	CAP Index Report
Hospital Demographics	Hospital variable data	
Pt Encounters	Patient days plus emergency department visits	Calculation
Pt Days	Hospital patient days	Definitive Healthcare
ED Visits	Hospital emergency department visits	Definitive Healthcare
Staffed Beds	Hospital staffed beds	Definitive Healthcare
Staff FTE	Staffed full-time employees (FTE)	Definitive Healthcare
BH Dx	Patients with a primary behavioral health diagnosis	Definitive Healthcare

Appendix D

Additional Tables

Table D1

Descriptive Statistics for Population Characteristics

	N	Mean	Median	Std. Deviation	95% Confidence Interval Lower	95% Confidence Interval Upper
US Total Pop	50	6615195	4581797	7436143.22	4501866.20	8728523.24
US Age (0-17)	50	1657052	1179857	1897853.68	1117688.39	2196416.49
US Age (18-44)	50	2181309	1497714	2547728.10	1457252.22	2905364.86
US by Age (45+)	50	2713086	1898153	3000939.85	1860227.89	3565943.23
US Male	50	3257623	2253672	3673736.76	2213558.06	4301686.94
US Female	50	3323224	2322051	3725899.07	2264335.24	4382112.84
US White	50	3923546	2676087	3728437.05	2863935.57	4983155.75
US Black	50	810159	350784	977740.50	532288.16	1088029.72
US Hispanic	50	1231799	427267	2761747.35	446918.67	2016678.49
US Crime Rate	50	383	394	153.4381	338.971	426.185
CAP Score	130	351	341	175.78	312.23	373.72
Comm. Total Pop	130	242,731	263,281	139499.12	215415.42	266345.89
Comm. Age (0-17)	123	6,575	6,113	4445.51	5830.58	7418.34
Comm. Age (18-44)	123	11,515	10,941	7176.06	10299.95	12868.42
Comm. Age (45+)	123	11,384	10,741	6857.20	10248.74	12692.55
Comm. Male	123	14,375	13,347	8070.98	13035.76	15913.59
Comm. Female	123	15,133	14,527	8539.01	13716.40	16760.78
Comm. White	123	25,635	20,005	42410.65	17998.50	33264.50
Comm. Black	123	6,125	2,853	9877.90	4340.84	7896.38
Comm. Hispanic	123	7,625	2,480	15577.86	4793.51	10399.74
Hosp. Pt Days	130	276,714	182,655	293138.66	225846.03	327581.61
Hosp. ED Visits	130	91,636	66,910	115626.61	71571.87	111700.79
Hosp. Pt Encounters	130	368,350	257,957	383953.39	301723.46	434976.85

Table D2

Tests for Normality (US, Community, and Hospital)

