

Closest Resource Dispatching as a Matter of Public Policy

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by

Nicholas Hoover, B.S., NRP

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Abstract

This goal of this study was to research if there is support for public policy to require the closest fire service resource to respond to emergencies regardless of jurisdiction in San Luis Obispo County. The problem was that there are lights and sirens emergencies occurring in all county jurisdictions where there may be a closer appropriate unit from a neighboring agency; however, the resource does not get dispatched because of a lack of policy, intentional policy preventing the response, or inconsistent policy. Qualitative research was conducted using the action research method through a survey instrument. Existing research showed that sending the closest unit is appropriate in life and property loss situations. There was little research as to whether or not public policy should require the closest resource to be sent. Coded and synthesized survey data revealed that there is a possible lack of awareness at the policy maker level. Participants thought that the closest resource was already responding. Further, there was a consistent theme that citizens who choose to live in unincorporated areas should not receive municipal resources due to tax disparity. Fire service leaders have the goal to fix this problem and need key foundational public policy elements like a regional dispatch center with a common governance model for it to be successful. Further development of public policy with all stakeholders may lead to more lives and property saved, the fire service's primary mission.

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Second, I also dedicate my research to Fire Chief Mark Miller. Mark retired from Cambria Fire Department in 2015 after spending most of his career in Westminster, Colorado. He was a 2012 Executive Fire Officer graduate. Mark inspired me throughout my career with his wisdom and thoughtfulness. He died from bile duct cancer in 2020 and will always be in my thoughts.

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Contents

CHAPTER 1: INTRODUCTION.....	5
Background.....	6
Significance of the Study	7
Problem Statement	8
Purpose Statement.....	10
Research Questions	11
Summary	11
CHAPTER 2 - LITERATURE REVIEW.....	12
Introduction.....	12
Existing Literature	12
Synthesis of the Existing Literature	20
Summary	22
CHAPTER 3: METHODOLOGY	23
Research Design.....	23
Population and Sample Size.....	24
Instrument	26
Research Process.....	27
Ethical Considerations	28
Summary	29
CHAPTER 4: STUDY RESULTS.....	30
Introduction - Demographics of the Participants	30
Research Results	32
Summary	38
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS.....	39
Summary of the Results	39
Conclusions Based Upon Study Results	40
Limitations	43
Implications and Recommendations to the Field.....	44
Recommendations for Future Research	44
Conclusion	45
REFERENCES	47
APPENDICES	51

Closest Resource Dispatching as a Matter of Public Policy

CHAPTER 1: INTRODUCTION

San Luis Obispo is a medium size county located between Los Angeles and San Francisco on the California coast with a population of 283,013 (United States Census Bureau, 2022). There are 7 cities, one fire protection district, the county itself, the California Department of Forestry and Fire Protection (CALFIRE), four community services districts, one power plant, one state park, the forest service, bureau of land management, California Highway Patrol and a special healthcare district that all provide fire and or emergency medical response. A majority of the agencies providing fire protection are dispatched by a regional fire communications center operated by CALFIRE. The remaining agencies are dispatched by individual city dispatch centers or the sheriff's office dispatch center, using a computer aided dispatch software that links them together called CAD to CAD (Pierucci, 2023). Some agencies provide basic life support emergency medical services (EMS), some transport either via ground or air, and some provide advanced life support EMS (Pierucci, 2023). With the exception of the healthcare district, all ground ambulance transport is provided by an exclusive operating agreement with a private ambulance company who has provided service in San Luis Obispo County since 1945 (California Ambulance Association, 2021).

One theme is shared amongst all fire agencies in San Luis Obispo County: a citizen may not receive the closest staffed fire unit in the event of an emergency. In fact, there are times where emergency incidents are occurring just feet across a jurisdictional boundary and the agency who may have a staffed unit that is minutes closer has no idea. Some agreements exist for sharing resources across jurisdictional boundaries; however, they are inconsistent and lack public policy to reinforce them. There is a possibility that consistent public policy and

agreements could allow the closest resource to render aid, regardless of what jurisdiction it comes from, and potentially take the mission of the fire service across community boundaries. These changes could mean the difference between life or death, or prevent further property and environmental loss based on reducing the response time for units to arrive at an emergency scene (Winbourne Consulting, 2018, p. 8).

Background

Emergency medicine has long known that critical patients need rapid access to life saving treatment to increase the odds of survival for a patient. A clear example of that is cardiac patients who are suffering from a myocardial infarction; the long-standing concept persists: time is muscle. Paramedics play a critical role in setting the stage for a cardiac patient to survive a cardiac event, which is largely dependent on the time it takes from the cardiac event to the time the patient's condition is recognized in the field and treatment is initiated (Carter, 2018).

The risk fires pose to life, property, and the environment are established by the very rationale of why the fire service exists: fires kill people, cause injuries, and destroy property. It would be criminally negligent for a fire department to send further away resources to an incident while the closest resource remains unaware and in quarters.

San Luis Obispo County fire agencies have mutual and automatic aid operating agreements; however, they're modified often to best suit the interests of the particular agency requesting the change. An example would be a small city elected to reduce its automatic aid medical response boundary to one mile outside of its city. The city's units were responding to medical emergencies in a rural community 10 miles away from the city. The city argued that the county should place a fire station in the rural community. The county lacked interest and funding to staff a station, so they simply cancelled the agreement and now respond a fire engine

that's 7 miles further away from the rural community. The net impact is response times went from 15 minutes to 30 minutes or more. County fire engines now drive past the city fire station to respond to the rural community (Five Cities Fire Authority, 2015).

When the closest resource agreements do work, technology and policy challenges can sometimes result in a significant response delay. A city in San Luis Obispo County has agreed to respond to medical emergencies outside of their jurisdiction if they are closer; however, the call must be transferred using CAD to CAD from the county dispatch center to the city. When the city receives the dispatch, they are not allowed to dispatch the closest unit until they reformat the information in their CAD system. This sometimes takes 2-3 minutes, and is considered an acceptable delay by the dispatch center because the incident is not in their jurisdiction, therefore is not their priority. In another jurisdiction, when a caller dials 911 from a county street that is adjacent to the city, the county receives the 911 call and then transfers it back to the city by agreement. Because the transfer occurs, the delay is again 2-3 minutes while they reformat the information, resulting in an automatic net delay of 4 minutes or more simply because a county citizen is just beyond the city boundary.

Significance of the Study

Citizens in San Luis Obispo County likely have no idea that when they request emergency services, they may be receiving a resource that's either much further away, or that there may be a significant delay in dispatch as agencies transfer calls back and forth. These delays may be significant enough to affect the outcome of a patient encounter or fire, possibly enough to lead to unnecessary death or injury. When seconds count, we are not meeting the expectations of our community — we are letting policies prevent the fire service's mission from being carried out.

Closest resource dispatching has been studied extensively. Technology exists to rapidly select the closest unit based on its availability and appropriate staffing. Bruegman & Martel's White Paper on 21st Century Fire and Emergency Services clearly identified sharing data and technology as a major goal moving forward in the fire service, (Bruegman & Martel, 2020). Data sharing would facilitate a more rapid response and remove some of the barriers to closest resource dispatching. Regional dispatch centers are being constructed throughout the country that make sending the closest appropriate unit easier, in what's known as a boundary drop. Santa Barbara County, adjacent to San Luis Obispo County, has suffered from the same problems with a mix of jurisdictions and dispatch centers. Their fire chief's association did significant political work and eventually succeeded in consolidating all fire and EMS dispatching into the same regional center, and agreeing to a formal boundary drop — where all emergencies will receive the closest resource regardless of jurisdiction (Guentz, 2023).

This study aims to evaluate the broader public policy issue: why are citizens, policy makers, and the public at large seemingly unaware that this gap in service exists? There is not a great amount of research that supports making closest resource dispatching a matter of public policy. No law exists that says a neighboring jurisdiction must send a unit if a fire occurs on the other side of their jurisdictional boundary. Further: no policy exists to regulate the amount of time it should take as a jurisdiction requests aid from another.

