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## **Fire Service Leadership Cost-Effective Strategies to Reduce Sudden Cardiac Death**

Kathryn Marie Bernardo-Preston  
*Walden University*

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# Walden University

College of Management and Human Potential

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Kathryn Bernardo-Preston

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Walden University  
2026

Abstract

Fire Service Leadership Cost-Effective Strategies to Reduce Sudden Cardiac Death

by

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MBA, University of Phoenix, 2009

BS, George Washington University, 1992

Research Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

March 2026

## Abstract

A high incidence of on-duty firefighter sudden cardiac death (SCD) results in increased costs and decreased organizational performance. Fire department leaders are concerned about the financial burden of SCDs as they put strain on departmental budgets and subsequently limit operational readiness. Grounded in transformational leadership theory, the purpose of this qualitative pragmatic inquiry project was to explore how fire department leaders used cost-effective strategies to reduce SCD episodes among on-duty firefighters. Participants comprised six fire department leaders located on the East Coast of the United States who had successfully implemented strategies to minimize firefighter SCD. Data were collected using semistructured interviews and a review of publicly available fire department information. Through thematic analysis, three key themes were identified: (a) firefighter health and wellness, (b) implementing and sustaining firefighter programs, and (c) sustainable program management. A key recommendation for fire department leaders is to promote holistic injury reduction strategies by emphasizing preventive measures to identify risk factors and implementing comprehensive health and wellness programs to support sustainable program management. The implications for positive social change include the potential to reduce on-duty firefighter SCD fatalities to foster effective financial policies that support proactive measures to mitigate the impact of personnel loss on the community.

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## Dedication

I want to dedicate my doctoral research project to my husband, Steve, who was my constant anchor through every adversity I encountered while working on completing the research project. His unwavering belief in my potential and tireless encouragement not only fostered my drive but also empowered me to persist and complete this journey. This achievement is as much a testament to his love and support as it is to my efforts.

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## Section 1: Foundation of the Project

### **Background of the Problem**

Sudden cardiac death (SCD) accounts for a significant portion of on-duty firefighter fatalities in the United States, despite an overall decline in firefighter deaths between 1977 and 2022 (National Fire Protection Association [NFPA], 2025). In 2023, the National Fire Protection Association (2024) began including SCD that occurred within 24 hours of duty in its annual firefighter fatality reports. This change aligns the NFPA's reporting with the criteria used by the U.S. Fire Administration (USFA) and the federal Hometown Heroes Survivors Benefits Act of 2003 (NFPA, 2024). In the United States, SCD episodes continued to increase among the on-duty firefighters' population according to the U.S. Fire Administration (2024). Since 2010, the National Institute for Occupational Safety and Health (NOSH, 2024) has identified SCD episodes as accounting for approximately 58% of all on-duty firefighter deaths investigated (Gendron et al., 2020; T. D. Smith, Mullins-Jaime, et al., 2020). Operational leadership strategies were essential qualifications for fire department officers (Al-Khaldi, 2022; Kuzmanov, 2025; Pajic et al., 2025; Struck et al., 2025; Wittmers et al., 2025). The purpose of this doctoral research project was to explore how fire department leaders developed cost-effective strategies to reduce SCD episodes among on-duty firefighters.

### **Business Problem Focus and Project Purpose**

The specific business problem was that some fire department leaders lacked cost-effective strategies to reduce the number of SCD episodes among on-duty firefighters. The purpose of the qualitative pragmatic inquiry project was to explore how fire

department leaders used cost-effective strategies to reduce SCD episodes among on-duty firefighters. The research project population included fire service leaders. Using the expert sampling method as discussed by Memon et al. (2025), the participants consisted of six fire department leaders with at least 5 years of leadership experience managing fire department operations. All six participants were from various fire departments located on the East Coast of the United States. All participants had extensive fire service, as well as operational and leadership experience. Data sources for this doctoral research project included semistructured interviews and my research notes related to the interview data. The amalgamation of interviews, documentation, and a combination of interviews, work documents, physical, and historic documents improved research project analysis (Chand, 2025; Donkoh & Mensah, 2023). The conceptual framework for this doctoral research project was based on transformational leadership theory, which was introduced by James Burns in 1978.

### **Research Question**

What cost-effective strategies do fire department leaders employ to reduce the number of SCD episodes among active-duty firefighters?

### **Assumptions and Limitations**

Assumptions and limitations are mandatory elements that allow readers to appreciate the doctoral research project (Alhazmi & Kaufmann, 2022; Moustakas, 1994). Assumptions are essential elements because they provide a perspective to the research methodology (Gupta et al., 2025; Iman et al., 2024). Assumptions and limitations are the standards used by researchers (Cox et al., 2022; Ferrill et al., 2021).

**Assumptions**

Assumptions are beliefs or inferences taken as a fact without proof and which are not part of what is being tested in a doctoral research project (Cox et al., 2022; Hsieh & Tai, 2020; Hsieh et al., 2023). Leadership strategy decisions made by leaders regarding circumstances, actions, or measures based on the premise of fact are considered assumptions (Singh et al., 2023; Struck et al., 2025). There were three assumptions in this doctoral research project. The first assumption was that participants would respond truthfully in their responses. The second assumption was that participants would provide in-depth responses to the interview questions. The third assumption was that participants would participate in the doctoral research project without bias.

**Limitations**

Limitations are potential weaknesses that affect the analysis of the doctoral research project's outcome (Antonelli et al., 2024; Ferrill et al., 2021). Limitations in pragmatic inquiries are weaknesses in the doctoral research project design or methodology that can theoretically impact the interpretation of the results.

Limitations can result from a variety of factors, such as constraints on the methodology or research design, or unexpected events that arise during the doctoral research project (Antonelli et al., 2024; Gupta et al., 2025; Tobia et al., 2020). In this doctoral research project, there were four limitations.

The first limitation was the researchers' prejudice founded on personal traditions, life experiences, and general familiarity with the topic under the doctoral research project. The second limitation was that the semistructured interviews conducted with the

participants of the doctoral research project presented limitations of the research.

Participants' capacity to remember events associated with the research is a limitation that occurs in pragmatic research projects. The third limitation was the restrictions of participants; the researcher and the gathering of data represent another limitation.

Fostering trust with participants was the fourth limitation, especially when researchers and participants are not familiar with the research project of the people (see McKeon et al., 2021). Trust and credibility are important tasks the researcher must secure.

Participants might be reluctant to disclose sensitive information about their organizations because of the fear of retaliation. The research conducted by Ahmed (2024) and Alhazmi and Kaufmann (2022) discussed the importance of establishing a connection with participants to assist the researcher in managing the participants' ability to feel comfortable and embrace full disclosure of the process. The interviews were conducted in a relaxed setting in a quiet, neutral location away from the workplace. This environment was intended to help establish a connection with participants and facilitate open communication.

### **Transition**

Section 1 included the basis of this doctoral research project and how fire department leaders used cost-effective strategies to reduce SCD episodes among on-duty firefighters. The concepts examined through the research explored the problem, leadership, leadership strategies, business skill training, and social transformation. The literature review within Section 2 connects cost-effective leadership strategies and the effects of managing SCD among on-duty firefighters.

The purpose of the doctoral research project, my role as the researcher, and the participants selected for the focus group are included as the elements in Section 3. The findings of the doctoral research project, the application of the doctoral research project in professional practice, and implications for social change are provided in Section 4.

## Section 2: The Literature Review

### **A Review of the Professional and Academic Literature**

The content of the literature review included a synthesis of multiple literary references that included journal articles, books, and multiple professional websites published between 2021 and 2025. This literature review represented the culmination of the concepts and theories fire officers used to manage the cost-effectiveness associated with reducing SCD among on-duty firefighters. The literature review contained the following sections: transformation theory, the economic impacts of SCD episodes among on-duty firefighters, hazardous operations, and applied leadership strategies, managing safety protocols for fire officers, and social transformation. The research for the doctoral project was conducted through Walden University Library and the following search engines: Google Scholar, ProQuest, Science Direct, and Business Source Complete Premier. The keywords used included *transformational leadership, leadership strategies, firefighters or first responders, heart or cardiovascular, prevention or intervention of treatments, cost, or expenses of managing a fire station, transformational leadership in safety, leadership strategies, safety processes, management theories, doctoral research project, and both qualitative and quantitative studies.*

A wide-ranging, comprehensive search of various Internet databases permitted the researcher to identify peer-reviewed articles via a key search word or key phrase. For this doctoral research project, there were 127 sources with 84 (66%) published between 2021 and 2025, and 107 (84%) sources were peer-reviewed articles. This ensured that much of the literature was current, having been published within 5 years of the anticipated

doctoral research project completion date. The literature review contained information that might contribute to social change by reducing the statistics of on-duty firefighter fatalities caused by SCD, improving safety standards, and improving cost-effective strategies for fire officers to enhance management performance through awareness and best practices for mitigating firefighter SCD episodes.

## **Conceptual Framework**

### ***Leadership***

The conceptual framework for the doctoral research project was the transformational leadership theory (TL). In the book *Leadership*, James MacGregor Burns (1978) introduced the transformational leadership theory (TL). James MacGregor Burns was a Pulitzer Prize and National Book Award-winning historian (Agazu et al., 2025). In 1978, James MacGregor Burns published *Leadership*, a ground-breaking book that challenged the conventional thinking on how leaders interacted with society and the impact of their influence to shape the course of history (Agazu et al., 2025; Jun & Lee, 2023). The book became the foundation for an emerging field of leadership studies, and whose application in business, government, and the social sciences. The following table presents the five managerial practices identified by Burns (1978) in his foundational work on transformational leadership theory. These practices are crucial for balancing organizational goals such as production efficiency with the critical need for safety and reliability (see Table 1). This pragmatic research project specifically examines how these principles can be applied within the fire service to enhance safety protocols and mitigate SCD events.

**Table 1***Burn's Five Managerial Practices*

Number	Practice
1	Balancing the tension between production efficiency and reliability (safety)
2	Creating and sustaining trust throughout the organization
3	Actively managing the process of change
4	Involving workers in decision-making pertaining to work design and workflow
5	Using knowledge management practices to establish the organization as a "learning organization."

Note: This table presents the five managerial practices proposed by Burns (1978) to facilitate effective leadership and organizational change.

TL is a progressive process based on motivation, ethics, and meeting objectives for engaging followers from a holistic perspective (Thompson et al., 2021). The fire service has not traditionally stressed the use of transformational leadership as a leadership strategy (T. D. Smith, DeJoy, & Dyal, 2020). The fire service operates as a hierarchical, paramilitary structure (Lim & Moon, 2020; T. D. Smith, DeJoy, & Dyal, 2020). Only recently have stakeholders emphasized changes in leadership strategies (Wang et al., 2023). Transformational leadership is one leadership strategy that exemplifies the leadership style firefighter leaders demonstrate as they train their officers during both critical and nonemergency events (Adra et al., 2024; Al-Khaldi, 2022; Changar & Atan, 2021).

Individual behavior significantly influences the trajectory of operational outcomes within the fire service (Lim & Moon, 2020, 2024). Firefighters responding to alarms on engine or ladder apparatus typically operate as part of a cohesive crew, where each member is responsible for specific assigned tasks upon arrival (Arefin et al., 2022; Lim & Moon, 2020). Consequently, fire officers must evaluate the competencies of each

firefighter to assign tasks that ensure optimal performance (Santa et al., 2023).

Transformational leadership serves as a primary strategy for influencing these behaviors and actions (Ramanadhan et al., 2021; T. D. Smith, DeJoy, & Dyal, 2020). Rather than exerting direct control, the objective for fire officers is to establish a clear, unified vision by leading by example (Mouazen et al., 2024; Singh et al., 2023). This leadership approach requires active engagement with staff members to be effective (Santa et al., 2023).