	Kolmogorov-Smirnov			Shapiro-Wilk			Skewness			Kurtosis	
	Statistic	df	Sig.	Statistic	df	Sig.	Statistic	Std. Error	z-score	Statistic	Std. Error
US Total Pop	.211	50	<.001	.712	50	<.001	2.640	.337	7.84	8.388	.662
US Age (0-17)	.217	50	<.001	.690	50	<.001	2.809	.337	8.35	9.385	.662
US Age (18-44)	.217	50	<.001	.687	50	<.001	2.861	.337	8.50	9.933	.662
US by Age (45+)	.211	50	<.001	.740	50	<.001	2.385	.337	7.09	6.793	.662
US Male	.210	50	<.001	.707	50	<.001	2.691	.337	7.99	8.766	.662
US Female	.213	50	<.001	.716	50	<.001	2.604	.337	7.74	8.162	.662
US White	.172	50	.001	.818	50	<.001	1.657	.337	4.92	2.579	.662
US Black	.227	50	<.001	.794	50	<.001	1.380	.337	4.10	1.137	.662
US Hispanic	.356	50	<.001	.434	50	<.001	4.133	.337	12.28	18.115	.662
US Crime Rate	.113	50	.152	.945	50	.021	0.878	.337	2.61	1.142	.662
CAP Score	.045	122	.200*	.976	122	.029	0.345	.212	1.63	-0.474	.422
Comm. Total Pop	.173	122	<.001	.866	122	<.001	-0.216	.212	-1.02	0.422	.422
Comm. Age (0-17)	.068	122	.200*	.922	122	<.001	1.271	.218	5.83	3.504	.433
Comm. Age (18-44)	.097	122	.007	.923	122	<.001	1.267	.218	5.80	3.116	.433
Comm. Age (45+)	.060	122	.200*	.954	122	<.001	0.853	.218	3.91	1.420	.433
Comm. Male	.062	122	.200*	.943	122	<.001	1.012	.218	4.63	2.252	.433
Comm. Female	.089	122	.019	.929	122	<.001	1.182	.218	5.42	3.395	.433
Comm. White	.316	122	<.001	.310	122	<.001	8.638	.218	39.58	85.099	.433
Comm. Black	.271	122	<.001	.556	122	<.001	4.090	.218	18.74	21.242	.433
Comm. Hispanic	.314	122	<.001	.466	122	<.001	4.248	.218	19.46	20.348	.433
Hosp. Pt Days	.188	130	<.001	.777	130	<.001	2.098	.212	9.88	5.295	.422
Hosp. ED Visits	.249	130	<.001	.503	130	<.001	4.528	.212	21.32	23.239	.422
Hosp. Pt Encounters	.183	130	<.001	.730	130	<.001	2.627	.212	12.37	8.732	.422

Table D3

Factor Analysis Clustering for US, Community, and Hospital Characteristics

	Initial Eigenvalues			Extraction Sums of Squared			Rotation Sums of Squared		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.326	34.541	34.54	9.326	34.541	34.541	8.329	30.849	30.849
2	5.346	19.800	54.34	5.346	19.800	54.341	5.738	21.250	52.099
3	4.411	16.336	70.68	4.411	16.336	70.676	4.651	17.226	69.325
4	2.030	7.518	78.19	2.030	7.518	78.194	2.271	8.413	77.738
5	1.350	5.000	83.19	1.350	5.000	83.194	1.473	5.456	83.194
6	.859	3.180	86.37						
7	.787	2.914	89.29						
8	.715	2.648	91.94						
9	.570	2.110	94.05						
10	.390	1.446	95.49						
11	.331	1.226	96.72						
12	.251	.929	97.65						
13	.196	.727	98.37						
14	.136	.503	98.88						
15	.097	.359	99.24						
16	.094	.350	99.57						
17	.068	.253	99.84						
18	.014	.051	99.89						
19	.013	.050	99.94						
20	.009	.032	99.97						
21	.007	.027	99.99						
22	.000	.001	100						
23	1.995E-5	7.388E-5	100						
24	4.941E-6	1.830E-5	100						
25	1.087E-15	4.026E-15	100						
26	-1.245E-16	-4.610E-16	100						
27	-9.084E-16	-3.365E-15	100						

Extraction Method: Principal Component Analysis.

Table D4

Factor Analysis Component Matrix for US, Community, and Hospital Categories

	1	2	3	4	5
US Age (45+)	.937		-.262		
US Female	.934		-.269		
US Total Pop	.933		-.271		
US Male	.931		-.273		
US Age (18-44)	.924	-.256	-.272		
US Age (0-17)	.920	-.256	-.281		
US White	.909		-.293		
US Hispanic	.879	-.269	-.269		
US Black	.643				-.408
Hosp. Pt Encounters	.433	.808			
Hosp. Pt Days	.394	.806			
Hospital Beds	.383	.786			
Hosp. Staffed Beds	.383	.786			
Hosp. FTEs	.472	.751			
Hosp. ED Visits	.450	.680	.275		
Hosp. BH Dx		.630			
Comm. Male	.369	-.364	.824		
Comm. Female	.378	-.357	.823		
Comm. Age (18-44)	.260		.788		
Comm. Age (0-17)	.323	-.408	.786		
Comm. Age (45+)	.373	-.381	.701		
Comm. White				.797	
Comm. Hispanic	.362		.395	.698	
Comm. Black			.487	.630	-.360
CAP Score		.434		.445	.396
US crime rate					.681
Comm. Total Pop	.497	.369		.292	.513

Extraction Method: Principal Component Analysis.

a. 5 components extracted.