Problem Statement

The problem is citizens are calling 911 with life threatening emergencies, and the closest fire engine that could save their life does not get dispatched because public policy does not require it. Instead, a fire engine is being dispatched from further away based on the jurisdiction rather than what is closest. Stakeholders will need research to better understand why this is

happening so they can make changes to eliminate the possibility of a life-threatening emergency incident receiving a slower response because policy does not exist that requires a closer resource from another jurisdiction to respond. Research will need to show what risks exist, how to mitigate them, and how to value the risk versus gain by changing public policy to support closest resource dispatching. Most agency leaders believe that the existing mutual and automatic aid agreements are sufficient, choosing to not study what the actual impact would be if policy changed. In fact, some automatic aid agreements are being reduced to relieve the burden on the agency providing more aid than the other, rather than focusing on reducing response times regardless of jurisdiction and finding a way to recover costs (Olson, 2014, p. 2). The greater policy question is: is the priority saving lives and property, or is the priority ensuring equity in a resource sharing agreement. These automatic aid agreements started with little restriction, and ended with significant modifications so one agency wasn't providing more aid than the other — seemingly misaligning the fire service's life safety mission with equity and financial costs. In a likely scenario, a cardiac arrest patient may receive life-saving treatment minutes faster if the closest unit was sent — each minute that passes without CPR results in a 7-10% likelihood of survival when in ventricular fibrillation cardiac arrest (Ibrahim, 2007). A victim trapped inside of a building on fire may be rescued minutes faster, where if they were not rescued by the closest resource: they may have perished before the first arriving unit from their own jurisdiction came to their aid. Response times to fires are critical: with the highest amount of impact being in the median range of response times, i.e. the difference between a 20 minute and 25 minute response time is not significant; however, we can increase the odds of survival by 3% if we can reduce a fire response by just one minute (Jaldell, 2017). Dispatching the closest resource in San Luis Obispo County can result in a time savings greater than 10 minutes in some cases (Five Cities

Fire Authority, 2015). In that scenario, saving 10 minutes could result in a 70% increase in survivability for a cardiac arrest event. In modern times where data analysis is readily available, the fire service cannot justify delaying response times when technology, resource sharing agreements, and policies can eliminate the delay by sharing resources across boundaries. Existing research has established that boundary drop agreements improve response times and effectively eliminate any political barrier to providing the closest resource to an emergency (Cooper, 1999). No existing research could be located demonstrating the need for a boundary drop agreement to exist at the public policy level, thereby creating a standard rather than allowing individual jurisdictions to pick and choose when and if they want to respond the closest resource. The City of San Luis Obispo elected to stop providing closest resource automatic aid responses to the County of San Luis Obispo during the coronavirus pandemic to reduce the possibility of COVID-19 exposure to their personnel (Aggson, 2020).

Purpose Statement

The purpose of this research is to determine the support for implementing public policy to dispatch the closest resource for emergency incidents, regardless of jurisdiction. Qualitative research will establish the consensus of policy makers, agency administrators, personnel carrying out the work, and the citizens in which they serve. The Center for Public Safety Excellence's 21st century white paper prioritizes sustainability in the fire service, with particular focus on implementing change that keeps the fire service moving forward. Specifically, the paper discusses the concept of predictable surprise — the concept that a catastrophic event can catch us by surprise, yet at the same time be both predictable and preventable (Bruegman & Martel, 2020). This research aims to clearly identify that closest resource fire and emergency response has been identified to improve response times, and to explore whether public policy can clearly

establish that not only is this a priority for the fire service's mission of life safety, but also a priority to the citizens and policy makers that we serve. No citizen should perish or lose their home because an agreement did not exist. That is both predictable and preventable.

Research Questions

This study will use qualitative research to answer:

1. What is the public's priority for fire and emergency medical services, is speed and proximity a factor?
2. What is the level of policy maker awareness that the fire agencies they govern don't send the closest resource to emergencies?
3. What methods exist or could exist to compensate for disproportionate aid across jurisdictional boundaries?
4. Can agency administrators balance the need for the potential to need their own resources with the actual needs of neighbor?

Summary

This study aims to show that a significant vulnerability exists where there is a disconnect between what the public expects when they request a fire or EMS emergency response versus what actually happens in the background. Chapter 2 will analyze existing research on closest resource dispatching public policy. Chapter 3 will detail the methodology for acquiring data.

CHAPTER 2 - LITERATURE REVIEW

Introduction

The fire service's primary mission is to respond to fires, rescues, and other emergencies to protect life, property and the environment. Many forms of research have been completed to study how the fire service can best mitigate the aforementioned emergencies; however, this review will focus on five main concepts from the literature reviewed. Those concepts are rapid response to medical emergencies saves lives, rapid response to fires limits death and property loss, consolidation of government can be economically unfavorable, information sharing across government entities can be challenging, and local control is favored by voters. The information reviewed in these articles has a variety of contexts. This review related them to the concept of providing fire and emergency medical services across jurisdictional lines as a matter of public policy. The literature reviewed was from five primary fields of study: the emergency medical services field, the fire service, local/state/federal government best practices, corporate social responsibility expectations, and government interoperability.

Existing Literature

The concept of sending the closest resource to an emergency makes sense from a logical perspective. The faster the unit can arrive, the more quickly the emergency can be mitigated. Literature was reviewed to provide a deeper understanding that better proves why this is a critical concept in the provision of emergency services. Urban firefighting resources should have a first arriving unit at the scene within 4 minutes or less 90% of the time (National Fire Protection Association, 2020). A deeper understanding of why that standard exists was part of the literature review. Further, the concept that time from incident to treatment dictates whether or not a medical emergency is survivable needed to be further broken down and evaluated.

Existing research on the palatability of public policy surrounding sharing of fire department resources across boundaries needed to be reviewed. The fire service standards on response and travel times were developed by the fire service itself (Averill et al., 2010). The desire to meet response times is largely internally driven based on research completed by the fire service itself — public policy is largely unaware of what the fire service’s standards are other than the expectation that emergencies will be mitigated. The fire service itself will likely have to expose that a lack of policy and interoperability has led to potentially unethical cross jurisdiction response standards that ultimately reduce the likelihood of a positive outcome from cardiac arrests, fires with victims, and saving property during fires.

Key search terms were used in Google Scholar, EBSCO and evaluation of sources from related studies. Those search terms were government interoperability, closest resource dispatching, pre-hospital treatment of cardiac arrest, pre-hospital treatment of trauma, automatic aid, mutual aid, fire department consolidation, local control in public safety, annexation and public safety.

A Framework for Resource Allocation in Fire Departments: A Structured Literature Review

Eslamzadeh, et al. (2022) look at various models for distributing fire department resources. The study shows that most models analyzed focus on geospatial analysis. Proximity and density were the two highest considerations. They conclude that another factor that should be considered is high vulnerability or high-risk occupancies. This analysis provides a basis for consideration that fire station placement is based on population density and risk probability. It is unlikely that a fire resource would be placed in an area with low density but high response times if underserved areas with higher risk exist. This study supports the theory that there may be

pockets in a jurisdiction that are not well served due to low density and low proximity. When this situation exists and a neighboring jurisdiction is significantly closer, public policy may help bridge that gap.

Strength of Strong Ties in Intercity Government Information Sharing and County Jurisdictional Boundaries

Ki et al. (2020) examine the concept of information sharing across multiple municipalities. The article discusses the concept that information sharing is limited when relationships do not exist at a higher government level, i.e. an association. This can prevent solving larger regional problems that are best handled with the operational area strength of many, and not just a solitary municipality. This article illuminates the strength in operational area organizations for both the fire services and municipal government. Clearly an agreement at the county level for all allied agencies would be easier to negotiate and ratify when an existing association is already functional and developing policy at all levels.

Fiscal Impact of Annexation Methodology on Municipal Finances in North Carolina

Smith et al. (2016) analyze the unforeseen costs, including public safety, of voluntary and involuntary annexation in North Carolina municipalities. Municipalities were either forced, or chose to annex parcels outside of their jurisdictional boundary. The study looked at public safety being one of the highest costs. “It is expected that higher public safety expenditures will be associated with lower municipal fiscal health findings.” (Smith & Afonso, 2016, p. 674). Public safety’s impact on the annexing municipality was higher than most services which had a fee component, i.e. sewer or water. They also discuss that providing services to non-annexed parcels can be mutually beneficial by charging higher fees for services rather than annexing, something that is not likely possible with public safety. This could create a cost sharing opportunity when

evaluating the research question: what methods exist or could exist to compensate for disproportionate aid across jurisdictional boundaries? When a neighboring jurisdiction is physically closer to non-jurisdiction emergency, there could be an opportunity for cost recovery considering that there would be no tax sharing otherwise. Public safety is one of the highest costs in municipal government, and annexing does not necessarily provide a cost recovery mechanism that outweighs alternative models.