In the fire service context, combining employee engagement with transformational behaviors can facilitate health and safety modifications, potentially resulting in improved safety performance (Singh et al., 2023). Promoting cost-effective management strategies for hazardous events is vital for reducing the likelihood of SCD episodes and supporting the well-being of high-risk professionals (Maio et al., 2023; T. D. Smith, DeJoy, & Dyal, 2020). Accordingly, the purpose of this doctoral research project was to explore the cost-effective strategies fire department leaders use to reduce SCD episodes among on-duty firefighters and to identify the leadership strategies utilized to manage costs affecting firefighter safety and well-being (Poudevigne et al., 2021; Ras & Leach, 2021; Raut et al., 2024). Consistent, positive engagement with employees remains a cornerstone for fostering reduced stress and promoting successful fire service operations (Maio et al., 2023; Mullins-Jaime et al., 2025). Ultimately, the integration of transformational leadership and cost-conscious wellness initiatives establishes a proactive framework that prioritizes the long-term health and operational efficiency of the fire service.

Using TL facilitates an understanding of successful leadership strategies within the fire service. TLT supports this doctoral research project by providing a compatible framework to identify how East Coast U.S. fire department leadership applies strategies to reduce SCD statistics. TL is essential in fire service organizations, as leaders must actively seek to attract and retain both career and volunteer firefighters (USFA, 2023). According to the USFA (2023), effective recruitment and retention strategies for volunteer emergency services often require personnel to align with the organization's managerial mission and goals, a process supported by effective leadership (T. D. Smith, DeJoy, & Dyal, 2020; Syed-Yahya et al., 2025). TL is instrumental in ensuring the overall well-being of firefighters (Maio et al., 2023; Tobia et al., 2020). TL supports this research project by explaining the specific strategies, processes, and tools leaders apply to mitigate SCD events among on-duty firefighters.

Firefighting involves engaging in hazardous environments and working on a range of tasks under high-risk conditions, according to a research project conducted by Butry et al. (2019) on behalf of the National Institute of Standards and Technology (NIST). An overview of fatal firefighter injuries between 1977 and 2022 indicates a consistent decline in on-duty firefighter deaths (USFA & National Fallen Firefighters Foundation [NFFF], 2024).

Traditionally, the research did not include statistics on SCDs or strokes unless symptoms or grievances of symptoms had been made known while on-duty (NFPA, 2024). The NFPA expanded the inclusion criteria in the 2023 research to show the number of firefighter fatalities attributed to SCD while on-duty. The inclusion criteria

demonstrate consistency with death benefit eligibility under the Hometown Heroes Survivor Benefit Act (2003). Despite the overall downward trend in firefighter fatalities, SCD accounts for the largest portion of on-duty firefighter deaths in the United States and the largest percentage of firefighter deaths year over year since the inception of the Overview of the Fatal Firefighter Injuries report.

Trust and performance enhancement are a result of effective leadership (Wang et al., 2023). When fire service leaders demonstrate valuing employees' safety (Basahel, 2021) and well-being and encouraging them to foster new ways of thinking about safety challenges, team regard leaders as role models (Adra et al., 2024; Lim & Moon, 2024; Mouazen et al., 2024; Wang et al., 2023). Effective TL is demonstrated when employees, such as firefighters, follow their leadership through emulating behaviors, such as trust, confidence, respect for team members, and compliance with safety protocols (Santa et al., 2023). Fire officers engage in specialized training to promote leadership strategies that enhance their ability to use sound decision-making for managing hazardous operations (Arefin et al., 2022). The specific business problem addressed in the research project through TL illustrated that some fire officers lack cost-effective management strategies to mitigate the risk of SCD among on-duty firefighters. They employ TL ideals to transform the workforce to a paradigm that focuses attention on the mission and goals of the organization (Lemstra & Aurélio de Mesquita, 2023; Wang et al., 2023). Leaders who demonstrate a commitment to an organization can influence and encourage trust and respect as a shared vision for the organization (Wang et al., 2023; Wittmers et al., 2025). Firefighters and those who support hazardous operations tend to exist as a tightly bound

group who respect the leadership and recognize the leadership's inspirational motivation, philosophical stimulation, and their influence (Lyubykh et al., 2022; Militz et al., 2022; Poudevigne et al., 2021; Wang et al., 2023).

Firefighters tend to have a cohesive relationship, as do many who support hazardous operations. They depend on each other to stay safe while performing many of their tasks (Zhou et al., 2024). Cost-effective management practices require commitment from both effective leadership and employees to improve efficiency in the cost of hazardous operations that mitigate the risk of SCD events (Arar & Saiti, 2022). Leadership's evaluation of employee needs that are derived from customized leadership strategies demonstrate relationship between the assessment and the policy (Agazu et al., 2025; Changar & Atan, 2021). argued that to be able to transform task accomplishment would be challenging, where the focus is on hazardous operations.

Leadership strategies can vary depending on the varying degree of the hazardous events (Lyubykh et al., 2022). Traditionally, the fire service follows a paramilitary leadership strategy (Syed-Yahya et al., 2025), which tends to dictate the methodology to follow. In transactional leadership scenarios, employees need instruction and motivation at every undertaking. The doctoral research project explored fire officers who are collocated with firefighters and who are engaged with the needs of the firefighters, the organization, and community service.

### ***Transactional Leadership***

Transactional leadership tends to dominate a hands-off approach that seeks to only enforce compliant behavior (Sienkiewicz-Malyjurek, 2016; Singh et al., 2023;

Struck et al., 2025). Transactional leadership in hazardous situations increases risk.

Firefighting requires both compliance and the ability to apply and perform beneficial behavior that focuses on the organizational goals (Basahel, 2021). Leadership's collaboration of both compliant and noncompliant behaviors serves to monitor employee behavior and confirm compliance (Lyubykh et al., 2022).

Fire officers work closely with firefighters and other fire responders to uphold compliance with organizational policies and foster constructive work relationships (Militz et al., 2022; Parrish et al., 2020; Pilbeam, 2024). The intervention of business leaders intersects where there is a deviation from the practice or norm (Shahaab et al., 2023; Syed-Yahya et al., 2025). Consistent negative leadership strategies and continuous supervision can lead to employee low morale, high turnover, and a reduction in compliance with hazardous operations, and increase risk (Farley et al., 2023; Syed-Yahya et al., 2025; Van Hasselt et al., 2022). Such strategies have not proven to be cost-effective (Boyce et al., 2024; Gibbs et al., 2025; Sienkiewicz-Malyjurek, 2016) and contribute to the economic impact on fire department budgets and the communities they support.

### **Economic Impacts of Sudden Cardiac Death Among On-Duty Firefighters**

Firefighting involves engaging in hazardous environments and working on a range of tasks under high-risk conditions, according to the study conducted by Butry et al. (2019) on behalf of the National Institute of Standards and Technology (NIST). The 2024 overview of the fatal firefighter injuries between 1977 and 2022 indicated a consistent decline in on-duty firefighter deaths (National Fallen Firefighters Foundation, 2024). Traditionally, the research did not include statistics on SCDs or strokes unless symptoms

or grievances of symptoms had been made known while on-duty (NFPA, 2024). The NFPA expanded the inclusion criteria in the 2023 research to show the number of firefighter fatalities attributed to SCD while on-duty. The inclusion criteria demonstrate consistency with death benefit eligibility under the Hometown Heroes Survivor Benefit Act (2003). Despite the overall downward trend in firefighter fatalities, SCD accounts for the largest portion of on-duty firefighter deaths in the U.S. and the largest percentage of firefighter deaths year over year since the inception of the Overview of the Fatal Firefighter Injuries report.

Layoffs, fire station closures, and high fatality statistics are examples of ineffective financial and operational strategies (National Institute for Occupational Safety and Health, 2023). A reduction in fire stations and fewer firefighters impacts communities and represents a lost financial investment put forth to enable firefighting resources to support the population (Boyce et al., 2024).

Managing a fire department is one of the many duties fire officers are responsible for conducting. It is a responsibility that requires fire officers to possess a firsthand knowledge of budgets, organizational frameworks, and people management. Fire departments are unique because of the ambiguity or nature of managing hazardous operations in contrast to a nonhazardous or traditional business with a stable work environment (Syed-Yahya et al., 2025; Wohlgemuth et al., 2024). Strategies to manage the costs of hazardous operations and the corporate aspects of a business are what fire officers must know to be able to manage a fire department (Kunadharaju et al., 2011; Pennington et al., 2022; Pilbeam, 2024; Shah et al., 2024; Wang et al., 2023).

Firefighters work in hazardous work environments and require strict safety policies and procedures to remain safe and healthy (T. D. Smith, DeJoy, & Dyal, 2023). The U.S. depends on over a million career and volunteer firefighters (NFPA, 2022, p. 1) to implement emergency operations. The NFPA (2024) identified SCD as the leading cause for most firefighter line-of-duty deaths (Arefin et al., 2022; Kunadharaju et al., 2011). The loss of one firefighter to a local community means a lost financial investment put forth to enable that resource to support the population (NFPA, 2024). The doctoral research project explored how fire department leaders develop cost-effective strategies to reduce SCD episodes among on-duty firefighters on the East Coast of the United States. The business problem's significance means incorporating cost-effective programs that reduce SCD episodes in on-duty firefighters to improve the department's performance.

Trends in SCD among on-duty firefighters continue to increase, according to the National Institute for Occupational Safety and Health (NIOSH) (2023). The United States fire department defined SCD as cardiac related event that occurs while the firefighter is on duty and death is immediate or shortly thereafter (NIOSH, 2024). SCD is the leading cause of on-duty firefighter fatalities in the United States. It accounts for the single highest number of deaths in 1 year (Wohlgemuth et al., 2024).

Firefighters engage in a variety of hazardous environments and work on a wide range of tasks under high-risk conditions (NFPA, 2024). The physical demands are due to the abundant responsibility, work schedule, noise, and the recovery time between calls and responsibilities (Bode et al., 2021; Day et al., 2024; Griffith & Roberts, 2020; Gulliver et al., 2021; Hendricks et al., 2023; Wohlgemuth et al., 2024).

The firefighter population is often considered to have poor overall health (Boyce et al., 2024; Casjens et al., 2021; DeBono et al., 2023; Fahy et al., 2022; Pennington et al., 2022; Pilbeam, 2024; Sidossis et al., 2023). Despite poor overall health perceptions and an increase in cancer diagnoses among younger firefighters (Gallagher, 2021), firefighters are still required to perform at maximum efficiency when responding to emergency calls (Henderson & Sowa, 2022; Shah et al., 2024; Wohlgemuth et al., 2024)

Firefighters face heightened risks due to the physical and mental demands of their profession (Angleman et al., 2021; Gulliver et al., 2021; Hu et al., 2024; Shah et al., 2024). In 2023, the NFPA estimated that on-duty firefighters suffered 63,175 injuries, a 4% decrease from the previous year. Of these, approximately 17% resulted in lost work time. The financial impact of such injuries is substantial; research indicates the annual cost of firefighter injuries ranges between \$2.8 billion and \$7.8 billion (Campbell, 2024). Firefighters are often at risk due to the demands of the job (Angleman et al., 2021; Gulliver et al., 2021; Hu et al., 2024; Shah et al., 2024). In 2023, there were 63,175 firefighters injured in the line-of-duty (NFPA, 2025). The estimated cost of firefighter injuries is between \$2M and \$7.8M per year (Campbell, 2024).

The NFPA overview of the fatal firefighter injuries between 1977 and 2022 indicated a consistent decline in on-duty firefighter deaths (NFPA, 2024). The statistics did not include statistics on SCDs unless symptoms were made known while on-duty (NFPA, 2024). The NFPA expanded the SCD inclusion criteria in 2022 to include SCD episodes show the number of firefighter fatalities attributed to sudden cardiac death (SCD) (Sales et al., 2024), while on-duty at around 40% (NFPA, 2024). Before the NFPA

2022 study, SCD statistics did not exist in the firefighter fatalities statistics unless the event took place while on active duty (NFPA, 2024). In 2022, the criteria for inclusion in the firefighter fatality statistics changed to SCD episodes that occur within 24 hours of active duty. According to the fatal firefighter injury statistics (Campbell, Hall, Petrillo, 2024). The inclusion criteria demonstrate consistency with eligibility, death benefits under the Hometown Heroes Survivor Benefits Act (HHSBA, 2003). Despite an overall downward trend in total firefighter fatalities since 1977, SCD remains a critical concern. In 2024, heart attacks accounted for nearly half of all reported firefighter deaths, according to the National Fire Protection Association (NFPA, 2025).

