Spring 2016

# Examination of Common Errors Committed During EOC Operations: A Content Analysis Study

Michael Kenneth Ryan
*Jacksonville State University*, mkryan433@gmail.com

DISSERTATION APPROVAL

Candidate: Michael Kenneth Ryan

Major: Emergency Management

Dissertation Title: Examination of Common Errors Committed During EOC Operations: A Content Analysis Study

Approval:

_____

Jeff Ryan Date
Major Professor, Professor of Emergency Management

_____

Stacey Mann Date
Professor of Emergency Management

_____

Bill Lowe Date
Professor of Emergency Management

_____

Alessandra Jerolleman Date
Distinguished Affiliate Professor of Emergency Management

_____

Joe G. Delap Date
Dean, College of Graduate Studies

# EXAMINATION OF COMMON ERRORS COMMITTED DURING EOC OPERATIONS:

# A CONTENT ANALYSIS STUDY

A Dissertation Submitted to the
Graduate Faculty
of Jacksonville State University
in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Science
in Emergency Management

by

MICHAEL KENNETH RYAN

Jacksonville, Alabama

April 29, 2016

_____

Michael Kenneth Ryan Date

ABSTRACT

One of the key aspects in the learning process, whether it is at an individual or organizational level, is the ability to recognize where errors occur. This is especially important in the field of public safety where small errors can present a serious threat to the safety of first responders and victims of disasters. Up to this point, there has been no systematic study to identify the most common errors that occur during emergency operations center (EOC) activations at the local level of government. Following the introduction, one chapter explores the history of emergency management and the difficulties local jurisdictions have encountered in their attempt to manage large-scale emergencies or disasters.

Another chapter is devoted to explaining the use of content analysis to review after action reports (AARs) from communities with a population between 300,000 and 499,000. The statistical analysis of the AARs analyzed indicated that issues associated with communication, organization, situational awareness, resource deficiencies, as well as training, did have an impact in a majority of emergency operations centers (EOCs) during an activation. In addition, commonalities among challenges was also noted. Based upon the findings of this study, the outcomes can be used to help enhance current and future training programs so that preventable errors can be reduced or preferably eliminated.

xiv, 234 pages

# VITA

Michael Kenneth Ryan was born in Camden, New Jersey on April 10, 1957. He is the son of Mr. and Mrs. (Kardash) Joseph T. Ryan. He is married to Joanna Ryan and they have four children. Mr. Ryan received a Bachelor of Science in Fire Science at University of Maryland University College in 2002, and a Master of Science in Emergency Management at Jacksonville State University in 2005. He had an extensive career in the fire service where he held various positions and retired as a Battalion Chief in 2005. He has continued to be involved in public safety where he currently holds the position of Manager for Emergency Planning with the Hillsborough County Fire and Rescue Office of Emergency Management. The Ryans reside in Riverview, FL.

ACKNOWLEDGEMENTS

I would like to begin with thanking my committee. Dr. Ryan, your leadership over the course of this journey has been remarkable and inspiring. You have consistently upheld the high standards established for the program and been a champion for those of us who have taken the challenge of pursuing the highest level of academic achievement. Dr. Lowe, your perspective of understanding what this adventure would entail, and the challenges that would come along with it, were always in the back of my mind. You helped me to forge a realistic approach, and to pace myself. In the end, I knew that if I would remain persistent and committed, the result would be worth every bit of what I put into it, and so much more. Dr. Jerolleman, your direction and guidance helped to make this dissertation beyond whatever I could have done with it on my own. You saw clearly the areas that needed to be addressed, and provided guidance that showed me not only how to make this paper better, but also why the changes were necessary. Finally, Dr. Mann, who provided me with insight, knowledge and abilities that will last, and benefit my future endeavors, for many years to come. Over the years, you helped me to become a better writer, analyst, and yes, a better student. I can never thank you enough for all that you have done.

Dr. Kushma, your encouragement and understanding has helped me to navigate all the steps needed to be successful. You have offered opportunities to extend myself beyond what I felt I was capable of accomplishing. All the while, demonstrating

tremendous patience in allowing me to fumble my way through each phase. In the end, building my confidence to take the next step. To my cohort, Scott Manning, Wayne Bergeron, Chris Kearns, Russ Peterson, John Fenn, Kay Vonderschmidt, Melody Dry Buchanan, Royce Woodruff, Terri Clay, and Jeanna Barnes. Thank you for all of your support over the years. We have come a long way and experienced both ups and downs, but none of you ever lost your commitment to friendship. For that, I am eternally grateful. To Dr. Hathaway, Dr. Plodinec, Dr. Shaw, and Dr. Hill for your excellent instruction and dedication to the overall success of the program. Of course, many thanks to Dr. Cox and Dr. Meehan for having the determination to turn a vision into a reality.