Fire truck relocation during major incidents

Usanov et al. (2019) study alternative models for covering uncovered areas with fire resources during major incidents. They developed a model that looks at relocating units not only based on closest proximity to an uncovered area, but also the call volume of the unit. The analysis was based on average response time and ensuring that coverage included not only busy areas, but provided optimal response to rural areas when a move up and cover event was triggered. Further, the study examines the willingness of the agency to move a fire engine for a move up and cover — analyzing the human factor that may not be willing to move up during certain circumstances. This article's methods for providing a move up and cover system could be a critical element of public policy supporting closest resource dispatching. The fear that the agency providing aid would leave itself vulnerable to an emergency in its own jurisdiction is a valid problem. An efficient move up and cover system would provide improved response times and minimize the impacts to agencies providing aid over boundary lines.

Consolidated city–county governments and economic stability

Matti & Neto (2023) break down the financial consequence associated with city and county government consolidation in a recession economy. Consolidation of city and county services is typically approached as a cost savings measure where redundancy exists, or greater

economic opportunity. “Despite previous research finding that city–county consolidation does not promote economic development, city–county consolidations across the US continue to be pursued on economic development grounds.” (Matti & Neto, 2023, p. 279). This study supports the theory that consolidating government functions may not be as plausible for a solution when two jurisdictions have a common boundary and provide common services. This is a model that has been researched and implemented in the past when multiple small fire agencies consolidate into a larger agency. This research concludes that the fiscal health of the successor agency may be in question when approaching consolidation as a method to dispatch the closest resource.

The Impact of Decentralization of Fire Protection on Fire Deaths in the US: A Cross-State Analysis

Shishkin (2021) presents a position that decentralizing fire services to a higher level of government results in more lives saved. The paper analyzes countries where state or federal based fire services exist. “Most importantly for the purpose of this work, the estimates show that the average size of fire departments measured both in population and in the area served by one fire department positively correlates with fire death rates, which we interpret as an evidence that decentralization is likely to improve the outcomes of fire protection services in those states where these services are more decentralized.” (Shishkin, 2021, p. 255). This study shows that the larger area a fire department serves, the lower the fire death rate is. This supports the author’s theory that consolidating fire services to a larger government entity provides a higher level of life safety for the municipality. Combining the author’s theory with the fiscal vulnerability that exists in a consolidated government leads us to the need for future research. A hybrid model where operational consolidation occurs without actually combining governments may be a potential solution.

The Illusion of Local Control: The Paradox of Local Government Home Rule

Perlman (2016) studies the voter relationship between local government and state or federal government. The local government model is the face of government according to Perlman and is the most recognized arm of government to the voter. Services provided by state or federal governments are less likely to be successful. “In addition to the general paradox of centralized government in the U.S. context, there is a corollary paradox specific to local government home rule. Citizens support the notion that, when needed, local governments should be helped by the states on which they depend and should benefit from supervision and instruction by the states.” (Perlman, 2016, p. 191). This article makes a clear connection between providing local control with support from state government. Policy at a state level for closest resource dispatching could provide a framework with multiple options for execution at the local level, thereby providing the local control that policy makers look for.

Effect of Time to Treatment With Antiarrhythmic Drugs on Return of Spontaneous Circulation in Shock-Refractory Out-of-Hospital Cardiac Arrest

Rahimi et al. (2022) clearly identify a higher rate of survival for patients who received cardiac arrest treatment faster than others. The direct tie to an improvement in mortality was the delivery of cardiac medications in the pre-hospital setting as soon as possible. Those patients who did receive treatment had a higher chance of survival once admitted into the hospital. Their original research concludes that receiving medication at 10 minutes from 911 call to treatment yields a return of spontaneous circulation probability of 60%. When pushing the time to receiving medication to 20 minutes, the probability reduces to 30%, or roughly a 3% loss of survivability per minute (Rahimi et al., 2022). “In our post hoc analysis of ROC ALPS data, the probability of ROSC at hospital arrival decreased as the time interval from cardiac arrest to the

administration of amiodarone, lidocaine, or placebo increased. The highest ROSC rates were seen in patients treated early after the onset of cardiac arrest.” (Rahimi et al., 2022, p. 5). This study clearly demonstrates that a lower response time saves more lives. This evidence provides the foundation that the closest resource being dispatched to a medical emergency will provide the highest likelihood of survival.

Impact of Direct Transport vs. Transfer on Out-of-Hospital Traumatic Cardiac Arrest

Martin et al. (2021) review the likelihood of survival for patients who experience out of hospital traumatic injuries, and their probability of survival if they’re transported directly to a trauma center versus a regional hospital. The interesting correlation in this article is that early access to surgery is the key connection to survival. “Patients with traumatic out-of-hospital cardiac arrest (OHCA) have significant risk of mortality, and effective resuscitation is hindered by delay in arrival to a trauma center where advanced resuscitation or operative intervention may be provided.” (Martin et al., 2021, p. 31). While they discuss that early access to some paramedic level skills may help increase survival, the most important element is rapidly transporting patients to the hospital. The authors differentiate medical cardiac arrest from traumatic cardiac arrest, in that stabilizing treatment for medical cardiac arrest can happen in the field. For traumatic cardiac arrest, even when transferred from a regional hospital, the likelihood of survival increases the sooner the patient arrives at a trauma center. This includes the time from 911 call to arrival of the unit at scene to load the patient and rapidly transport. Clearly extending the time of arrival of the transporting and treatment field units would extend the overall time from injury to trauma center arrival, thereby reducing survival probability.

Statistical Analysis of Fire Department Response Times and Effects on Fire Outcomes in the United States

Buffington & Ezekoye (2019) correlate fire damage to 1 and 2 family dwellings with response time of the first arriving unit. They conclude that the likelihood of fire damage valued at \$50,000 or more is almost twice as likely when the response time is 12 minutes versus 3 minutes. They also show that as the response time lengthens, the rate of fire damage flattens — meaning that a quick response time can limit fire damage extent. As the response time increases past 20 minutes, the fire damage value flattens showing that there isn't a significant difference between a 20 minute response time and a 30 minute response time. “Longer response times are linked to an increased frequency of fires reported as confined to building and a decreased frequency of fires reported as confined to room over the interval of 4–11 min.” (Buffington & Ezekoye, 2019, p. 2391). This article reveals that property damage increases proportionately with the arrival time of the first fire unit, providing evidence for consideration of the first two research questions regarding public perception of speed and proximity of responding units, and whether or not policy makers are aware of boundary drop agreements.

How Important is the Time Factor? Saving Lives Using Fire and Rescue Services

Jaldell, H. (2017) models residential fire data from Sweden and concludes that response times are tied to fire deaths. In Sweden's case, a reduction of 1 minute would reduce fire deaths by 2.8%. This study also demonstrates, similarly to Buffington & Ezekoye (2019), that as the response time lengthens — the impact lessens. A response time of 20 minutes is not significantly different from a response time of 30 minutes; however, short duration responses have a much larger impact. A response time of 3 minutes versus 7 minutes may have over a 10% increase in survivability from a fire death, a key piece of information to consider when answering whether or not speed and proximity is a factor in responding fire units.

Beyond Interoperability

Harris (2007) provides interviews and after-action review summaries that indicate communication was a key issue in major incidents like the Oklahoma City Bombing. The author provides quotes where police officers discuss not being able to see if a detained subject is wanted in a neighboring jurisdiction because computer dispatch systems were not able to communicate with each other. The Silicon Valley Interoperability Project discussed in the article will integrate an operational area's dispatch systems so cross jurisdiction communication can occur seamlessly. There is not much research in this area of study. Interoperability requires operational area participation and can effectively create a virtual consolidation of resources. One of the largest barriers to automatic aid closest resource dispatching is the technology element: where even if policy exists for the closest unit to be dispatched the computer software component can make it difficult if not impossible to execute considering delays in dispatch telephone transfers.

Corporate social irresponsibility

Topic (2023) analyzes the role that corporations play in social responsibility as viewed by either their stakeholders or shareholders. The shareholder approach satisfied profits and growth as a priority regardless of the impact to the stakeholders. Likewise, the stakeholder approach focused on better serving the customer through transparency, diversity, equity, and inclusion. As social responsibility rises in our culture, a new concept of corporate social irresponsibility also emerges. The concept that corporate social irresponsibility may have significant reputation impacts is parallel to the viewpoint that the fire service can be viewed as a business. The stakeholders are the customers the fire service serves, and the shareholders are public policy makers who guide its trajectory.