The United States depends on over a million career and volunteer firefighters (NFPA, 2020) to implement emergency operations. United States communities depend on career and volunteer firefighters to safeguard their residents and property from damage caused by fire. According to the research conducted by the NFPA (2024), there were approximately 1,041,000 career and volunteer firefighters in the United States in 2020. There were 29,452 fire departments in the United States in 2020. It is important to understand that approximately 37% of the total number of fire departments do not provide any medical services (NFPA, 2024). Basic life support services and advanced life support services are provided by 63% of the nation's fire departments across the United States. Since 1986, the cost for firefighter services has increased 140%, yet the number of career firefighters has only increased 51% (NFPA, 2024). The statistics make it difficult to interpret if the reported problem with decreased budgets or level budgets are related to fire departments servicing larger communities and having an increase in responsibility or

other factors exist such as shorter workweeks, the need to increase staffing, or the rising cost of the healthcare and retirement (Butry et al., 2019; Campbell, 2024; Campbell, 2025; Pajic et al., 2025).

The primary funding source for local fire departments is derived from local property taxes. The fire department is subsidized by Congress (Campbell, 2024), and approximately 64% of the nation's fire departments are staffed primarily by trained volunteers. The loss of one firefighter to a local community means a lost financial investment put forth to enable that resource to support the population (NFPA, 2024). The cost of safety has no impact on the service provided by the fire department. The United States fire departments responded to 36,416,00 calls (NFPA, 2024). The number of calls that were responded to in 2020 represents more than three times the number of calls responded to in 1980. Less than 4% of the calls fire departments responded to were related to actual fires. Funding for fire departments regulates the level of service provided by the fire department (NFPA, 2024). Fostering cost-effective strategies as a basis for fire officers to manage hazardous operation budgets is critical to the longevity of the fire service, the ability to support the community in an effective and safe manner (Sedlmeyer & Dwyer, 2018) and ensure firefighters' well-being.

Fire departments often exist with fewer than the optimal resources. There are approximately 19,000 municipal governments, and more than half of the budgets are comprised of public safety workers. The probability that budget increases will affect fire departments in some manner is evident in how funding directly correlates with staffing, operational preparedness, and community safety metrics such as response time. Fire

officers must deal with the economics of safety for both firefighters and the public.

According to the statistics collected by the United States Fire Administration (2023), at least one hundred firefighters die in line-of-duty each year, and more are diagnosed with chronic illnesses and injuries associated with fire services. On-duty firefighters who experience SCD are among the highest fatality statistics (U.S. Fire Administration, 2023).

Fire departments' costs associated with disabled firefighters range from \$250,000 to \$500,000 per firefighter (NFPA, 2024). According to research conducted by Boyce et al. (2024) and Campbell (2024), the cost of a wellness program ranges from \$130 to \$150 and up per firefighter per year. However, fire officers' cost-effective strategies are impacted by the jurisdiction the fire department serves. Fire officers must always be aware of the fatalities and injuries in comparison to prevention (Syed-Yahya et al., 2025). The increasing health benefit costs due to the replacement of trained, experienced firefighters who experience SCD lead to budget deficits. The reduction of SCD episodes may provide potential derivative improvements in public safety.

### **Hazardous Operations and Applied Leadership Strategies**

Leadership strategies include all phases of cost management for dangerous operations. Farley et al. (2023) concluded that mutual trust and respect are often recognized by leaders who demand respect. Organizational behavior reflects the relationship between employees and the management of the organization, which can also impact business success (Agazu et al., 2025). Ethical behavior is a value that fosters trust. Ethical behavior and trust are leadership attributes that may impact the opinion of cost-

effective strategies for fire departments as well as the firefighters' health over a period (Marques-Quinteiro et al., 2022).

Leadership strategies demonstrated during the execution of hazardous operations, such as fire suppression and toxic chemical spills, to name two, need to align with the mission of the business. Traditional roles differ from business leader roles. Leaders mediate, distribute resources, and handle conflict resolution. Transformational leadership in the fire department is an operational resource, specifically when engaged in firefighting activities (Adra et al., 2024; Agazu et al., 2025; Marques-Quinteiro et al., 2022). The operational demands of firefighters include fire suppression, and the varied stresses that exist before arriving on-scene, during the suppression, and in managing the aftermath of the episode. Fire suppression demands can have a significant impact on the well-being of firefighters (Park et al., 2024). During fire suppression firefighters are forced to exert both physical and psychological strength as they encounter extreme heat, and other work-related experiences such as task management and the coordination with other, and critical stress levels that serve to deplete their mental and physical resources (Fahy et al., 2022; Park et al., 2024; Wang et al., 2023; Wohlgemuth et al., 2024).

Leadership is regarded as a critical component to fostering the firefighting capabilities of firefighters (Lim & Moon, 2024; Marques-Quinteiro et al., 2022; Park et al., 2024). A transformational leadership style provides support to firefighters dealing with the physical and emotional stress they encounter during fire suppression events, as well as the duties firefighters are assigned to conduct (Mullins-Jaime et al., 2025).

Transformational leadership in the fire service strives to inspire and to motivate others in

achieving their potential as well as promoting personal growth (Sedlmeyer & Dwyer, 2018). It also cultivates a safety culture of camaraderie that leads individuals to surpass personal goals for the benefit of the organization (Eliades et al., 2025; T. D. Smith, Mullins-Jamie, et al., 2020).

In 2004, the Firefighter Life Safety Summit introduced 16 initiatives to ensure firefighters return home safely after every shift (NFFF, 2024). The associated slogan "Everyone Goes Home" emphasized the fire department's commitment to a strong safety culture and a secure work environment (NFFF, 2024). Fire officers are responsible for managing numerous safety protocols to safeguard the well-being of both firefighters and the public (USFA, 2024). The table below identifies examples of key safety protocols fire officers need to administer.

**Table 2***Examples of Key Safety Protocols Fire Officers Manage*

Protocol	
Personal Protective Equipment (PPE)	Defined as a helmet, gloves, fire-resistant coats and pants (also referred to as turnout gear, boots, and breathing apparatus (SCUBA – Self -Contained Breathing Apparatus).
Incident Command System (ICS)	The Incident Command System (ICS) is a standard method to coordinate resources, assign roles, and manage the incident landscape.
Hazard Identification and Risk Assessment	Assessing the risks associated with fire events means observing structural integrity, hazardous materials, such as vaporized toxic chemicals, and weather conditions.
Safety Briefings	Briefings involve potential hazards, evacuation routes, and highlight specific safety concerns based on the environment and the conditions or nature of the fire.
Firefighter Accountability Emergency Medical Protocols	Fire officers ensure all firefighters reporting to the incident are always accounted for during the incident. Fire officers ensure no one is left behind at the incident. Fire officers guarantee proper medical procedures are in place for both firefighters and casualties. Fire officers ensure there is an on-site medical team and can execute triage and coordinate the evacuation of injured personnel or civilian victims.
Firefighter Rehabilitation	Fire officers manage regular breaks, the availability for hydration, rest, and medical evaluations to safeguard against fatigue, heat stress, or other health issues.
Post-Incident Review and Debriefing	Following the incident, fire officers conduct a retrospective type of briefing as a way of engaging with the firefighters and getting their opinions and thoughts on what worked well and what needed improvement.
Training and Drills	Fire officers manage and facilitate drills to enhance firefighters' preparedness for an extensive range of emergencies.

Fire officers manage risk and ensure the safety of their team, and ensure the civilians are protected during a fire (Xu et al., 2021). Given the significant climate and societal change events the world has experienced since the beginning of the 21st century, there have been unprecedented fire suppression episodes (Eliades et al., 2025; Smith et al., 2019). Fire departments have been forced to adopt alternate managerial procedures for fighting fires and effectively address the additional hazards while protecting the well-being of firefighters (Lim & Moon, 2024; Wohlgemuth et al., 2024). The challenges fire departments are confronted with are forcing an examination of leadership and managerial characteristics (Yulman, 2023). In addition, fire departments continue to examine existing protocols for managing cost-effective strategies for hazardous operations and embark on a comprehensive understanding of how firefighters perceive risk outside the parameters of standard regulations (Militz et al., 2022). Still, the fire department lacks cost-effective strategies to combat SCD among on-duty firefighters.

Transformational leadership involves leading by example (Mullins-Jaime et al., 2025). Fire officers need to set an example when coaching firefighters to comply with operational standards. It means that fire officers must demonstrate transformational leadership attributes that motivate, encourage open, two-way communication, and develop trusting relationships with other firefighters (Leduc et al., 2022).

The research conducted by Boyce et al. (2024) and Campbell (2024) demonstrated cost-effective strategies for implementing fire services to reduce SCD among on-duty firefighters. The authors compared the cost-effectiveness of the three approaches to prevent cardiovascular episodes in on-duty firefighters. Using published

observational and clinical data, and cost quotes from physiological monitoring devices, developed a cost-effective analysis model and conducted one-way and two-way sensitivity analysis. The doctoral research project identified that wellness-fitness programs can provide a cost-effective solution to preventing SCD in firefighters compared to real-time physiological devices or no physical activity (Boyce et al., 2024; Campbell, 2024).

Implementing comprehensive medical screenings and mental wellness initiatives is essential for mitigating the diverse health and safety risks inherent in fire service operations. Kunadharaju et al. (2011) demonstrated the benefits of medical physicals for firefighters, noting that despite regular physical activity, lifestyle and environmental factors contribute to significant health risks. By analyzing fire department fatality investigations, Kunadharaju et al. (2011) reinforced that medical physicals serve as a critical tool for the early detection of disease, the monitoring of health progress or decline over time, and the promotion of overall well-being (see also Casjens et al., 2021; DeBono et al., 2023; Sidossis et al., 2023). Furthermore, researchers have identified mental wellness as a significant factor in the effective management of safety protocols (Changar & Atan, 2021; Santa et al., 2023; Smith, 2019; Zhou et al., 2024). Based on the evidence provided, the essential elements of this research project center on leadership and comprehensive health strategies. Fire officers must utilize transformational leadership attributes—including leading by example, fostering two-way communication, and building trust—to motivate personnel to adhere to safety standards (Leduc et al., 2022; Mullins-Jaime et al., 2025). Furthermore, the implementation of structured wellness-

fitness programs serves as a more cost-effective strategy for preventing sudden cardiac death (SCD) than the use of real-time physiological monitoring devices or physical inactivity (Boyce et al., 2024; Campbell, 2024). Regular medical screenings are also vital for the early detection of disease and the monitoring of persistent health risks that remain despite physical activity (Kunadharaju et al., 2011; Sidossis et al., 2023). Additionally, proactive mental health initiatives are critical for managing safety protocols and mitigating occupational hazards (Changar & Atan, 2021; Zhou et al., 2024). In response to shifting environmental and societal demands, fire departments must adopt adaptive managerial procedures to protect firefighter well-being while maintaining cost-effective operations (Lim & Moon, 2024; Yulman, 2023). Finally, understanding how firefighters perceive risk outside of standard regulations is essential for aligning leadership strategies with hazardous operations (Militz et al., 2022).

In their research, Changar and Atan (2021) explored how an organization responds to tragedy and the lasting impact the response can have on the reflection of the disaster and future actions. Leadership can influence the management of safety protocols for fire officers, and leadership behavior can impact the well-being of employees (Changar & Atan, 2021). The Yarnell Hill Fire serves as a seminal case study for understanding participants' responses to organizational crises, particularly how such events precipitate significant internal stress and interpersonal conflict (Isherwood, 2019; Stalmeijer et al., 2024). The tragedy has been analyzed as a catalyst for cultural introspection, revealing how sensemaking and emotional responses among organizational

members can lead to both operational learning and persistent organizational disagreement (Jahn et al., 2024; Leduc et al., 2022).