Table D5

K-Cluster Iteration History Between US Population and Sample Community Population

	Change in Cluster Centers				
Iteration	1	2	3	4	5
1	1863509.46	278880.14	2941012.15	15226.631	4011188.31
2	.000	.000	466657.05	.000	706561.03
3	.000	.000	589575.63	.000	690737.55
4	.000	.000	336746.61	.000	384122.13
5	.000	.000	1680070.31	.000	960704.28
6	.000	.000	486013.19	.000	197394.92
7	.000	.000	.000	.000	.000

a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 7. The minimum distance between initial centers is 14414743.394.

Table D6

ANOVA Comparing US Demographics and Sample Community Demographics

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
US Crime Rate	78017.64	4	10336.38	117	7.548	<.001
CAP Score	20613.43	4	29720.13	117	.694	.598
US Total Pop	3161160175617734.0	4	2303913822262.77	117	1372.083	<.001
US Age (0-17)	204164274112786.80	4	126990607725.55	117	1607.712	<.001
US Age (18-44)	386618254617004.00	4	239536563584.32	117	1614.026	<.001
US Age (45+)	496511025083833.40	4	511893292952.86	117	969.950	<.001
US Male	780716739248476.90	4	564191450229.00	117	1383.780	<.001
US Female	788995017288851.50	4	576053716720.07	117	1369.655	<.001
US White	540047668781912.50	4	1913705545506.56	117	282.200	<.001
US Black	32085946168672.72	4	333790417442.84	117	96.126	<.001
US Hispanic	589968836939767.00	4	356819898610.11	117	1653.408	<.001
Comm. Total Pop	121794826514.61	4	16711151286.52	117	7.288	<.001
Comm. Age (0-17)	30150581.82	4	19257318.45	117	1.566	.188
Comm. Age (18-44)	25955731.03	4	52203803.97	117	.497	.738
Comm. Age (45+)	131045572.34	4	43582434.57	117	3.007	.021
Comm. Male	129096079.29	4	62236806.15	117	2.074	.089
Comm. Female	162422540.57	4	69035187.29	117	2.353	.058
Comm. White	738630932.15	4	1850274869.45	117	.399	.809
Comm. Black	272199457.71	4	92432192.11	117	2.945	.023
Comm. Hispanic	840884070.12	4	224190394.57	117	3.751	.007

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Table D7

K-Cluster Final Clusters Between US Population and Sample Community Population Characteristics

	Clusters				
	1	2	3	4	5
US Crime Rate	324.4	499.5	338.1	431.9	414.9
CAP Score	400	300	332	408	340
US Total Pop	21023980	39538223	11352627	29145505	5203948
US Age (0-17)	4742140	10031434	2869764	8261232	1321233
US Age (18-44)	6665373	13909520	3692600	10141216	1714460
US Age (45+)	9461088	15514399	4737897	10460133	2136353
US Male	10232688	19714044	5549747	14398171	2563910
US Female	10635914	19741309	5750513	14464410	2608136
US White	11930802.5	16296122.0	7143357.4	14609365.0	3490040.6
US Black	3146300.6	2237044.0	2312458.7	3552997.0	602195.7
US Hispanic	5024467.7	15579652.0	1159407.6	11441717.0	686506.7
Comm. Total Pop	341375	345133	177469	398499	227382
Comm. Age (0-17)	7650	9246	6880	6107	5868
Comm. Age (18-44)	13422	13359	11462	9793	11087
Comm. Age (45+)	14938	16054	11748	9618	9947
Comm. Male	17356	19688	14571	12108	13108
Comm. Female	19048	20443	15493	13023	13577
Comm. White	27993	24763	19218	14243	29592
Comm. Black	13488	1875	7410	4330	4641
Comm. Hispanic	19180	16730	3221	5773	6189