Synthesis of the Existing Literature

Existing literature shows that response times are integral to life safety and property conservation (Carter, 2018; Ibrahim, 2007; Martin et al., 2021), supporting the research question that asks if speed and proximity in public safety are a priority for a municipality's citizens. There is a clear direct link between getting resources to an emergency as quickly as possible and life, death, or property loss. When posed with the question of whether or not it matters if a fire engine or ambulance is from a neighboring jurisdiction, the data showing that all forms of life safety emergencies are improved when the response time is faster would need to be part of the discussion.

It could be argued that a simpler model for dispatching the closest fire and emergency medical services (EMS) ambulance would be consolidating to larger forms of government, i.e. a fire authority or a county fire department. The literature reviewed does not support that theory, in fact it shows that whatever promise exists from a consolidation effort typically does not materialize (Matti & Neto, 2023). Further, public policy at a state or federal level appears less likely to be supported than public policy at the local government level, where policy makers have a higher level of recognition and are more trusted (Perlman, 2016). A common theme in public policy articles is that local control is preferred.

There is a gap in existing research regarding operational consolidation at the public policy level. When agencies are unable to consolidate or form a larger government entity, what alternative methods can accomplish the desired improvement in service delivery without the downfalls of annexation, consolidation or higher-level public policy? Further research could investigate the public's general knowledge regarding public safety. Citizens do not have a choice as to which agency comes to their door when in need, automatic and mutual aid agreements are complicated policy documents that may not be easily publicly examined. There

is no competition for municipal public safety agencies, when a citizen needs emergency services: they're largely at the whim of operational policies that few outside of the municipality know about or understand. Future research could examine the general public's perception of how emergency services are delivered: do they get the closest resource when in need, or do they get their municipality's closest resource due to a lack of policy or lack of technology. Further: as our country and the world evolve, transparency is becoming more important than it ever was before. The fire service has an ethical responsibility to improve service delivery when evidence shows that a faster response results in better outcomes for life and property conservation.

Summary

This literature review was intended to study the most current articles surrounding the concept of closest resource dispatching as a matter of public policy. The literature reviewed provided a firm foundation that the intent behind sending the closest resource has been well studied and shows that the fire service's mission to save lives, property and the environment is best carried out by reducing response times as much as possible.

This research on elevating closest resource dispatching of fire and EMS resources to the level of public policy will help provide a framework on methods to implement policy, demonstrate effective technology, and provide a roadmap for cost recovery options potentially leading to more lives and property saved.

CHAPTER 3: METHODOLOGY

This study focuses on the acceptability of implementing public policy to change how the fire and emergency medical services look at allocating resources outside of their jurisdictions. In chapter 2's literature review, existing research is well established showing the importance of a rapid response to save life, property, and the environment, yet the fire service of today in San Luis Obispo County does not always send the closest resource regardless of jurisdiction due to policy that either limits or prevents sending resources across boundaries. This study's methodology focuses on how to best synthesize the collective thoughts of stakeholders. A key focus was comparing what is actually occurring in the field versus what the problem statement identified. This will illustrate that citizens requesting emergency services do not necessarily receive the fastest response.

Chapter 3 will detail the research approach and method that was used to acquire data for the study. How the research instrument was designed will be covered, including what the study's population is, the sample population that was surveyed, and how the sample population was chosen. Each component of the research process will be illustrated so the study can be replicated if necessary. Next, the method used to analyze the data and report on findings will be discussed. Ethical considerations will be discussed, clearly showing how participants were protected and how their consent was obtained prior to participation.

Research Design

Qualitative research was chosen to best evaluate the perception of stakeholders across four different domains: the fire service, policy makers, emergency medical service providers, and the citizens who actually request and receive the service. The action research method was chosen to identify the problem, collect data, create an action plan, and evaluate its results in

future work. This method focuses on highlighting a problem and suggesting a solution, followed by evaluating the solution. The fire service's problem could be based in a culture of routine and complacency. Action research helps question the culture we operate in today to help develop a more efficient culture for tomorrow. "Action research aims to change practices, people's understandings of their practices, and the conditions under which they practice" (Kemmis, 2009, p. 467). In a similar action research methodology study, a Colorado fire department struggled with developing fire officers who had limited experience while the agency itself was rapidly expanding during a time of intense building development within their district (Standridge, 2012). Standridge utilized action research to suggest a development program that offered officers the opportunity to participate in an exchange program, gaining valuable exposure to higher call volume agencies so that they might become more experienced rapidly elsewhere. The action research methodology was used to develop a hypothesis, suggest a solution, evaluate the results, and continue the solution-evaluation cycle until the desired outcome was achieved.

Data collection will utilize a survey sent to participants with open ended questions. The open-ended questions will be anonymized using data analysis software and assigned a unique identifier. Ensuring participant privacy will be paramount to collecting valid data.

Population and Sample Size

The study's population is the entirety of San Luis Obispo County, which has a population of 283,013 (United States Census Bureau, 2022). All citizens within the county are served by one of eleven fire service agencies and would be potentially affected if public policy were to change regarding sending the closest fire resource in an emergency. Six of the eleven fire service agencies provide paramedic level service and share a boundary where fire service units are potentially closer to non-jurisdictional areas. Qualitative research sample saturation can

begin to occur at 12 participants, with research demonstrating that 12 responses will likely have the same outcome as surveying 120 participants (Sandelowski, 1995). Surveying four random personnel in four categories from the six most affected agencies will yield a sample size of 24 participants, assuming that all participants complete the survey. The study looks to evaluate public policy as a reasonable solution to improving fire service delivery to the public. Public policy involves the public at large, those who make the policy, the administrators who manage it, and those who do the actual work in the field. The Fire Department of New York (FDNY) chose to reduce the number of fire companies in the 1970's. The effects of that decision carried forward to emergency response in the 2000's, where studies demonstrated that the fire company reductions affected the areas with the highest fire problem and highest poverty, effectively accomplishing the opposite of the fire company reduction program's intent. A key finding in an article regarding the FDNY fire company reduction program was the lack of involvement of public policy, scrutiny from the affected stakeholders, and lack of academic involvement in how the data was analyzed (Thomson, 2012). In the case of this study, four specific categories of the affected population were identified: public policy makers, administrators of the organizations that carry out the service, the members of the organizations that actually do the work and are in the field, and finally the public who is both affected by public policy and served by the organizations involved.

Using these four categories, the sample population was categorized into:

- An organization board or council member who will be randomly chosen with no respect to age or board position.
- A firefighter that will be chosen from randomized rank, with no respect to age.

- A citizen that will be chosen from a community organization (the chamber of commerce, for example) with no other selection factors considered.
- Finally, the fire chief of the organization, who will be chosen randomly from the rank of battalion chief or above.

These four groups will help sample the policy development stakeholders: citizens, staff members, policy makers, and the people who carry out the work. For all randomly chosen participants, a random letter generator will be used and the person whose last name is closest to the random letter will be chosen. In the case of two potential participants where their last names start with the same letter, the process will be repeated with their first name and middle name if needed.

Instrument

A survey was chosen to provide access to the wide geographical group in the sample size. Prior to participation, each survey respondent was presented with an introduction to the study and a consent form which must be completed prior to participation. The survey is anonymous, and has open ended questions to provide a greater opportunity for original themes to surface during the research phase. The survey questions were designed to present the problem, ask whether or not the participant sees that as a problem, and what solutions they may have moving forward to both solve the problem and make the solution sustainable. The study's research questions focus on whether or not the sample population sees closest resource fire emergency response as priority, whether or not they see public policy as the solution, how the financial component of service delivery across boundary lines could work, and whether or not serving a neighbor is a disservice to the population served by the organization itself. The survey's questions are written to ask for open ended responses. The survey has at least two questions

each that are directly tied to the research questions in this study. The analysis from the survey questions will answer the study's research questions. The survey was reviewed and field tested by research colleagues in the industry to validate that it was both effective in answering the research questions and adequately protected survey participants.