This conflict led to discussions and a process of negotiation to understand the situation, manage feelings, and share knowledge (Chen et al., 2021). The process of navigating the complex discussions of emotion and sensemaking within a crisis fosters organizations to develop the fundamental understanding and adaptability essential for facilitating meaningful social change transformation.

### **Social Change Transformation**

Analysis of the evidence from the data and literature suggests that because the United States relies on over one million career and volunteer firefighters for emergency operations, any reduction in force due to preventable deaths has profound societal and economic implications (National Fire Protection Association, 2020). By integrating cost-effective leadership strategies with proactive financial policies, fire departments can mitigate the occurrence of sudden cardiac death (SCD) and offset the operational strain caused by the loss of personnel (Boyce et al., 2024; Chen, DeJoy, & Smith, 2021; Chen, Li, et al., 2023; Pilbeam, 2024). This evidence indicates that leadership is a critical catalyst for social change; specifically, transitioning from reactive management to a proactive, community-centric model fosters organizational resilience and public trust (Singh et al., 2023; Struck et al., 2025). Ultimately, the synthesis of these findings underscores that strategic leadership behavior and innovative risk-reduction initiatives are essential mechanisms for preserving the human capital necessary for community safety.

## **Transition**

The literature review relates to leadership approaches and the results of promoting safe, healthy lifestyles for those who are engaged in fire service operations. The information in Sections 1 and 2 provided the foundation of the doctoral research project and consideration of the relationship of leadership policies for managing fire service operations. The theories examined in the research survey are the problem, leadership, the business of managing fire service operations, leadership strategy, business skill training, and social transformation.

Section 3 includes the procedures, methods, and validation procedures needed to conduct the doctoral research project. Section 4 will conclude with the results from data collected through interviews, conclusions, the application of the doctoral research project in practice, and how the doctoral research project applies to the fire department's professional practice, implications for social transformation, and personal recommendations.

### Section 3: Research Project Methodology

Section 3 includes a discussion of project ethics, the doctoral research project's research methodology, and the nature of the research. In Section 3, the population is identified, sampling and participants, the collection methods for data collection, analysis, and the techniques used to carry out the semistructured interviews of six firefighters from various fire departments located on the East Coast of the United States. In Section 3, the reliability and validity of the doctoral research project are also addressed.

#### **Project Ethics**

I was the primary data collection instrument for this doctoral research project. Tomaszewski et al. (2020) stated that the researcher was considered a primary research medium. I was dedicated and committed to safeguarding the highest ethical standards to ensure the integrity and credibility of my doctoral research project, in addition to protecting the integrity of all the participants who were involved. As the primary data collector, I maintained a neutral and objective position throughout the research project for the purpose of reducing bias and making certain the authenticity of the findings. My behavior required being apparently clear about any potential conflicts of interest as well as maintaining professional separation from the participants and the research topic.

I made certain that informed consent was obtained from all participants. Each participant received an informed consent form that articulated the purpose of the doctoral research project, the procedures, potential benefits and risks, and that their participation was strictly voluntary. Each participant had ample opportunity to ask questions and/or withdraw from the research project at any point without any adverse consequences.

I maintained strict confidentiality and upheld the anonymity of all participants.

Pseudonyms were used to shield the identities of participants, and all personal identifiers were extracted from the data. I will protect the data securely for 5 years by encrypting the digital data and physically storing it in a locked cabinet and only having access.

I adhered to the ethical guidelines outlined in *The Belmont Report*, which underscores the principles of respect for persons, beneficence, and justice (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). This implied that participants were treated with respect, their well-being was ensured, and the research was managed in a responsible and unbiased manner. I complied with Walden University's Institutional Review Board (IRB) conditions for the approval and monitoring of the research project. Participants were informed that they could withdraw their participation in the research project at any time without any adverse consequences, and participation was entirely voluntary without the provision of incentives.

Participant confidentiality was protected by securely storing all collected data for a minimum period of 5 years in a password-protected computer and a locked file cabinet, as required by the university's research policy. Following this 5-year retention period (e.g., in December 2030), all electronic data files will be permanently deleted from all storage devices, and all physical records will be shredded to ensure their complete and irreversible destruction.

The integrity of the doctoral research project was dependent on ethical leadership behavior, as discussed in the research conducted by Arar and Saiti (2022) on collecting reliable, valid data as well as answering the research questions posed for the research project (Arar & Saiti, 2022; Lester et al., 2020). The purpose of the qualitative, pragmatic inquiry was to explore how fire department leaders use cost-effective strategies to reduce SCD episodes among on-duty firefighters. I explored how fire department leaders use cost-effective strategies to reduce SCD episodes among on-duty firefighters. Researchers could gain additional insight through compounding communication channels. According to Tomaszewski et al. (2020), the qualitative method used by researchers fostered the opportunity to explore phenomena and specify an explanation of the meanings. The data collection for the doctoral research project included interviews, member checking, and triangulation.

My experience in the fire service fostered potential for bias. Observing data with a nonpersonal perspective mitigated bias. Maintaining the participants' privacy was a dominant concern. Establishing and following a specified procedure mitigated bias and maintained participants' privacy throughout this research project. Participants in my research project were identified by a number that was cross-referenced to a table in an Excel spreadsheet, which was password-protected and saved to my personal data files. No one had access to the spreadsheet. Each interview question was presented in the same way to ensure consistency. My research project's participants could withdraw from the research project at any point by communicating their intent. I requested participants to sign a consent form and provided them with a written explanation regarding the use of

audio recording for capturing their responses to research questions. Providing participants with information about the tools and techniques used for data collection in the research project fostered transparency in the interview process before the interview process began.

I established an interview process for interview participants to follow as a way of maintaining the interview schedule and the research project timeline. The objective of the interview process was to explore phenomena from the leadership strategies participants use, and to expose successful strategies and clarification of their interpretation example of the interview protocol, which provided a description of how the interviews were staged, and the list of interview questions can be found in the Appendix. I provided updates to participants and stakeholders throughout the doctoral research project process. My updates included the sharing of preliminary findings and soliciting feedback to ensure the relevance and accuracy of the outcomes. Adherence to established guidelines for ethical research ensures accountability to both the academic and professional communities (Heinemann et al., 2024; Lim, 2024).

At the conclusion of my doctoral research project, I made certain that my research proposal was reviewed and approved by the IRB. The IRB approval number is 06-24-25-0151025. By committing to the following ethical guidelines, I upheld the rights and self-respect of the participants involved with the doctoral research project.

### **Nature of the Project**

Qualitative methodology was used in this doctoral research project. Using the qualitative approach, I focused on comprehensive data collection utilizing a semistructured interview process with open-ended questions to address observable facts

and explore the data to identify outcomes and conclusions. The pragmatic inquiry design was used in this doctoral research project. The project design was appropriate for gaining a deeper understanding of the participants' responses and could answer the research question. Doctoral research inquiries are designed to evaluate the effectiveness of interventions and incorporate operational decisions based on the best option (Lester et al., 2020). It also offers ways to make strategic, analytical decisions based on existing data and fosters the integration of the data into practice (Ramanadhan et al., 2021).

A pragmatic inquiry design was appropriate because it provided a narrative approach that allowed for the collection of data with multiple participants through interviews to provide their strategies that reduce the number of SCD episodes. The data analysis was focused on participants' stories as expressed during the interview process.

### **Population, Sampling, and Participants**

The population in this doctoral research project was fire department leaders. The participants in this doctoral research project included six fire department leaders from six fire department jurisdictions along the East Coast of the United States. The purposive sampling method was selected for the doctoral research project. The purposive sampling method is a method that engages the researcher's judgment for determining and selecting participants for the doctoral research project that will potentially provide data that addresses the research problem (Arar & Saiti, 2022). The purposive methodology could be grounded on experience, the size of the group, and the location of the research members (Ramanadhan et al., 2021). The purposive selection method provided a broad perspective interpretation of the research.

This doctoral research project consisted of six fire department leaders from various fire departments located on the East Coast of the United States, who actively manage or managed fire department operations for a period of 5 years. A smaller purposive sample size of six participants with diverse experiences provided sufficient information for a specific problem. There is no definitive number of participants required to conduct a doctoral research project.

Data saturation was realized at the point where no additional new information was uncovered, and answers to the interview questions revealed the same consistent answers. The interview process allowed the researcher to ask clarifying questions to uncover new information. By asking for clarification or follow-up questions, the researcher clearly interpreted the accuracy of the answers provided by participants. Once the researcher completed the transcripts, the participants were provided with the opportunity to review their answers during a separate interaction. A major factor in the legitimacy of a doctoral research project is data saturation. It is the researcher's responsibility to ensure that the data is sufficient. By emerging the data from participants, I was able to fill the gaps in business practices to address the research question appropriately.

The process for selecting participants includes identifying at least six fire department leaders who manage or have managed fire department operations for at least 5 years along the East Coast of the United States. It is suitable for the researcher in qualitative, doctoral research project to use a sample size comprising of six participants (Alhazmi & Kaufmann, 2022). The participants had to meet the eligibility criteria to participate in the research project. The selection criterion for participants included

firefighter station officers with at least 5 years of experience and who manage or managed fire department operations. The establishment of criteria for research studies safeguards that the participants have the necessary experience required to provide critical data for the doctoral research project, as discussed in the research conducted by Borjesson et al. (2024).

The eligible population in this doctoral research project was fire department leaders in the fire department that I met and became familiar with during my tenure as an emergency medical technician volunteer and was familiar with the strategies cost-effective strategies that these fire department leaders implemented as part of the effort to reduce the SCD among on-duty firefighters. Before beginning any activity with participants, each participant will be required to sign a written consent form. The purpose of the written consent form is to ensure ethical standards are followed and to verify that participation is voluntary. Initial contact with participants begins once the fire chief provides me with the list of participant names and contact information. Research phenomenon initiates the beginning of the doctoral research study's participant conditions (Moustakas, 1994).

The interview protocol and the interview questions are in the Appendix. Each interview was conducted under strict compliance with the interview protocol to maintain consistency with the interview process. During the interview process, it was essential to maintain the integrity of the research project (Ramanadhan et al., 2021). Interview protocols ensure consistency across all participants, regardless of the format used for the interaction. For example, Basahel (2021) utilized standardized protocols when selecting

virtual employees to ensure each candidate was evaluated using the same questions and procedures.

I used the same interview questions for each participant, maintaining consistency. As with other researchers, I used the same set of questions for each participant, maintaining the integrity of the research project. Interview questions guided me and kept data collection on track (Thomann & Maggetti, 2020). Researchers ensure reliability when they maintain a primary set of research questions used for each participant.

### **Data Collection Activities**

Interviews for this doctoral research project occurred in an environment free of distractions and interruptions, such as conference rooms, offices that offered privacy, as well as neutral locations on or off premises. I advocated for a peaceful environment that was free from distractions and fostered a calm atmosphere. With the primary goal of the doctoral research project as protecting the integrity of the research project as well as the identification of the participants, a tranquil place supports the qualitative research study goals. Data collected during the interviews were used to form the themes for this doctoral research project.

The data collection process for data collection, analysis, and tracking encompassed Excel spreadsheets, the voice recording feature of a cell phone, and hardcopies of journal notes. Hardcopies of journal notes provide a mechanism for the researcher to record personal remarks regarding the participants' interviews. They also serve as a repository for any files or company records shared during the interview process. Documents such as standard operating procedures, training courses, training

curriculum, and statistical metrics will enable a richer appreciation and understanding of the existing strategies. An effective data organization technique is an organizational tracking system that enables the researcher to maintain the artifacts collected and in an orderly manner (Laurisz et al., 2023). The use of an organizational tracking system is for the purpose of safeguarding the participants' anonymity and confidentiality. It fosters an organized arrangement for storing data and convenient retrieval.