Table D8

K-Cluster Cluster Centers Between US Population and Sample Community Population

	1	2	3	4	5
1	263837.69	166034.01	207301.95	160694.24	196238.67
2	28728.23	.000	10447.03	.000	.000
3	18712.47	.000	7727.59	.000	.000
4	28231.18	.000	13585.53	.000	.000
5	5141.36	.000	2675.56	.000	.000
6	.000	.000	.000	.000	.000

a. Convergence achieved due to no or small change in cluster centers. The maximum absolute coordinate change for any center is .000. The current iteration is 7. The minimum distance between initial centers is 604096.8

Table D9

ANOVA Comparing Sample Community Demographics and Hospital Demographics

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
US Crime Rate	8968.36	4	12697.04	117	.706	.589
CAP Score	145502.74	4	25450.41	117	5.717	<.001
Comm. Total Pop	152055573267.92	4	15676595841.97	117	9.700	<.001
Comm. Age (0-17)	128376419.26	4	15899170.17	117	8.074	<.001
Comm. Age (18-44)	170065986.58	4	47276957.63	117	3.597	.008
Comm. Age (45+)	297178092.35	4	37902690.29	117	7.841	<.001
Comm. Male	387529925.49	4	53401460.98	117	7.257	<.001
Comm. Female	424386166.41	4	60079165.90	117	7.064	<.001
Comm. White	35368981097.99	4	666331274.04	117	53.080	<.001
Comm. Black	665264658.39	4	78994065.59	117	8.422	<.001
Comm. Hispanic	3034671487.09	4	149189115.35	117	20.341	<.001
Hospital Beds	3944033.07	4	83276.99	117	47.360	<.001
Hosp. Pt Days	1891164389692.31	4	11798631252.35	117	160.287	<.001
Hosp. ED Visits	366382371614.99	4	2059950176.32	117	177.860	<.001
Hosp. Staffed Beds	3944033.07	4	83276.99	117	47.360	<.001
Hosp. FTEs	889327790.19	4	7470345.13	117	119.048	<.001
Hosp. BH Dx	198847180.86	4	13510593.74	117	14.718	<.001

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Table D10

K-Cluster Final Cluster Centers Between Sample Community Population and Hospital Demographics

	1	2	3	4	5
US Crime Rate	405.1	375.6	367.0	431.9	258.9
CAP Score	467	780	672	294	435
Comm. Total Pop	223698	401702	7126	402146	403442
Comm. Age (0-17)	10461	1030	795	5428	12636
Comm. Age (18-44)	22021	8814	2687	11073	21378
Comm. Age (45+)	17990	6313	2311	6028	25995
Comm. Male	22689	9589	1813	10808	30563
Comm. Female	24838	6568	2980	10893	29446
Comm. White	32805	451623	3073	12554	21793
Comm. Black	10668	51419	3062	6983	16230
Comm. Hispanic	6378	60563	491	8512	16656
Hospital Beds	960	321	382	196	3612
Hosp. Pt Days	780534	133563	95957	1567691	909602
Hosp. ED Visits	72115	58121	34672	788244	797773
Hosp. Staffed Beds	960	321	382	196	3612
Hosp. FTEs	9771	4075	1902	34594	39891
Hosp. BH Dx	6822	4377	2699	0	2209

Table D11

Eta Squared for CAP Score Group and Community and Hospital Characteristics

	df	Mean Square	F	Sig.	Partial Eta Squared	Adjusted R Squared
Comm. Total Pop	12	59277278906	3.878	<.001	.286	.212
Comm. Age (0-17)	12	35796514.728	1.971	.034	.178	.088
Comm. Age (18-44)	**12**	**76902871.91**	**1.565**	**.113**	**.147**	**.053**
Comm. Age (45+)	12	126767195.61	3.278	<.001	.265	.184
Comm. Male	12	130907625.50	2.238	.014	.198	.109
Comm. Female	12	141910867.49	2.151	.019	.191	.102
Comm. White	12	5348765926.1	4.002	<.001	.306	.229
Comm. Black	12	73126810.48	1.231	.271	.119	.022
Comm. Hispanic	12	324303897.68	2.090	.023	.187	.098
Hospital Beds	12	498352.37	2.708	.003	.219	.138
Hosp. Pt Days	12	153065708580.14	1.927	.038	.166	.080
Hosp. ED Visits	12	12361026486	.926	.523	.087	.007
Hosp. Staffed Beds	12	498352.37	2.708	.003	.219	.138
Hosp. FTEs	12	51260385.94	1.351	.200	.123	.032
Hosp. BH Dx	12	24827364.27	1.282	.239	.117	.026