Research Process

Each of the fire chiefs from the six agencies selected for survey responses was contacted to build a list of potential survey candidates for their respective board member, firefighter and citizen. The fire chiefs were first informed about personally identifiable information, how their participation was voluntary, and that no respondent should be informed of any other respondent's participation. The solicitation made it clear that the respondent's name, job title, and agency would not be collected to ensure an anonymous response. A spreadsheet was created with the names and e-mail addresses for the survey participants.

Each survey was sent via e-mail to the sample population via the online survey app Qualtrics. After successfully sending the survey, the list was deleted to ensure privacy. Each response was received as a comma separated value export from Qualtrics and imported into the qualitative research analysis software Dedoose. The survey analysis function was used, and each respondent was assigned a unique identifier. Each response was coded based on the themes that emerged from the open-ended questions. The themes were then analyzed to assess their frequency. Frequent themes were quantified and, commonalities were identified using thematic analysis. This allowed the survey responses to be synthesized so no personally identifiable information could emerge from the results, while at the same time providing an opportunity to quantify the frequency of similar themes. The qualitative research analysis software was encrypted and password protected to protect the respondents. Any identifiable information that

was gathered to send the surveys was deleted prior to analysis. No agency was informed of another agency's participation. Each participant was directed to not sure their participation to anyone else to ensure integrity in the research process and to prevent their identification as a respondent.

All data received from respondents was used and coded with the exception of open-ended responses that did not relate to the study question or were unintelligible by the researcher. Due to the anonymous data instrument, respondents could not be contacted if a response was not clear.

Ethical Considerations

The research process requires that respondents be protected in order to ensure their privacy and to create an environment where information is shared freely, with less likelihood of bias. The participants in this study were clearly informed of why the research was being done, what the intent was with the finding, and why their participation was helpful, but not required. Participation in this research was communicated clearly as being entirely voluntary, and not required or mandated.

The researcher is a member of one of the affected agencies should this public policy change. The respondents were informed of the researcher's identity, employer, and that the research was being conducted due to a perceived problem from the researcher's point of view regarding sending the closest fire and EMS resources to emergencies.

The responses from participants could be contentious and could affect the respondent if the responses from survey participants were disclosed to their colleagues, superiors or the public. Coding responses and using synthesized themes rather than direct quotes or identifiable information prevented their identity from being disclosed. Ensuring that bias was minimized in

the research problem was clearly communicated to the sample population during the research introduction phase. While the ethical consideration of not sending the closest fire or EMS resource is somewhat counterintuitive based on established research in the literature review, it was clearly communicated that the open views of the participants was needed to help synthesize what the true priorities were from the stakeholders.

Participants were clearly informed that this study was conducted as part of a federal education program, and that absolutely no personally identifiable information about them would be included in any part of the study.

Finally, respondents were ensured that, beyond their personal information, no information regarding their agency, job, or any other information that could be loosely associated back to them would be included in the study. No direct quotes, direct responses, or unique views that could be associated with them in any way would be used.

Summary

In chapter 3, the research methodology of this study was reviewed. A qualitative analysis using the action research method was used. A sample population was developed from the involved agencies and their citizens that would be affected by the public policy change being studied. A survey instrument was developed using open ended questions that was field tested by colleagues. Data integrity and privacy was ensured by using recognized qualitative analysis software that prevented any identifiable information from being included in the study. Responses were coded anonymously, with the researcher seeking to derive common themes. Participants were clearly informed of the study's intent, and their consent was gathered prior to participation.

CHAPTER 4: STUDY RESULTS

Introduction - Demographics of the Participants

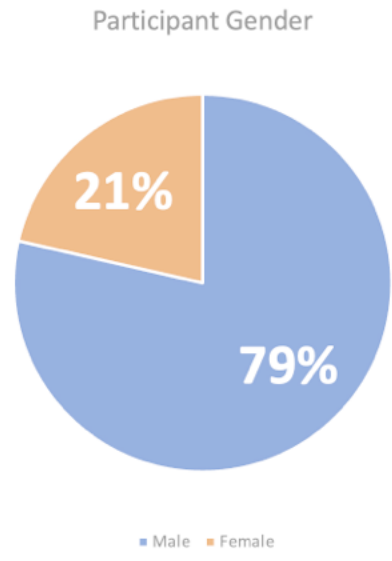
24 surveys were sent using Qualtrics survey software to participants based on the sample population identified in chapter three. Survey participants were notified initially via e-mail. Participants that did not respond were reminded three times via both e-mail and text message. Ultimately 14 survey responses were received. Each survey included an informed consent form and a brief explanation of the study's significance. All 14 responding survey participants agreed to participate in the study. 10 surveys were not returned.

Each survey was exported from Qualtrics and loaded into Dedoose qualitative analysis software. Each response was coded for further thematic analysis. Per chapter three's methodology, no direct quotes appear in this study to protect the identity of each participant. Responses that identified key themes in the study were synthesized to protect the participants identity while still providing substance to the qualitative data. The study's content could cause significant employment, political, or other challenges for the participants. Full anonymity was a core component to the study and the informed consent agreement.

Three participants (21%) were female, 11 participants (79%) were male.

Figure 1

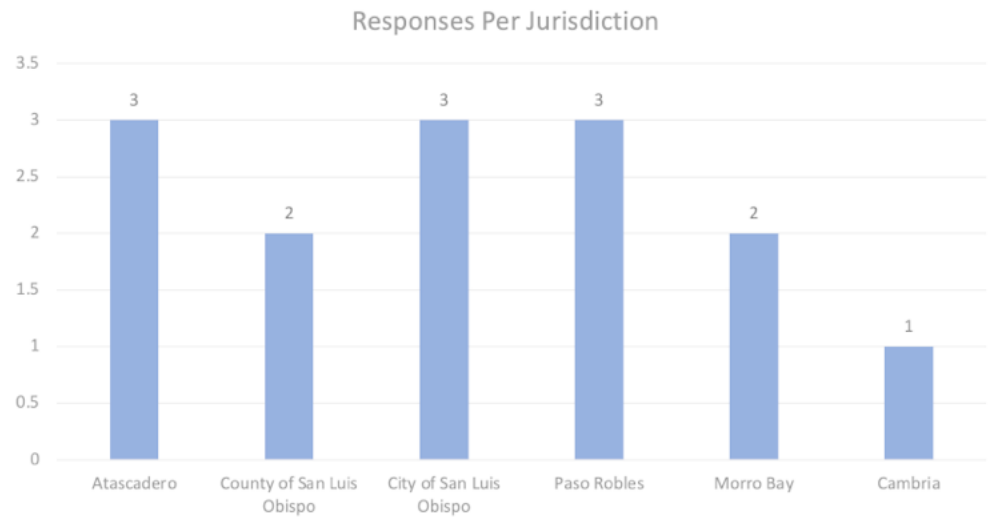
Participant Gender



Six jurisdictions were included in the sample size. A survey was sent to a chief officer, community member, policy maker and fire service member from each jurisdiction. All six agencies had at least one survey participant.

Figure 2

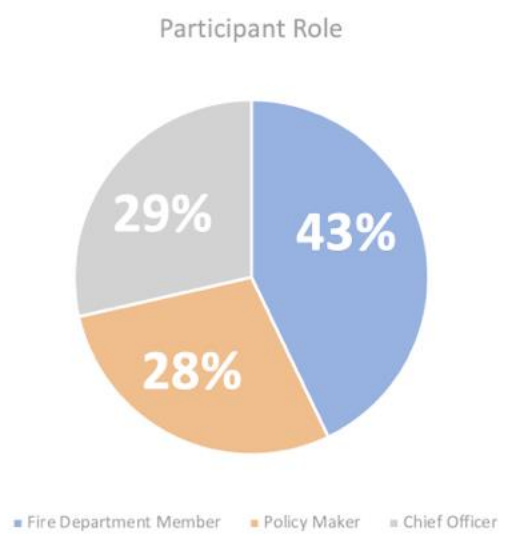
Responses Per Jurisdiction



Four participant roles were identified in the sample population: chief officers, community members, policy makers, and fire service members. No community members responded to the survey. The distribution of responses were six fire department members, four chief officers, and four policy makers.

Figure 3

Participant Role



Research Results

52 codes were identified throughout participant data, see Appendix C. Each set of codes was applied to the research questions to derive relevance and thematic analysis.