The security of the doctoral research project data were enabled by saving the research project material on my secure, home computer hard drive. The computer is housed in a locked, fireproof file cabinet drawer within my home office. Backup files were created as data collection expanded, and after each participant completed the interview process. There are two keys available to the file cabinet drawer. One key is locked away in a safe that I have in my home. The other key is locked in a safety deposit box at a bank less than a mile from my home. All hard copies of the doctoral research project data and interview notes will remain secured for a minimum of 5 years following the conclusion of the research project. Interviews for the qualitative research study occurred in an environment free of distractions and interruptions. Securing a peaceful environment that is free from distractions fostered a calm atmosphere, according to Saunders et al. (2015). With the primary goal of the study as protecting the integrity of the study as well as the identification of the participants, a tranquil place supports the qualitative research study goals.

Interviews started with a review of the interview procedures as noted in the interview protocol Step 1 (see Appendix) to obtain a deeper appreciation of the

participants' responses. Semistructured questions were asked to solicit information and ignite additional or new views from participants (Arar & Saiti, 2022).

I used a mobile device with an audio setting for data collection and note-taking, as well as for storing raw data with hard copies of journal notes. I transcribed the interviews using Microsoft Office Suite and saved a copy of the consent notifications. Both the nonverbal communication of participants and written notes added value to the process of data collection, as described by Maurer et al. (2022). I clarified imprecise participant responses to gain an accurate understanding of the response.

The interview phase of the doctoral research project took place virtually from within a conference room or office. The interviews employed the face-to-face method at the convenience of the participant's schedule. A quiet location where there are no distractions is the ideal interview setting. An alternative location was not required.

The data collected for the doctoral research project will be leveraged to explore the cost-effective leadership strategies employed to help reduce SCD statistics among on-duty firefighters.

### **Interview Questions**

1. How do you develop cost-effective strategies to reduce SCD events while inspiring and motivating your team to embrace these changes and take ownership of prevention efforts?
2. When integrating policy changes and updating standard operating procedures aimed at reducing SCD, which transformational leadership styles—such as idealized influence, inspirational motivation, intellectual stimulation, or

individualized consideration—do you prioritize, and how do they guide your approach?

3. How do you assess the effectiveness of leadership strategies grounded in transformational leadership principles when implementing preventative measures to reduce SCD?
4. In updating strategies and related standard operating procedures, how do you incorporate cost-effective components while intellectually stimulating your team to innovate and improve these processes?
5. As a transformational leader, how do you enhance the physical fitness of active firefighters to mitigate SCD episodes, particularly through fostering motivation, individualized support, and a shared vision for health and safety?
6. What equipment-changing strategies, including the use or modification of personal protective equipment (PPE), do you employ to mitigate SCD episodes among active-duty firefighters, and how do you use transformational leadership to encourage adoption and continuous improvement of these strategies?
7. What else can you share with me about your strategies to reduce SCD among on-duty firefighters?

### **Data Organization and Analysis Techniques**

Using the qualitative approach, I focused on comprehensive data collection utilizing semistructured interviews to address observable facts through open-ended questions and exploring the data to identify outcomes and conclusions (see Ryan, 2018;

Saunders et al., 2015). Thematic analysis was selected as the data analysis method for this research project, aligning with the framework established by Yin (2015). This process involved exploiting numerous data sources—including semistructured interviews, organizational documents, and historical records—to cross-reference findings and identify comparable results (Adra et al., 2024; Lim & Moon, 2024; Tomaszewski et al., 2020). I employed methodological triangulation to articulate a thorough understanding of the interviews and uphold the integrity of the study (Alhazmi & Kaufmann, 2022; Gibbs et al., 2025; Heinemann et al., 2024; Lemstra & Aurélio de Mesquita, 2023). By integrating these diverse evidentiary streams, the research transitioned beyond single-source reliance toward a more rigorous and multifaceted analysis.

To maintain organizational rigor throughout this process, I implemented a structured data management system. I utilized a research log to chronologically document all research activities, methodological decisions, and recruitment milestones. To capture emerging understandings and researcher bias, I maintained a reflective journal, which served as a critical tool for reflexive thematic analysis by documenting my evolving interpretations of participant experiences (Bode et al., 2021). All data were organized through a cataloging and labeling system using standardized alphanumeric codes (e.g., P1, P2...) to protect participant anonymity while ensuring easy retrieval during the cross-referencing phase.

The data collection phase employed open-ended, semistructured interview questions to capture observable facts and explore participant experiences, a strategy

consistent with the methodological standards of Saunders et al. (2015). Through the application of reflexive thematic analysis, I facilitated a comprehensive cross-referencing of data points to identify significant outcomes and emergent conclusions (Adra et al., 2024; Ramanadhan et al., 2021). In accordance with Walden University's Institutional Review Board (IRB) standards and data integrity protocols, all raw data—including audio recordings, transcripts, and personal notes—will be stored in a secure, encrypted digital environment for a minimum of 5 years post-study completion, after which they will be permanently destroyed. Ultimately, the application of methodological triangulation and these systematic tracking protocols provided a thorough understanding of the interviews and ensured the overall integrity and validity of the pragmatic research project.

The first step of the data analysis process involved immersion in the data by transcribing and reading each transcript to determine repetitive or common words or phrases (Arar & Saiti, 2022). The second step required identifying and categorizing data into initial groups (Arar & Saiti, 2022). This categorization process was iterative and not limited to a single occurrence (Thomann & Maggetti, 2020). The third step involved data coding, which required detailed scrutiny of the interviews and field notes to classify themes based on commonalities. Using the principles of qualitative analysis, I identified existing patterns and commenced classifying them through an exhaustive examination of the data and relevant literature (Thomann & Maggetti, 2020).

In the fourth step, I reconstructed the data by coupling identified codes and patterns using Excel spreadsheets to convey the primary message of the collected data. During this stage, I engaged in bracketing to set aside personal prejudices and analyze the

issue for its absolute value (Moustakas, 1994). The fifth step focused on the clarification and mapping of findings. By using classification structures, I provided transparency and correlated findings with the literature and conceptual framework to confirm validity or identify areas for theoretical expansion. This integration was strengthened by incorporating studies published between 2021 and 2026 to ensure the discussion reflects the current state of the field (Alhazmi & Kaufmann, 2022; Lim & Moon, 2024). All data will be safeguarded for at least 5 years, after which electronic files will be permanently deleted and physical records shredded to ensure destruction.

### **Reliability and Validity**

#### **Reliability**

The objective of reliability and validity is to bring credibility to all sections of the research study and present a complete project. This section represents the use of consistent data collection and demonstrates that engagement with participants follows a consistent, logical interview protocol (Appendix). The doctoral research project conveys credibility, transferability, and conformity through reliable and valid research data collection and analysis techniques.

An integral part of the dependability of the research project is integrity (Leduc et al., 2022). I conducted member checking as a two-fold procedure. The initial procedure was conducted after the transcript was completed by summarizing each of the interview questions, following the participant's answer, and requesting confirmation that I had accurately interpreted their response to the question asked. The second procedure I conducted was scheduling a second meeting with each participant to review the complete

transcript and verify the accuracy. The purpose of the initial step, member checking, was to reduce errors or misinterpretations in the research. By conducting a data review, the researcher expands the precision of the participants' responses. The importance of presenting participants with my interpretations was to affirm the accuracy of my interpretation.

### **Validity**

One of the most critical aspects of a doctoral research project is validity. The integrity of the research project is hinged on safeguarding the validity throughout the research process. The validity of raw data is reinforced by the consistent tactics used to address any interpretation issues regarding the validity of the study. I addressed the validity of my project by observing any indication of personal bias by participants. Personal bias may include voice tone, body language, and anxiety (Hendricks et al., 2023). I applied in-depth questioning techniques to foster the maintenance of validity. In-depth questioning techniques helped to ensure validity. Reviewing the content to confirm that I coded the responses by participants is pertinent or not applicable to the research question is another technique I used for ensuring validity.

### ***Credibility***

To establish the rigor of a research project and ensure findings are reliable, researchers often emphasize the importance of achieving "credible assurances" or trustworthiness (Drisko, 2025). In qualitative research, this is frequently operationalized through the concepts of credibility and dependability to solidify the pragmatic value of the study (Drisko, 2025). Member checking fostered credibility in my reviews of the

summarized responses obtained during the interviews. I scheduled additional interviews with participants to verify and validate the accuracy of the researcher's interpretation. Member checking is the technique I employed before the data analysis phase. Integrity was an integral part of the research project's dependability (Leduc et al., 2022). Member checking was conducted as a two-fold procedure. The initial procedure was conducted after each transcript was completed by summarizing each interview question following the participant's answer and requesting confirmation that the interpretation of their response was accurate. The second procedure involved scheduling a second meeting with each participant to review the complete transcript and verify its accuracy. The purpose of this initial step of member checking was to reduce errors or misinterpretations in the research. By conducting a data review, the precision of the participants' responses was expanded, and presenting interpretations to participants affirmed the accuracy of those interpretations.

Achieving credible assurances was essential to solidifying the pragmatic research project. Member checking fostered credibility in that the reviews of the summarized responses were obtained during the interviews. Additional interviews were scheduled with participants to verify and validate the accuracy of the researcher's interpretation. Member checking was the technique employed before the data analysis phase. As part of the member checking process, a review of the recorded interviews and transcripts was coordinated with participants to foster accuracy and eliminate errors between the audio-recording and the transcripts.

Methodological triangulation was used to compare notes, themes, and other accumulated documentation related to the pragmatic project. This approach is employed by researchers to enable the credibility of the research study. Research questions, interview questions, notes, and achieved documentation consisted of some of the types of data considered in methodological triangulation. All were vital data elements for upholding the integrity of the study (Alhazmi & Kaufmann, 2022). The use of information from a variety of data collection sources may serve to close gaps in business practices.

### ***Transferability***

Transferability is a vital component of research as it enables future researchers to extend the current findings to other contexts. By providing dense descriptions and detailed assumptions, this doctoral research project allows subsequent investigators to determine the applicability of the results to their own settings and ensures alignment with related conceptual frameworks. Transferability helps capture the meaning of the research and supports the development of future research (Drisko, 2025). According to the research conducted by Stalmeijer et al. (2024), transferability may change the research result, as research data may change when the next generation takes on the research.

### ***Confirmability***

Confirmability serves as a measure of neutrality, ensuring that research findings are derived directly from participant data rather than researcher bias (Ahmed, 2024; Lim, 2024). To maintain focus on the research data, I utilized reflexive journaling to document personal thoughts and assumptions, a practice that fosters transparency and ensures

findings remain grounded in the participants' narratives (Tariq, 2025). Confirmation and verification processes were further employed from the initial stages of data collection through to the conclusion to resolve potential contradictions and prevent the contamination of the study's results (Ahmed, 2024; Lim, 2024).

### ***Data Saturation***

In qualitative research, a fundamental indicator of study legitimacy is the attainment of data saturation, which occurs when no additional new information is uncovered and responses to interview questions yield consistent, redundant data (Lim & Moon, 2020; Tariq, 2025). During the interview process, I utilized clarifying and follow-up questions to ensure the accurate interpretation of participant responses. To further enhance the rigor and credibility of the findings, I employed member checking, a technique where participants are allowed to review their completed transcripts during separate, scheduled meetings to verify the accuracy of the researcher's interpretations. By synthesizing this data and ensuring it reached a point of sufficiency, I worked to address information gaps relevant to the research question (Lim & Moon, 2020; Tariq, 2025).

I used methodological triangulation to compare notes, themes, and other accumulated documentation related to the project. Methodological triangulation is employed by researchers to enable the credibility of the research study. Research questions, interview questions, notes, and achieved documentation consist of some of the types of data considered in methodological triangulation. All are vital data elements for upholding the integrity of the study (Alhazmi & Kaufmann, 2022). The use of information from a variety of collection data sources may serve to close gaps in the

research. The data collection process for the pragmatic project involved interviews, member checking, and methodological triangulation with existing fire officers.