Appendix E

Table E1

Speroni et al. Study on Characteristics of Most Serious Career Workplace Violence Incidents (n=595)

Characteristic	Emergency nurses (n = 85 [11.1%])	Non-emergency nurses (n = 510 [66.9%])	All nurses (n = 595 [78.1%])
Incident type			
Physical violence by patient	61 (71.8%)	301 (59.0%)	362 (60.8%)
Verbal violence by patient	13 (15.3%)	96 (18.8%)	109 (18.3%)
Verbal violence by patient visitor	2 (2.4%)	40 (7.8%)	42 (7.1%)
Patient threatened physical assault	4 (4.7%)	37 (7.2%)	41 (6.9%)
Patient visitor threatened physical assault	1 (1.2%)	23 (4.5%)	24 (4.0%)
Physical violence by patient visitor	4 (4.7%)	13 (2.5%)	17 (2.9%)
Relationship of perpetrator			
Patient	82 (96.5%)	455 (89.2%)	537 (90.3%)
Visitor of patient	3 (3.5%)	55 (10.8%)	58 (9.7%)
Perpetrator gender			
Male	47 (55.3%)	324 (63.5%)	371 (62.4%)
Female	30 (35.3%)	134 (26.3%)	164 (27.6%)
Both male and female in 1 incident	8 (9.4%)	52 (10.2%)	60 (10.1%)
Perpetrator age			
26-35 yr	32 (37.6%)	113 (22.1%)	145 (24.4%)
>65 yr	15 (17.6%)	114 (22.3%)	129 (21.7%)
36-45 yr	16 (18.8%)	107 (21.0%)	123 (20.7%)
46-55 yr	7 (8.2%)	72 (14.1%)	79 (13.3%)
56-65 yr	3 (3.5%)	71 (13.9%)	74 (12.4%)
≤25 yr	12 (14.1%)	33 (6.5%)	45 (7.6%)
Perpetrator race			
White, non-Hispanic	57 (67.1%)	353 (69.2%)	410 (68.9%)
Black or African American	21 (24.7%)	110 (21.6%)	131 (22.0%)
Spanish, Hispanic, or Latino	2 (2.4%)	15 (2.9%)	17 (2.9%)
Asian	1 (1.2%)	6 (1.2%)	7 (1.2%)
Other	4 (4.7%)	26 (5.1%)	30 (5.0%)
Incident location			
Other inpatient unit	6 (7.1%)	253 (49.6%)	259 (43.5%)
Emergency department	73 (85.9%)	33 (6.5%)	106 (17.8%)
Intensive care unit	2 (2.4%)	98 (19.2%)	100 (16.8%)
Surgical services	1 (1.2%)	46 (9.0%)	47 (7.9%)
Inpatient behavioral health unit	3 (3.5%)	41 (8.0%)	44 (7.4%)
Pediatrics	0	15 (2.9%)	15 (2.5%)
Other outpatient unit	0	7 (1.4%)	7 (1.2%)
Lobby/waiting area	0	5 (1.0%)	5 (0.8%)
Other	0	12 (2.4%)	12 (2.0%)
Causes of incident [a]			
Confused behavior/delirium	26 (30.6%)	218 (42.7%)	244 (41.0%)
Alcohol intoxication	34 (40.0%)	145 (28.4%)	179 (30.1%)
Under influence of drugs	36 (42.4%)	134 (26.3%)	170 (28.6%)