Four research questions were identified in chapter one:

1. What is the public's priority for fire and emergency medical services, is speed and proximity a factor?

The second most common theme from the survey data centered on the need for the closest resource to be sent to emergencies. A participant's synthesized response stated that people have a basic right to emergency services, and that the closest resource should respond as a matter of ethics, not policy or cost. The cost of a life lost because of policy or finance violates the basic principle of emergency medical services and could be considered negligent. Nearly all participants agreed that the closest resource should be sent; however, there were concerns regarding cost, staffing levels, and EMS capability level. While participants agreed that a rapid response is necessary to protect life and property, several caveats emerged. Municipal agency participants felt that closest resource would unjustly support unincorporated areas that might benefit from the higher level of service without having to pay for it via taxes. Participants also had a high level of concern for what a jurisdiction would do to safeguard its own area, nearly universally suggesting the need for a county wide move up and cover system. This was also backed up with the concept that a regional dispatch center would be needed to facilitate success. Grouping the chief officers and fire department members revealed that most participants believed that while a regional dispatch center would be highly effective, cost would be a barrier. It was clearly identified that most dispatch centers are combination law enforcement and fire, with no likely change in staffing if fire dispatching were to consolidate regionally. The law enforcement mission would not change, resulting in the staffing remaining the same and triggering little cost savings. A second theme was noted: interagency cooperation in a regional dispatch center environment would be paramount. Many responses identified that being able to have a

governing structure that provided equal input and decision making at the dispatch center policy level would be required for all county agencies to participate.

A strong theme was clear that while participants felt that citizens have a right to the closest resource during an emergency, they also were concerned about how to create agreements that would be successful in the eyes of the tax payer. The theme was centered on the desire to not supplement a neighbor who did not reciprocate with the same service, for example a two-person basic life support engine company versus a four-person paramedic engine company. The code EMS level was noted as a concern 71 times, the most frequently noted code.

2. What is the level of policy maker awareness that the fire agencies they govern don't send the closest resource to emergencies?

Coding and thematic analysis revealed that there is a misconception that the closest resource is being sent, or that agencies send the closest resource within their own jurisdiction. Policy makers felt that there were concerns with cost, aid agreements that are not balanced, or that while sending the closest resource is ideal, that taxpayer acceptance of a void in their own jurisdiction would be unacceptable even if it meant supporting a neighboring jurisdiction in need. Planning and resource allocation was highly present in responses. Aid beyond incidental responses was seen as a planning problem: does the neighboring jurisdiction need to reallocate resources, or build a new fire station? Further, there was a feeling that current aid agreements are sufficient, likely backed by the misconception that the closest resource is currently being sent. When grouping policy maker responses and analyzing for themes, nearly all policy makers thought that the current mutual and automatic aid system sends the closest resource. One

synthesized response identified that people in rural areas choose a lower level of service when they purchase a property that isn't in a city or higher-level service area. Another participant's synthesized response went even more direct to say: people choose to live in cities because they know they'll have better services, such as police and fire protection.

Consolidating to a regional dispatch center with agency level policy was a common theme in responses. The fourth most common code analyzed was need for a regional dispatch center. This was paired with the concern over cost for a regional center. One participant's synthesized response equated that the cost for regional dispatching would be less than the generally accepted insurance calculation for the value of a life, justifying the expenditure if even one life was saved.

Policy makers had a concern that even though there is a clear need for regional dispatch, the cost may simply be prohibitive to tax payers, even if it's clearly identified that it will save time and enhance life safety. A synthesized response identified that the clearest proposal may be disregarded by taxpayers if there's a cost, considering the comparative priorities of a voter base. More specifically, a large incident that results in a loss of life or property has a better change of highlighting the need and is entirely situational based, meaning it's all about timing which may be challenging considering the amount of preparatory work that would be required for a regional model.

3. What methods exist or could exist to compensate for disproportionate aid across jurisdictional boundaries?

There were three common themes noted regarding how to overcome this problem. The most common was to calculate a cost per call considering staffing and service levels and to reconcile that with the neighboring agency for a cost sharing agreement. This was highly correlated with concerns over EMS and staffing levels. Most agency leaders mentioned their concern for rural areas with limited staffing benefitting from municipal areas with higher staffing or service levels. This theme was combined with the general understanding that people who choose to live in a rural area don't expect the resources of a municipality.

A less costly solution was present in most responses, indicating that a county wide move up and cover system would alleviate the burden. This theme was correlated though with the need for all agencies to come up to the same staffing and service level, creating a like for like environment where a cover unit provides the same service level as the proximal unit. Fire service members stated almost unanimously that disproportionate move up and cover aid was a challenge that would need to be resolved. A key theme was identified by one fire service member who illuminated that until service levels are more equitable, it would be difficult to see tax payers accepting a lower service level covering their area when they live in a municipality that has a higher service level.

Finally, the least common theme solving this problem was that aid can be disproportionate when looking narrowly; however, over time it balances out during larger scale incidents.

4. Can agency administrators balance the need for the potential to need their own resources with the actual need of neighbor?

The most common theme from participants is that a regional dispatch center is needed, citizens have the right to the closest resource, staffing and service levels need to be equitable, and that a move up and cover system would overcome the impact to a local jurisdiction's void from participating in a closest resource system. This theme included frequent coding showing that public policy would likely solve this problem. When narrowing the view to chief officers, there was a common theme that a regional dispatch center was needed to accomplish the need for citizens to receive the closest resource, this was paired with coding indicating a need for a policy driven governing structure providing equal rights and access to dispatch center decision making. There were minor themes indicating that this problem could be best solved at the agency level rather than the public policy level; however, this was not as common as public policy being perceived as the solution. Several excerpts from coding showed a concern that financial and public image concerns currently prevail over finding collaborative solutions to the largest theme that would facilitate a closest resource system: a regional dispatch center. A chief officer identified that the county fire chief's association sees regional dispatch as a priority; however, the lack of a governing structure in the current county dispatch structure has prevented some agencies from transitioning over to a regional model. Several chief officers stated that a lack of a common platform at the operational level even causes disruption in the agencies that are being dispatched by the county. They wanted to see a governing structure that gives every contracting agency a seat at the table. The fire service members group saw this differently, nearly all of them identified that a regional dispatch center is the first step to creating a closest resource boundary drop model. Their view that this needed to happen first, contrasts with the lack of policy level governance from the fire chief's group. Finally, the policy makers group saw

regional dispatch as a good goal but feared that voter acceptance would be limited, thereby challenging any increased funding that would be required.

The research question asked if administrators could see a way to help their neighbor while balancing their own need. The fire service members who are doing the work in the field see the need for regional dispatch and service level equality as a high need. One fire service member's synthesized response identified that they would support public policy if the groundwork had first been completed, regional dispatch and service level equality. Chief officers have identified that there's a governance problem with the regional dispatching model. Policy makers believe that the closest resource is already being sent, and that regional dispatch may be a challenging budget topic. All groups agreed that the closest resource should be sent. These disparate group perspectives were clear throughout thematic analysis, indicating that there may be a lack of common understanding as to what is happening in the field versus what exists in policy today.

Summary

Coding responses into consolidated themes has revealed that participants believe we do not send the closest resource to emergencies. Further, participants felt that the biggest barriers are a lack of a regional dispatch center, lack of interagency cooperation at the dispatch center level, and that disparity in service levels are barriers. Public policy was a more common theme than solving the problem at the agency level. Finally, participants saw supplementing a neighboring jurisdiction was a problem if there wasn't a form of cost reconciliation.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Summary of the Results

This study aimed to identify whether or not public policy should require the closest resource should be sent to fire and medical emergencies. Fire service professionals, leaders, and elected officials who draft public policy were surveyed to first identify if sending the closest resource is appropriate considering the challenges that exist when coordinating neighboring government entities to work with each other. Coding their responses in chapter four revealed that nearly all participants saw sending the closest resource to an emergency was paramount to safeguarding life and property. Research analyzed in this study clearly identified that time is critical to saving patients experiencing cardiac arrest (Carter, 2018). Traumatic injuries stand little to no chance of survival without rapid access to surgery (Martin et al., 2021). Participants were also nearly universal in seeing a regional dispatch center as a critical element to sending the closest resource: a boundary drop does little good if the dispatch center cannot see where units are, or what their status is. Responses from the qualitative research survey centered on the need for a common platform to pave the way for the possibility of a closest resource system. Some participants even identified how being a participant in a regional dispatch center does not equate to having an equal seat at the table amongst the other agencies dispatched in a combined system. Several responses identified that a common governance model that promotes inclusiveness in a regional model is critical for success.