### **Transition and Summary**

Section 3 modeled the complete design and purpose of the qualitative pragmatic inquiry research project. Elements of the project include the role of the researcher, the assortment of the data criteria, and the research methodology the researcher will use for employing the selection criterion for participants. This section contained a detailed presentation of the level of effort needed to collect data and perform data analysis.

Section 3 describes both the methodology and the approach the researcher will use to certify the validity and reliability of each phase of the research project. I used triangulation in the research technique to maintain the integrity of the research project.

Section 4 presents the conclusion of the qualitative doctoral research project with the results from the data collected obtained through interviews, assumptions, relevance of the study to professional practices, implications for social change, and recommendations.

## Section 4: Findings and Conclusions

### **Presentation of the Findings**

The purpose of the qualitative pragmatic inquiry project was to explore how fire department leaders used cost-effective strategies to reduce SCD episodes among on-duty firefighters. This research project addressed the primary question: What cost-effective strategies do fire department leaders employ to reduce the number of SCD episodes among active-duty firefighters? Through semistructured interviews with six fire department leaders (P1–P6) and methodological triangulation of the data, three distinct themes emerged that illustrate how leaders navigate the complexities of firefighter mortality. Findings from Theme 1: Firefighter Health and Wellness support a direct correlation between transformational leadership and improved health outcomes, emphasizing that fostering psychological safety and personal accountability mitigates stress and traumatic exposure contributing to sudden cardiac events. The data for Theme 2: Implementing and Sustaining Firefighter Programs revealed that while initial implementation of wellness initiatives is critical, long-term success depends on leadership's ability to integrate cost-effective pillars like peer fitness training and nutritional education into a paramilitary culture to maintain operational readiness. Finally, Theme 3: Sustainable Program Management is supported by evidence regarding the strategic use of limited resources, underscoring that effective management requires proactive financial policies and strategic partnerships, ultimately shifting the departmental model from a reactive stance to a proactive, community-centric institution focused on long-term risk reduction.

### **Theme 1: Firefighter Health and Wellness**

The initial theme identified highlighted the focus on preventative measures to reduce the risk of SCD in firefighters. All the participants (P1, P2, P3, P4, P5, P6). in this capstone research project conveyed that the perceived causes of SCD are attributed to several factors such as undiagnosed cardiovascular disease, obesity, poor physical fitness as well as emotional stress, and exposure to pollutants P1, P2, P3 and P5 participants concurred that having undiagnosed cardiovascular disease is as a leading significant perceived causes of SCD among active-duty firefighters. Participants' respective views included preventative health and fitness strategies, including stress and behavioral health support, as instrumental to firefighter health and wellness.

#### ***Analysis of Participants' Responses***

Firefighters currently face a discrepancy between entry requirements and effective health interventions, as a comprehensive physical exam is not a universal prerequisite for acceptance into the service despite the recognized impact of daily fitness initiatives. P1 stressed that despite efforts to encourage physical fitness and healthy eating habits, this lack of universal mandatory entry screening persists. Conversely, P2, a fire officer, mentioned that the adoption of required daily physical fitness participation was one of the most impactful cost-effective initiatives implemented. In fact, all participants indicated that the adoption of these activities, which included a combination of aerobic activity and strength-building activities, was one of the most influential initiatives overall to combat SCD. It was recommended that the results of these initiatives should be monitored

intensively using various metrics such as sick leave usage, injury on the job, heart-lung related incidents, and attrition rates, among others.

Volunteer firefighters are not required to have a comprehensive physical exam as a prerequisite to being accepted into the fire service, despite P1's emphasis on encouraging physical fitness and healthy eating habits. P2, a fire officer, mentioned that one of the most impactful cost-effective initiatives implemented was the adoption of required daily physical fitness participation. Indeed, all participants indicated that the adoption of required daily physical fitness participation was one of the most influential initiatives. This included a combination of aerobic activity and strength-building activities. Results of these initiatives should be monitored closely using various metrics such as sick leave usage, injury on the job, heart-lung related incidents, among others.

A consistent theme among participants was the importance of establishing mandatory physical examination standards for all firefighters, career, and volunteer alike, as a prerequisite for engaging in operational duties. P1, P2, and P3 all mentioned the necessity of having a fire service board adopt these qualification standards. P6 noted that an initiative to standardize requiring physicals for both career and volunteer personnel had recently been implemented. All participants (P1, P2, P3, P4, P5, and P6) agreed that physical exams are important for determining if any existing significant cardiovascular issues exist, as undiagnosed cardiovascular disease can be triggered by duty-related stressors. P5 concurred with P6 that firefighting involves strenuous physical exertion, such as climbing stairs with heavy gear and performing forcible entry, which increases body temperature and can lead to dehydration and induced cardiac strain.

### ***Public Industry Records Analysis and Methodological Triangulation***

Organizational documents are not typically used in pragmatic inquiry because the focus is on participants' experiences in the industry under the research project. Consistent with P1, P2, P4, and P6 participant responses, I found publicly available policies that focused on firefighter health and wellness. For example, P3's response cited that career and volunteer firefighters are not all subject to the same health and wellness policies. For example, P3 indicated that the policies regarding a physical exam as a prerequisite to joining the fire service only applied to career firefighters and not to volunteers. There was a direct contrast between where physical exams were a mandatory prerequisite for joining the fire service, regardless of volunteer or career status, and a mandatory requirement for maintaining active fire service status.

P1 identified the recognition of carcinogens on personal protective equipment (PPE) as a critical safety strategy. To support this need, the Assistance to Firefighters Grant (AFG) program, established under the Federal Fire Prevention and Control Act and active since 2001, has provided funding for additional sets of PPE. This secondary gear allows firefighters to change out of contaminated equipment immediately after exposure to toxic environments. Furthermore, these grants have funded the acquisition of specialized PPE washing and drying equipment to ensure the proper removal of hazardous substances. National studies indicated that exposure to carcinogens was a leading indicator for increasing cancer rates among firefighters (Sinclair et al., 2023).

There was a 31% decrease in firefighter fatalities between 2023 and 2024 (NFPA, 2025). There were 90 on-duty firefighter fatalities in the United States in 2023 and 62 in 2024 (NFPA, 2024). The decrease in firefighter fatalities was attributed to an increased momentum in improved firefighting practices, policies, and procedures that foster awareness through training and education programs that promote awareness of the perceived causes of SCD among firefighters (NFPA, 2025). As noted by P3, P4, and P5, stress and behavioral health support are additional, essential requirements for encouraging firefighter health and wellness. Examples of some activities the participants mentioned included communication. P4 stated that firefighters need “positive peer pressure support.” P4 explained that following critical incidents, it is important to conduct critical incident stress management to ensure everyone is doing okay both mentally and physically. Not only after a critical incident, but it is always important to invest in getting to know the team by spending time together and being available for one-on-one conversations. Each person on the team is different. They all have other things going on in the background. Providing access to counseling programs, employee assistance programs, nutrition counseling, and encouraging two-way communication all contribute to reducing SCD among on-firefighters. Based on publicly available documentation, P4’s comments proved credible because P4’s district has mandated annual, comprehensive physical exams for all firefighters regardless of career or volunteer status. P4 and P2 concurred that standardizing fit-for-duty from a municipal policy level could serve to identify undiagnosed health risks and provide referral services

for health risk mitigation strategies. Additionally, it would caution those considering firefighting as a career or as a volunteer and encourage them to evaluate the risk factors.

### ***Correlation With the Literature***

According to the research conducted by Wohlgemuth et al. (2024), the firefighting profession is physically demanding, with numerous responsibilities, shift-based work schedules, and restricted recovery time. In 2022, there were 1,041,200 career and volunteer firefighters across 29,452 fire departments in the United States (NFPA, 2024). This demanding effort increases risk for illness, injury, and death for firefighters. In 2022, 34 firefighters died on-duty, which represents a sizable portion of the 96 on-duty deaths that year and were attributed to stress and overexertion (NFPA, 2024).

I found, through Theme 1's outcomes, that each participant focused on perceived causes of SCD and was committed to implementing and maintaining strategies that safeguard firefighter health and wellness. Specifically, P1 and P2 employed strategies such as advocating for health screening to assess the predisposition of cardiac issues. P3 and P4 advocated that policies among U.S. fire departments should be consistent for both career and volunteer firefighters. All participants agreed that peer support programs and access to counseling provided stress and behavioral health support.

All participants agreed that transformational leadership positively correlates with firefighter health and wellness by fostering psychological safety, building trust, and mitigating the detrimental effects of occupational stress and trauma. Although the fire service operates under a paramilitary structure, participants P1, P2, P3, P5, and P6 emphasized that specific leadership styles directly impact personnel's well-being.

Common themes among participants included the importance of nutritional education and peer fitness training as preventative measures for SCD. However, they collectively noted that accountability for health is driven by leadership that utilizes a transformational style to encourage personal responsibility. This finding aligns with evidence from the literature that active, supportive leadership prevents burnout and enhances overall well-being, whereas passive or toxic leadership causes significant harm (Smith et al., 2019). The evidence highlights the essential role of leadership in bridging departmental wellness programs with individual accountability, demonstrating that initiatives such as nutritional education and peer fitness training often fail without leadership engagement. The inclusion of external research (Smith et al., 2019) provided empirical justification, validating that supportive leadership is a primary determinant of health outcomes, thereby offering the necessary emotional and structural support to effectively implement and sustain health initiatives.

The findings provided demonstrate a relationship directly to the theme "Firefighter Health and Wellness" by establishing a clear link between transformational leadership and tangible health outcomes. This relationship is a central component of the theme because it outlines how leadership explicitly affects wellness through mechanisms like fostering psychological safety, building trust, and mitigating occupational stress and trauma—critical aspects of mental and emotional well-being in a high-stress occupation. Furthermore, the evidence highlights the essential role of leadership in bridging departmental wellness programs with individual accountability, demonstrating that initiatives such as nutritional education and peer fitness training often fail without

leadership engagement. The inclusion of external research provides empirical justification, validating that supportive leadership is a primary determinant of health outcomes, thereby offering the necessary emotional and structural support to effectively implement and sustain health initiatives.

### ***Correlation to the Conceptual Framework***

The conceptual framework of transformational leadership (Burns, 1978) provides a critical foundation for Theme 1, as it underscores how fire officers utilize trust and emotional safety to mitigate occupational stressors. By aligning leadership influence with mental health awareness, transformational leadership empowers firefighters with the coping strategies necessary to improve overall health and wellness outcomes (Lim & Moon, 2024; T. D. Smith, DeJoy, & Dyal, 2020). This theoretical approach facilitates a shift from reactive management to a supportive organizational culture that prioritizes the physical and psychological resilience of the workforce.

Compared to passive leadership, which can serve to increase anxiety and stress, TL serves to engage, sympathetic, compassionate leadership that contributes to the mental health of firefighters. Acting as a mitigation strategy that supports a climate of safe communication exchange and fosters emotional protection against intense job demands, TL promotes supportive leadership. Supportive leaders provide a buffer to traumatic impressions and assist firefighters with managing intense emotional demands that contribute to burnout syndrome. TL is thought to be embedded in psychology and has a safety-oriented form that is positively associated with firefighter safety motivation and effective use of PPE. By infusing a sense of purpose and fostering self-motivation

among firefighters, transformational leaders can promote safety behaviors and indirectly decrease safety events, such as SCD, resulting from compromising safety engagements.

## **Theme 2: Implementing and Sustaining Firefighter Programs**

The second theme identified is implementing and sustaining firefighter programs. Successfully implementing and sustaining firefighter programs requires a systematic approach that integrates core management principles with the specialized demands of the fire service. Effective programs rely on strategic stakeholder collaboration, robust resource management—including specialized technology—and the development of evidence-based interventions like comprehensive wellness initiatives. Long-term success is further driven by progressive, realistic training and a commitment to transparent communication, all supported by data-driven evaluations through Key Performance Indicators to ensure continuous improvement and organizational resilience. The analysis of the data retrieved through semistructured interviews correlated with the literature view in support of fire departments' need for a systematic approach that integrates core management principles with specialized demands for fire services, for implementing and sustaining firefighter programs.

### ***Analysis of Participants' Responses***

Theme 2 identified the importance of implementing and sustaining firefighter programs that foster a long-term decrease in SCD among on-duty firefighters.

All the participants (P1, P2, P3, P4, P5, P6) in this doctoral research project conveyed a perception that leadership commitment to wellness needs to be modeled by healthy behaviors demonstrated by fire service leaders. P1 and P3 expressed that when

fire chiefs participate in physical fitness activities, it demonstrates the fire departments' commitment to wellness. P4 and P5 conveyed leadership participation, encouraged engagement, and accountability. P3 and P4 discussed policy and program implementation from a tracking outcomes and perspective, and communicating fitness scores and incident data as a mechanism for improvement for programs in existence and programs being considered for implementation. P1, P2, P3, and P5 participants in the study concurred that some barriers and challenges to implementing and sustaining firefighter programs include budget limitations, training schedule conflicts, and cultural resistance. Nevertheless, participants acknowledged that personal accountability translates to participating in the programs that are offered. Programs that lack participation are not cost-effective strategies that serve to reduce SCD statistics. All participants concurred in leadership's commitment to wellness and communicating health and wellness priorities as critical to fostering engagement among firefighters. P4 and P5 also agreed that a standardized feedback mechanism was important to know how to adjust programs versus eliminating them due to lack of participation.

### ***Public Industry Records Analysis and Methodological Triangulation***

I located publicly available information from websites and fire service associations. I used information from Theme 2 to conduct methodological triangulation and was able to validate some of the information that the participants shared with me. I compared data specific to implementing and sustaining firefighter programs and policies specific to the location, based on the narrative provided by each participant.

All participants provided consistent responses relating to leadership and safety, policy program and implementation, and barriers to implementing and sustaining firefighter programs, such as budget constraints and the lack of personal accountability. I was able to substantiate P1, P2, P4, and P6 participant responses following an evaluation of public records.

I was able to substantiate P3, P4, and P5, and identified policies that focused on firefighter health and wellness. However, there were significant differences. While most locations have implemented sustainable programs, the availability and sustainability of the programs prove significantly different due to individual fire departments' variances, state-level legislation, funding, and collaboration with local and national organizations. I was able to correlate the information shared by participants with Wohlgemuth et al.'s (2024) research on strategies for improving firefighter health that consider the need to implement standardized sustainable programs, such as feasible training models to reduce SCD statistics among on-duty firefighters.

### ***Correlation With the Literature***

Implementing and sustaining firefighter programs requires a systematic approach that aligns general management principles with the unique demands of fire service operations. Effective programs that focus on strong leadership, a clear planning process, ongoing training, and a commitment to health and safety can prove cost-effective in reducing the future high cost of firefighter injuries and fatalities. Research conducted suggested integrating strategies to implement sustaining firefighter health and wellness programs, specifically studies that demonstrated effectiveness, aligns with Theme 2.

There was a consensus among the participants that the robustness of the programs initiated and sustained was significantly associated with leadership support as well as the advocacy of local firefighters. P4 and P2 participants noted the same motivational factor by referring to it as “positive peer pressure. Additionally, the arrangement fosters job-related physical fitness as a core component that is advocated by standard NFPA 1500, which is the regulatory framework for occupational safety and health, which mandates the minimum for health and safety programs based on the inherent physical demands of the job. All participants seemed knowledgeable about the NFPA 1500 standard, but had opposing opinions on some updates to the standard. P1, P2, and P4 cited that changes made to the physical fitness baseline should not be influenced by recruiting metrics.

Mental health support involving access to resources like employee assistance programs correlates with the literature addressing the high levels of operational stress and anxiety inherent in firefighting. Research conducted by Hendrix et al. (2023) indicated that physical and mental health among firefighters showed an increased risk of SCD due to heart disease and other physical health-related conditions. Hendrix et al. also identified suicide risk, depression, anxiety, and an increase in substance use. By leveraging insights from participants and peer-reviewed sources, fire service leaders can focus their implementation and sustaining program objectives to foster a sustainable cultural change within the department that benefits both individual health and operational effectiveness.

### ***Correlation to the Conceptual Framework***

Transformational leadership and safety in the fire service involve prioritizing health, understanding resource allocation, and providing encouragement and support for

compliance with safety standards. When fire service transformational leaders proactively support safety and wellness programs, it promotes a positive organizational culture. Transformational leadership communicates a clear message that fire service leadership prioritizes the health and well-being of firefighters equally to the priority of operational training. TL empowers fire department leaders with an understanding of long-term, cost-effective benefits of health and wellness programs. Fire department leaders can more effectively advocate and allocate funding resources for medical exams, fitness equipment, gym memberships, and nutritional and mental health programs that represent the essential elements of an overarching safety and wellness program.

Compliance with the standards of operation and safety reduces the risk factors for SCD. TL assists with established safety standard implementation, such as NFPA 1500, which provides baseline requirements for compliance with operational and safety programs. The intended establishment of safety standards is as a mitigation strategy for financial impacts that result from incidents. Compliance with comprehensive policies that seek to address underlying atherosclerosis and other risk factors like obesity that contribute to SCD needs to align with formal wellness programs that include consistent physical training, nutrition education, and medical screening as part of a scheduled physical examination at least on an annual basis. TL supports a proactive approach to assist firefighters with understanding their medical status and how to manage it. Early identification and intervention promote compliance with health and wellness policies and are a cost-effective strategy to reduce SCD episodes (Clark et al., 2023). Still, there is more to early identification and intervention compliance. TL encourages the examination

of operational levels. Overexertion is a leading stress factor that contributes to cardiac events. Appropriate staffing levels prevent overexertion. Adequate staffing provides firefighters with on-scene monitoring of vital statistics necessary during rehabilitation and helps manage contaminant exposure. All the activities that firefighters conduct on-scene require adequate staffing policies to be in place. Health and safety policies alone, even when combined with staffing protocols aimed at reducing SCD, are insufficient to fully mitigate risks; effective implementation requires TL. TL promotes proactive engagement and transparent communication among firefighters, first responders, and budget administrations to identify and overcome systemic barriers, demonstrate departmental value, and secure sustainable funding for critical safety initiatives. This leadership style drives the fortification and implementation of effective health and safety programs, functioning as a cost-effective strategy with substantial positive long-term impacts on the well-being of firefighters and departmental financial resources. TL drives effective leadership to implement and sustain effective health and safety programs via the fortification of transparent policies, which function as a cost-effective strategy with substantial long-term, positive impacts on firefighters' lives and financial resources. Supportive leaders drive organizational advances and promote health and well-being (Clark et al., 2023).

### **Theme 3: Sustainable Program Management**

The third theme identified is sustainable program management. Sustainable program management reduces SCD among firefighters by transitioning from reactive emergency spending to initiative-taking, cost-effective prevention. This approach relies

on transformational leaders who foster a culture of wellness and accountability, ensuring long-term participation in evidence-based initiatives like regular medical screenings and fitness evaluations. By optimizing resource allocation and utilizing data-driven adaptive management, departments can continuously refine their strategies to incorporate new research and feedback. These integrated health and wellness programs protect personnel while providing significant financial savings through the mitigation of cardiovascular risks and associated operational losses.

### *Analysis of Participants' Responses*

Theme 3 emphasized implementing and sustaining firefighter programs that foster a long-term decrease in SCD among on-duty firefighters. All the participants (P1, P2, P3, P4, P5, P6) in this research project conveyed a perception that leadership commitment to wellness needs to be modeled by healthy behaviors demonstrated by fire service leaders. P1 and P3 expressed that when fire chiefs participate in physical fitness activities, it demonstrates the fire departments' commitment to wellness. P4 and P5 conveyed leadership participation, encouraged engagement, and accountability. P3 and P4 discussed policy and program implementation from a tracking outcome and perspective and communicating fitness scores and incident data as a mechanism for improvement for programs in existence and programs being considered for implementation. P1, P2, P3, and P5 participants in the study concurred that some barriers and challenges to implementing and sustaining firefighter programs include budget limitations, training schedule conflicts, and cultural resistance. Nevertheless, participants acknowledged that personal accountability translates to participating in the programs that are offered.

Programs that lack participation are not cost-effective strategies that serve to reduce SCD statistics. All participants concurred in leadership's commitment to wellness and communicating health and wellness priorities as critical to fostering engagement among firefighters. P4 and P5 also agreed that a standardized feedback mechanism was important to know how to adjust programs versus eliminating them due to lack of participation.

All participants consistently recognized the universal importance of leadership's commitment to the long-term management of sustainable health and wellness programs. While some specifically identified budget limitations as a potential barrier to these efforts, a consensus emerged on a practical, no-cost solution: all participants agreed that fire departments could continue vital training initiatives through in-house peer fitness programs, even when external funding is unavailable.

Sustaining firefighter programs is incumbent upon firefighter personal accountability. I was able to substantiate P1, P2, P4, and P6 participant responses following an evaluation of public records. I compared each participant's narratives to fire department disclosures via websites. I found no formal supportive evidence for tracking outcomes such as program attendance, feedback mechanisms, or lack of leadership buy-in. Participants indicated that program participation is not tracked consistently among districts. P3 stated that there were no policies that required volunteer firefighters to participate in health and wellness programs. Career firefighters often lack a mandate to participate in formal health and wellness programs. Participants P3, P4, and P6 noted that

in rural areas, much of the workforce consists of volunteers who must balance fire service duties with full-time external professional responsibilities.

Budget constraints and data-informed program adjustments need to align with the policies and procedures that support the existing population of firefighters assigned to support a jurisdiction. I was able to substantiate the disparate elements in health and wellness policies in some jurisdictions.

I was able to substantiate P3, P4, and P5, and identified policies that focused on firefighter health and wellness. However, there were significant differences. While most locations have implemented sustainable programs, the availability and sustainability of the programs prove significantly different due to individual fire departments' variances, state-level legislation, funding, and collaboration with local and national organizations. I was able to correlate the information shared by participants with Wohlgemuth et al.'s (2024) research on strategies for improving firefighter health that consider the need for sustainable programs, such as feasible training models to reduce SCD statistics among on-duty firefighters.

### ***Correlation with the Literature***

Sustainable program management requires fire service leaders to adopt a systematic approach that aligns funding opportunities with health organization partnerships and leverages existing resources to ensure cost-effective resource management. Effective programs require a top-down leadership approach that follows a clear, transparent planning process that demonstrates commitment to health and safety. Additionally, program evaluation and continuous process improvements need to include

tracking outcomes such as incident data or fitness scores and provide avenues for a feedback mechanism for the firefighter populations to express their voice. Cost-effective program management to reduce SCD fosters program sustainability if the evaluation reduces the future high cost of firefighter injuries and fatalities. Research conducted by Kuehl et al. (2013) proposed integrating strategies to implement sustaining firefighter health and wellness programs, specifically, studies that demonstrated that peer-led, team-based interventions and culturally informed mental health support significantly reduce post-traumatic stress symptoms and work-related injuries while improving long-term behavioral health durability. Recent research published by Azadehyaei et al. (2025) supports the 2013 findings of Kuehl et al. on implementing firefighter health and wellness programs. This body of work indicates that peer-led, team-based interventions leveraging fire station culture and tailored management strategies are durable and yield substantial returns on investment by reducing absenteeism and psychological injuries, particularly with strong leadership and administrative support.

### ***Correlation to the Conceptual Framework***

Sustainable program management assists fire service leaders with employing cost-effective strategies to reduce SCD among on-duty firefighters. The approach highlights long-term prevention through health and wellness initiatives, efficient resource allocation, and adaptive management, ultimately reducing the high costs associated with cardiac events among on-duty firefighters.