Participants were mixed on whether or not public policy was the appropriate place to solve the problem of sending the closest resource. Some felt that fire service professionals would be the best to negotiate automatic aid and boundary drop agreements with their neighbors, a practice that is already happening and is inconsistent in its approach to sending the closest unit

(Aggson, 2020). Participants were also challenged at the concept of sending the closest resource to a rural area from a municipal agency. They felt that citizens who choose to live in a rural area acknowledge that they may not get the same services that would be available in a city that offers a higher level of service at many levels beyond just the fire service, like police protection.

Cost sharing amongst disparate government agencies providing services across jurisdictional lines was a major theme that needs to be solved. Research participants saw the likelihood of an agency not meeting its obligation to provide appropriate services and instead leaning on a neighbor to offset their lack of resource allocation. When posed with the question of cost recovery, participants saw cost sharing as a method to balance the scales if aid across boundary lines was not reciprocal.

Conclusions Based Upon Study Results

Agreements, contracts, and policy are intended to provide a roadmap for how a process should carry out given a set of conditions. At face value, survey participants clearly identified that sending the closest appropriate resource in the event of a fire or medical emergency was imperative to carry out the fire service mission: to save lives, property, and the environment. This concept is in alignment with the concept that trauma patients need rapid access to surgery (Martin et al., 2021). Cardiac death was also identified in the literature review as being time sensitive, indicating that rapid transport to the hospital is paramount (Ibrahim, 2007). Most survey participants identified that sending the closest resource was a basic right in a life-or-death situation, which is the basis for adequate resource distribution in fire and medical services (Jaldell, 2017). At the same time, participants were concerned if a closest resource was sent, that it would displace the jurisdiction's ability to serve its own constituents. That concept directly ties in with the first research question: what is the public's priority for fire and emergency

medical services, is speed and proximity a factor? Speed and proximity were noted as a priority and basic right by participants.

The basic elements of government in the United States provide for federal, state, county and local laws to allow geographic flexibility in law making. Public policy lies at all four levels of government. The second research question identified in chapter 1 asked: what is the level of policy maker awareness that the fire agencies they govern do not send the closest resource to emergencies? This study has clearly shown that the fire service and public policy makers believe we should send the closest resource, with many participants at the public policy level believing that we already do. Move up and cover agreements can solve jurisdictional coverage problems while responding across boundaries (Usanov et al., 2019). Regional dispatch is a foundational element to closest resource dispatching, providing that there is an equal governance model. Cost sharing agreements can overcome inequality in response volume. All of the elements to creating a closest resource system may require public policy to be achieved. Relying on government agencies to negotiate these aid agreements consistently is not occurring now, and may not occur in the future without a better model that requires it.

Participants identified that cost sharing would be needed to overcome inequality in resource allocation across jurisdictional lines. The third research question asked: what methods exist or could exist to compensate for disproportionate aid across jurisdictional boundaries? Further research would be needed to determine best practices beyond what this study identified. It was a clear priority to participants that disproportionate aid would be unsustainable.

This research is important because there are 911 responses occurring across the county where people may be in a life-or-death situation, and they're not receiving the closest response because such public policy does not exist. Agency level policy certainly dictates that the closest

resource be sent; however, there are large border areas where a unit across a boundary line could save a life, but a lack of policy prevents it. Fire service professionals clearly responded in this study and identified that our mission to save lives and property are diminished if resources are delayed. The final research question in this study asked: can agency administrators balance the need for the potential to need their own resources with the actual needs of neighbor? This research showed that there is a sense that unincorporated or rural areas simply don't deserve a high level of service because the residents chose to live there. Fire stations are not movable objects that can simply be relocated as development occurs. Certainly, planning at a municipal or county level determines the need for additional resource at certain trigger points depending upon response times, population density, or threat. Between those trigger points lie boundary areas, or areas where when a unit is out of position: a neighbor may be closer. The fire service may want to position itself to focus on technology such as regional dispatch models, automatic vehicle locators, and dynamic response plans. These tools may lead to a faster response.

Advanced life support, training, high quality fire apparatus, physical fitness, staffing, and well positioned fire stations are all designed to provide the highest chance of survival for the people we serve. If we cannot reach the people we serve in a timely manner, none of those elements matter. Closest resource dispatching is a blind problem that goes unnoticed because agencies operate within their own area and seemingly are unaware that an incident is even happening because common systems are not yet required by any form of policy (Guentz, 2023).

A study participant identified that the cost of a human life is quantifiable by insurance companies. The exact dollar figure may vary based on profession, age and geographic location. The value of saving one life by a policy change may be sufficient to justify the additional cost that this study identifies as probably necessary to accomplish the public policy change. Regional

dispatch models provide the ability to serve our citizens better. In the case of San Luis Obispo County, there are four centers that dispatch fire departments at the time this study was written (Aggson, 2020). Study participants identified that there will be hesitation to join a county wide model until a common governance model and cost sharing can be overcome. Further, policy maker participants in this study identified that the cost may be prohibitive to voters.

Limitations

This study was limited to a sample size inclusive of advanced life support agencies in San Luis Obispo County, California. Applying the results from this study beyond San Luis Obispo County would likely have limited applicability. Unique factors such as agency size, boundary arrangement, dispatch configuration, and service levels could limit the relevance to another county with similar challenges. The sample size used in this study was relatively small considering the total population of the county, further research could overcome the qualitative sample size limit.

Not all participants solicited in this study responded to the survey. Citizens in each agency's area did not respond after multiple attempts, limiting the sample size to policy makers and fire service professionals. Citizen involvement would likely give better research direction on citizen level expectations of the fire service in general.

The researcher conducting this study is professionally involved with many of the participants that responded to the survey instrument. It is possible that the responses themselves, willingness of participants, and the study's design could have affected the outcome of the research. Further study on this topic may have different results should the researcher be from outside of the study's operational area.

Implications and Recommendations to the Field

Fire service professionals and policy makers responded nearly universally in this study that the closest resource should be sent to life and death emergencies. This cannot occur until policy exists at least at the county wide level where all agencies participate equally and agreements are created to overcome regional dispatching, service levels, move up and cover agreements, and cost sharing. Fire service professionals responded in this study indicating that their mission to save lives and property cannot always be carried out with best practices if we do not send the closest unit to an emergency. San Luis Obispo County fire agencies may need to work together at the policy level to create a governance model that requires a boundary drop. Fire service professionals may want to consider rising this issue to the level of their respective policy makers to initiate developing agreements that solve this problem. It may be possible to save more lives by developing boundary drop policies that could further the fire service mission to save lives, property, and the environment.

Agencies have had mixed results negotiating with each other resulting in automatic aid agreements that are not universal. The San Luis Obispo City Fire Department ceased all medical emergency automatic aid during the corona virus pandemic to reduce potential exposure to its employees beyond its own boundaries (Aggson, 2020). A common governance model could identify a path forward for public policy, regional dispatching, move up and cover agreements, and cost reconciliation. These were the critical research questions this study aimed to analyze and were identified as barriers during coding.

Recommendations for Future Research

This study sought to identify if public policy was the appropriate place to resolve sending the closest resource to emergencies. Prior literature reviewed in this study shows that time is

critical. Future research that gathers response time data from all agencies within San Luis Obispo County could identify exactly how much time could be saved by a policy change requiring the closest resource to be sent. This may help quantify cost sharing agreements before the policy change goes into effect. Further, it may help quantify how much of an improvement agencies may see in response times.

Citizens may not be fully aware that the closest fire station to them does not respond in the event of an emergency. Further, they may not know how much of an impact time has on their survivability in an emergency. Further research could seek a larger sample size specifically of citizens to analyze what their priority is with fire and emergency services. The fire service is unique in that there is no competition: your jurisdiction, voting, and tax dollars determine what services you will receive. It may be appropriate to actually identify what the citizen's priority is, with guidance from industry experts.

Conclusion

This study was conducted to research why citizens are calling 911 with acute emergencies and do not receive the closest fire engine that could save their life or property. No public policy exists that requires jurisdictions to send the closest resource across jurisdictional lines. Policy makers and fire service professionals universally agreed in this study that the closest resource should be sent, with caveats. Most policy makers believed that we already do send the closest resource, while fire service professionals knew that we did not. The gap between policy maker awareness and fire service professional industry knowledge needs to be closed.