A transformational leader plays a crucial role in making health and wellness programs sustainable and cost-effective (Irshad et al., 2021). TL serves to motivate and

empower firefighters to actively participate in wellness activities and take accountability by fostering ethical role models and inspiring cultural changes where health and well-being are central organizational values that are crucial for program sustainability.

Resource allocation and effective management of resources have a direct impact on cost-effectiveness. Cost-effective strategies for firefighter health involve shifting from reactive spending on emergency care and benefits to proactive investment in preventative health and fitness programs, which can prevent significant costs associated with medical events and personnel loss. This approach includes targeted, evidence-based programs like regular medical screenings and fitness evaluations, as well as optimizing staffing and operational policies to mitigate risks such as hyperthermia and cardiovascular strain during duty.

Sustainable firefighter health programs evolve through continuous improvement to maintain cost-effectiveness and relevance. This involves using data from health assessments and incident reports to make informed, data-driven decisions that maximize the return on investment in reducing cardiac events. Adaptability is crucial, as leaders must incorporate new research and best practices, such as those outlined in the National Fallen Firefighters Foundation's (NFFF, 2024) 16 Life Safety Initiatives, to ensure strategies remain effective against evolving challenges. Finally, establishing feedback loops allows for firefighter input, which improves participation rates, fosters a culture of shared responsibility, and ultimately helps protect lives while providing substantial financial savings to fire departments.

### ***Public Industry Records Analysis and Methodological Triangulation***

I located public, available information about the participants' organizations from respective websites and fire service associations. I used information from all themes to conduct methodological triangulation. The information assisted me in validating some of the information that the participants shared with me. I compared data specific to sustainable program management within the fire service, such as cost—effective resources management offered via grants and external funding opportunities specific to location, based on the narrative provided by each participant. I examined program evaluation methodologies and policies and procedures that foster continuous improvement.

### **Business Contributions and Recommendations for Professional Practice**

Based on my findings, I found strategies that fire department leaders were using some cost-effective to reduce SCD statistics among on-duty firefighters. I added to the existing gap in business practices the actual strategies leaders were using to overcome the challenges of mitigating the risk of SCD episodes through tenets of Burns (1978) transformational leadership (TL) theory. Three themes emerged from the central research question using interviews with participants. My themes included (a) firefighters' health and wellness, (b) implementing and sustaining firefighter programs, and (c) sustainable program management. The three themes highlighted significant interlocked perspectives. The data presented perspectives that, when combined as a unified approach, can be interpreted as a strategy to mitigate fatality risk and decrease statistics related to SCD among on-duty firefighters. The intersecting aspects of the themes presented three

specific arguments: (a) fire department administration strategies, (b) individual firefighters, and (c) awareness and education about SCD.

Strong fire service leadership support for implementing, sustaining, and effectively managing health and wellness programs represents a top-down approach for establishing support programs. Support programs need to incorporate mental health and physical well-being as part of the overall health and wellness approach. The participants in this research project shared ways fire service leaders could leverage cost-effective strategies to reduce SCD among on-duty firefighters. These findings offer cost-effective strategies for fire service leaders of any organizational size to reduce on-duty sudden cardiac deaths (SCD). Because the leadership factors identified by Burns (1978) are not industry-specific, these results are also applicable to organizations outside the fire service.

I make several recommendations along with actionable steps based on my findings in this research project. The first recommendation underscores the importance of all firefighters' health and wellness by improving productivity and cost savings efforts. Investing in firefighter wellness programs yields a return on investment by reducing SCD rates (Chen et al., 2023). To expand on this recommendation, fire service leaders need to proactively champion efforts to position safety as a primary operational requirement. Establishing mandatory comprehensive fitness programs and regular health screenings, as well as providing integrated workday fitness opportunities, are program investment objectives. Championing health and wellness programs, including providing confidential access to mental health professionals, is an essential component to address mental health

issues. Inclusive of health and wellness efforts is a strategic overview of shift schedules and hygiene protocols. The effective use of PPE and decontamination protocols is significant to reducing hazardous exposures, which contribute to SCD events. These programs demonstrate a fire department's commitment to its personnel and align with recognized standards like the NFPA 1500 on Occupational Safety, Health, and Wellness, which also help ensure safety compliance.

The fire service expends significant time and effort in recruiting and training firefighters. Firefighter attrition rates can serve as a barometer for retention and organizational health, long-term stability, and effectiveness of public services (Aabdien et al., 2022; United States Fire Administration, 2023): Retention and Recruiting for the Volunteer Emergency Services (FA-361)). The second recommendation, implementing business-like practices, such as cultivating a supportive work environment, enhances recruitment and retention by making an organization more attractive to potential hires and encouraging experienced personnel to stay, which is critical for maintaining the healthy, qualified staffing necessary for public safety operations.

Implementing and sustaining firefighter programs demands cost-effective program management and strong transformational leadership support; with fire chiefs leading initiatives and modeling cost-effective health and safety behaviors is a third recommendation. Firefighter programs need to incorporate integrated health and wellness learning with all training practices and protocols, starting with day-one at the fire academy. Initiating awareness about health and wellness from the start of firefighter tenure is a key to motivating personal accountability and implementing positive, healthy

behavior. TL promotes interactive, cross-domain training peer support. This interlocked team provides support for firefighters who experience mental and emotional challenges without the stigma that is often associated with mental health issues (Hendrix et al., 2023).

Program effectiveness can be measured and monitored via data-driven, empirically supported health and wellness-based practices such as trending health outcomes (Shahaab et al., 2023). Analysis of data-driven trending statistics influences the sustainability of effective program management and safeguards consistent funding for continuous operation. Ensuring the long-term management and sustainability of fire service programs requires a formalized and standards-based approach to structure and funding. This involves establishing clear standard operating procedures that define specific roles and accountability, and securing dedicated, consistent funding to guarantee program continuity and stability. Adherence to best practices is vital, necessitating the adoption of guidance from authoritative organizations such as the NFPA, the USFA, and the NIOSH (2020). Proactive program management also involves leveraging these initiatives to enhance recruitment and retention efforts, as a supportive and well-structured environment attracts new talent and encourages experienced personnel to remain with the service. Ultimately, this leads to healthier, more qualified staff and improved operational readiness and performance, thereby ensuring the optimal use of public funds and building essential community trust through strategic partnerships.

### **Implications for Social Change**

The purpose of the qualitative pragmatic inquiry project was to explore how fire department leaders used cost-effective strategies to reduce SCD episodes among on-duty firefighters. This doctoral research project's potential contributions to social change were to appeal to firefighter leaders the promotion of cost-effective leadership strategies that reduced fatalities among on-duty firefighters resulting from SCD and to foster effective financial policies that supported proactive measures that offset the impact one less firefighter made on a community. Social change was the positive or negative altering of a social structure or the aspects of a social structure over time (Vadrot, 2020). The U.S. relies on over a million career and volunteer firefighters (NFPA, 2020) to implement emergency operations. Promoting constructive leadership strategies among fire department leaders and adopting innovative, cost-effective leadership strategies and effective financial management policies might have provided some fire departments with the opportunity to positively impact the trending statistics of SCD in on-duty firefighters. Effective leadership practices within the fire department contribute to positive social change by changing the department from reactive to a proactive emergency-response-only model and advocating a community-centric institution that builds public trust and resilience (Giessner et al., 2023). This strategic shift is widely recognized as essential for the modern fire service to remain relevant and effective, moving beyond traditional emergency response metrics to a model that emphasizes prevention and long-term community safety.

Effective fire department leaders champion Community Risk Reduction (CRR) initiatives, strategically tackling the underlying causes of emergencies. They achieve this through a coordinated approach that incorporates data-driven interventions, public education, and the formation of strategic partnerships (USFA, 2021, p. 1). This strategy is a cornerstone of the USFA's national initiative for risk reduction, which promotes the use of data, public education, and strategic partnerships as essential elements of a modern fire service approach. The implementation of CRR represents a data-driven process that allows departments to better identify and mitigate local risks before they result in emergencies, enhancing overall community awareness and safety.

### **Recommendations for Further Research**

The purpose of this qualitative pragmatic inquiry project was to explore cost-effective strategies that fire service leaders used to reduce SCD among on-duty firefighters. To address the disproportionately high rate of SCD within the service, three recommendations for future research and implementation have emerged:

- **Mandate Holistic Wellness and Stringent Medical Oversight:** Future initiatives must prioritize holistic fitness programs and investigate the implementation of mandatory, stringent medical evaluations. Utilizing data-informed adjustments to operational procedures is essential to mitigate cardiovascular stress during active duty.
- **Target Stress-Related Triggers in At-Risk Individuals:** Because work-related stressors frequently trigger fatal events in personnel with pre-existing

conditions, future studies should focus on identifying specific operational triggers to better protect these high-risk individuals.

- Institutionalize Sustainable Best Practices: To ensure long-term efficacy, research must establish best practices for sustaining health programs through a systematic management approach. These strategies should be standardized and institutionalized via clearly communicated, frequently updated policies and procedures that align with overall departmental management goals.

By focusing on these proactive strategies, the U.S. Fire Service can move beyond reactive measures toward a sustainable model of firefighter health and safety.

### **Conclusion**

The findings from this doctoral research project identify SCD as a significant, yet preventable, health risk that necessitates a multi-dimensional and sustainable organizational strategy. The research establishes that reducing SCD requires a three-pronged approach: the institutionalization of top-down comprehensive wellness programs to support mental and physical health, the mandate of regular medical screenings to establish "fit-for-duty" standards and early risk detection, and the implementation of rigorous operational protocols. These operational measures include ensuring adequate staffing to prevent overexertion, using on-scene rehabilitation for vital sign monitoring, and enforcing strict PPE compliance to minimize hazardous exposures. This doctoral research project underscores that proactively integrating these standardized medical, wellness, and safety initiatives is essential to mitigating cardiovascular tragedies within the fire service.

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## Appendix: Interview Protocol

Staging: The interview will be conducted in a quiet, private location that is free from interruptions and distractions.	The Script: The pragmatic inquiry project (the study) is being conducted by Kathryn Bernardo-Preston. She is a doctoral student at Walden University. The research obtained for the study will be leveraged to explore the leadership strategies for managing costs of dangerous operations, and to identify the factors that influence sudden cardiac death among on-duty firefighters. Throughout each interview – Observe for nonverbal communication. Ask follow-up investigative questions. Summarize by paraphrasing
1.	How do you develop cost- effective strategies to reduce SCD events while inspiring and motivating your team to embrace these changes and take ownership of prevention efforts?
2.	When integrating policy changes and updating standard operating procedures aimed at reducing SCD, which transformational leadership styles—such as idealized influence, inspirational motivation, intellectual stimulation, or individualized consideration—do you prioritize, and how do they guide your approach?
3.	How do you assess the effectiveness of leadership strategies grounded in transformational leadership principles when implementing preventative measures to reduce SCD?
4.	In updating strategies and related standard operating procedures, how do you incorporate cost-effective components while intellectually stimulating your team to innovate and improve these processes?
5.	As a transformational leader, how do you enhance the physical fitness of active firefighters to mitigate SCD episodes, particularly through fostering motivation, individualized support, and a shared vision for health and safety?
6.	What equipment-changing strategies, including the use or modification of personal protective equipment (PPE), do you employ to mitigate SCD episodes among active-duty firefighters, and how do you use transformational leadership to encourage adoption and continuous improvement of these strategies?
7.	What else can you share with me about your strategies to reduce SCD among on-duty firefighters?
Interview Conclusion	Thank you for your participation in my doctoral study. By participating in the study, you are fostering the fire service in progression with identifying cost-effective leadership strategies needed to reduce sudden cardiac death among on-duty firefighters.
Member Checking: Follow-up interview	In approximately one week from the date of the interview, I will contact you via telephone, text message, or email to schedule a follow-up interview. During the follow-up interview, I will provide you with a summary of my interpretations of the responses you provided for your review.