If policy can be developed in the future that requires agencies to develop closest resource agreements, shared dispatch centers, and cost sharing agreements — the fire service may be able to save more lives, property, and better protect the environment.

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Appendices

Appendix A: Interview Consent Form

Interview Consent Form

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Nicholas Hoover from the National Fire Academy (NFA) and Columbia Southern University. The purpose of this study is to develop a better understanding of a critical issue in the fire and emergency services. This study will contribute to the researcher's completion of their final project for the Executive Fire Officer program.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all of your questions about the study have been answered to your satisfaction. The study consists of a survey that will be administered to individual participants. You will be asked to provide answers to a series of questions related to your experience within a particular community. Your survey will not have any identifying information recorded, and any responses will be coded for themes, without any direct quotes from the information you provide. In no way will any of your original responses be included in the study.

Time Required

Participation in this study will require approximately 20 minutes of your time.

Risks

The investigator does not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

The NFA, Columbia Southern University, and its contractors take no responsibility for the actions or outcomes of the research study.

Benefits

There are no direct benefits to the participant; however, information from this study may benefit your, and other communities, in the future.

Incentives

There are no incentives (financial or otherwise) associated with participation in this study.

Confidentiality

The results of this research will be presented to NFA and Columbia Southern University program faculty and students. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. The researcher retains the right to use and publish non-identifiable data. While individual responses are confidential, aggregate data will be presented representing averages or generalizations about the responses as a whole. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all information that matches up individual respondents with their answers will be destroyed. Final aggregate results will be made available to participants upon request.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion, or you would like to receive a copy of the final aggregate results of this study, please contact:

Nick Hoover
Student
National Fire Academy
nhoover@slocity.org

Dr. Justin Heim
Course Manager
Columbia Southern University
Justin.Heim@columbiasouthern.edu

Giving of Consent

I have read this consent form, and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have received satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18-years of age.

Interviewer Signature		Date:	
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Interviewee Signature		Date:	
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Appendix B: Survey Questions

1. Do you believe that 911 callers today receive the closest fire and emergency medical services unit, regardless of jurisdiction? Explain in detail.

2. Do you think it is a problem if a fire engine from the county has to drive by staffed and available city fire stations to reach an emergency incident on the opposite side of its jurisdiction?

3. Do you believe citizens have a right to the fastest response time from fire and medical services, regardless of what jurisdiction they're in, please explain why?

4. If a fire unit is responding outside of its jurisdictional boundary (ie. from a city and into the county) to a neighboring community, because it is the closest unit, what issues do you believe that poses for the community it belongs to? Should fire departments respond across boundaries into neighboring communities?

5. If a county fire engine responds into the city because its station is closer to the city's edge, how should the city and county reconcile the cost to provide services to one another?

6. How should a fire department balance the need to cover their own area, with the need of a neighboring community? If a 911 caller has a life-threatening emergency, should the fire department respond across their boundary line if they're closer?

a. If you believe they should, how do they justify responding out of their area and leaving their own response area uncovered?

b. If you believe they shouldn't, should they only handle emergencies in their area even if they're closer to an incident across a boundary line?

7. What barriers do you see to providing closest resource dispatching of fire and emergency medical services units? Explain in detail

8. One limitation to dispatching the closest fire engine to emergencies is a unified county wide dispatch center that can see the status and location of all fire units in a geographical area. What are your thoughts on the cost of a regional dispatch center being prohibitive to dispatching the closest fire unit to an emergency? In other words, is avoiding the higher cost to provide regional dispatch more important than sending the closet unit to lights and sirens emergencies?

9. Do you believe that dispatching the closest fire unit to lights and sirens emergencies should be required by public policy? Please explain why or why not.

10. If you could flip a switch today and begin sending the closest unit to fire and emergency medical incidents, what would your highest concern be?

Appendix C: Survey Coding Matrix

	Balance need home vs neighbor	Barriers with closest resource	Citizens right to closest resource	Current closest resource belief	Highest concern	Problem with units bypassing	Reconciliation of cost	Regional 911 cost vs benefit	Should it be public policy	What is problem for home agency	Totals
We should send the closest resource	2	0	2	0	1	8	1	0	0	3	17
Agency level problem	1	1	1	0	1	0	0	0	3	0	7
County fire chiefs trying to solve	0	0	1	1	0	0	0	0	0	1	3
Aid across boundaries creates a tax allocation issue	0	0	1	0	0	0	0	0	0	2	3
Delays patient care to not send closest resource	0	0	0	0	0	1	0	0	0	0	1
Aid agreements are sufficient	0	0	0	0	0	0	1	0	1	2	4
Aid exists but not the fastest response	0	0	0	0	0	1	0	0	0	0	1
Automatic vehicle location	0	0	0	1	0	0	0	0	0	0	1
Benefitting from higher service level area without paying equal taxes	0	1	1	0	2	1	0	0	1	1	7
Budget versus benefit	0	0	0	0	1	0	0	0	0	0	1
Staffing level	1	4	2	1	4	2	0	0	1	1	16
Closest resource isn't necessary	0	0	0	0	0	2	1	0	0	0	3
Regional dispatch cost prohibitive	0	0	0	0	0	0	0	6	0	0	6
Closest resource only in high risk incidents	1	0	0	0	0	0	1	0	0	0	2
Closest resource only within own jurisdiction	0	0	1	6	0	0	1	0	0	0	8
Public policy would solve this problem	1	1	1	0	0	0	1	1	8	0	13
Regional dispatch improves life and property protection	0	0	0	0	0	0	0	3	0	0	3
Rural people do not receive closest resource	0	0	2	1	0	1	1	0	0	1	6
Cost is the barrier	0	3	0	0	1	0	0	0	0	0	4
Cost of life is worth the budget implication	1	1	0	0	0	0	0	0	1	0	3
Re-allocation of resources to meet jurisdictional needs	0	0	0	1	0	0	2	0	0	0	3
Increase in liability	0	0	0	0	1	0	0	0	0	0	1
We already send the closest resource	0	0	0	1	0	0	0	0	0	0	1
Disparity in budget	0	1	1	0	1	0	0	0	0	1	4
Does not know that closest resource is not happening presently	0	0	0	4	0	0	0	0	0	0	4
Cost to aid a neighbor without compensation	0	0	0	0	2	0	0	0	0	0	2
EMD Priority Dispatching	1	0	0	0	0	0	0	0	0	0	1
EMS Level	1	6	4	1	6	2	0	0	3	3	26
Emergencies are cross jurisdictional	0	0	2	1	0	0	1	0	0	0	4
Financial obligation precludes closest resource	0	0	0	1	0	1	0	0	0	0	2

Handle current incident versus potential incident	1	0	0	0	0	0	0	0	0	0	1
Human life cost	1	0	1	0	0	0	0	0	0	0	2
Wildland fire different process	0	0	0	0	0	1	0	0	0	0	1
Administrative challenges	0	1	0	0	0	0	0	0	0	0	1
Aid Agreement Handles Cost Issue	3	1	0	0	0	1	8	0	0	1	14
Aid agreement out of balance	0	0	0	0	0	0	4	0	0	1	5
Closest resource is a right	0	0	9	0	0	2	0	0	0	0	11
Closest resource not dispatched	0	0	0	2	0	0	0	0	0	0	2
Community need highest priority	0	0	0	0	0	0	0	0	0	0	0
Community pays for higher service level	0	1	0	0	0	0	0	0	0	0	1
Cost a matter of policy	0	0	0	0	1	0	1	0	0	0	2
Cost if we don't respond closest resource	1	0	0	0	0	0	0	0	0	0	1
Duplication of cost	0	0	0	0	0	0	0	0	0	0	0
Impact to local jurisdiction	2	2	0	0	5	3	0	0	0	5	17
Interagency Cooperation	0	1	1	0	1	1	0	2	1	0	7
Move up and cover	7	0	1	0	2	3	0	0	0	7	20
Need for regional dispatch	0	2	0	1	0	0	0	13	1	1	18
Public image	0	1	0	0	2	0	0	0	0	0	3
Public policy would be a barrier	0	0	0	0	0	0	0	0	4	0	4
Rapid response priority	1	0	2	0	0	0	0	0	0	0	3
Shared cost if disparity exists	0	1	0	0	1	0	3	0	0	0	5
We do not send the closest resource	0	0	0	7	0	0	0	0	0	0	7
Totals	25	28	33	29	32	30	26	25	24	30	