Without question, all this would not have been possible if it had not been for the support from my family, Sara, Tyler, Joshua, and Jacob, who have made, and continue to make, each and every day a blessing. To close, to my wife Joanna, who is the absolute love of my life, my world, and my best friend.

## DEDICATION

To my wife Joanna, who provided support,

encouragement, and never ending patience. Without you,

none of my accomplishments would ever be possible

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

Page

# CHAPTER I

# INTRODUCTION

## Background

Emergency management is a field that is interdisciplinary by nature and incorporates multiple functions in order to be successful. Whether it is an interagency planning effort conducted to address the potential outcome of a regional influenza outbreak or the gathering of community organizations to discuss an annual family preparedness program, collaboration, coordination, and communication are critical. Whether man-made, technological, or natural, any large-scale incident or major crisis will involve numerous organizations. Emergency managers will be expected to serve as facilitators and convene those organizations so that an effective and efficient response can be initiated. Most likely, the response to, or recovery from, these types of scenarios will typically involve a network of multiple jurisdictions, as well as private and non-profit actors. In addition, multiple levels of government will become involved at some point (Moynihan, 2009).

During times of non-emergency, or what is often referred to as "blue sky" periods, emergency management entities, much like other organizations, utilize a framework or some type of organizational structure by which they can prioritize their tasks in order to help meet the needs of the community they serve. By using an organizational structure, they are able to meet their desire to build upon good business

practices and eliminate foreseeable errors, taking advantage of their own past experiences and using lessons learned along the way. Good preparation is based upon the realization that each crisis and disaster is unique and may take unknown (and unknowable) resources. At the same time, preparedness aims to build organizational capacities to deal with known risks that can be expected to occur (Boin & Hart , 2010).

This being the case, emergency management agencies benefit from having a template to follow during large-scale emergencies and/or disasters that require the activation of the local Emergency Operations Center (EOC). Unfortunately, at this point, established overarching standards, templates, or best practices that are utilized for activating EOCs are not in place. The result, according to one emergency management director from Virginia, is that "lessons learned, in many cases, are "lessons observed", because modifications in policy, protocol, training, equipment, personnel, or mindset to actually promulgate change are not adopted (Brown, 2015).

One of the most common methods regarding how change is undertaken is to identify common obstacles and challenges, or situations or incidents that inhibit an EOC from reaching optimum efficiency and effectiveness. By taking the time to identify persistent obstacles, first responders can become aware of the challenges they face and place themselves in a better position to avoid future errors through better planning and training (Donahue & Tuohy, 2006). Additionally, through the process of understanding why some challenges remain unresolved, "responders may be able to adapt their lessons-learned processes to better support behavioral change and improvement" (Donahue & Tuohy, 2006, p. 2). Accordingly, to improve current training programs, the foundation of the improvements must be based upon sound empirical evidence and be inclusive of best

practices where applicable. Taking deliberate steps to correct actions or create policies based upon empirical evidence is a good approach to solving issues hindering optimal performance.

Historically, emergency managers have taken the position that learning occurs from making mistakes. While to some extent this may be true, not all crises and disasters result in procedural or policy reform, or, for that matter, learning, even when mistakes and oversights have been clearly identified (Deverell & Hansen, 2009). Past and current research have been somewhat lacking in terms of identifying and comprehending organizational learning (Deverell, 2012), which has served as an unsurmountable hindrance to those professions that are trying to move forward. For example, many public safety and public health organizations implement and utilize formal knowledge management practices to help with the identification and sharing of experiences gained by individuals and groups over time (Savoia, Agboola, & Biddinger, 2012). One of the most common techniques used to enhance the learning process is through the aforementioned "lessons-learned" approach. A significant benefit of this type of approach is its application to both large and small enterprises, which is especially helpful in terms of addressing EOC operations because a "one-size-fits-all" approach is inappropriate for the variety of communities in which individual EOCs operate.

Within the public safety arena, learning from successes and failures, both within the organization itself and from others, has been a cornerstone for helping agencies become better prepared. Whether during blue-sky times or in the midst of a response to a disaster, the necessity and desire to improve policies, procedures, and processes is always present. Learning from historical practices, whether good or bad, helps individuals as

well as organizations improve their own performance (Savoia, Agboola, & Biddinger, 2012). For emergency management professionals, drawing upon lessons learned from real-world events and training simulations not only influences their ability to assist with life-saving activities, but also improves their capacity to minimize avoidable economic and social consequences (Savoia, Agboola, & Biddinger, 2012). Through this technique, many organizations have created formal procedures for identifying, documenting, and sharing lessons learned from prior responses to emergencies as well as from simulations (Savoia, Agboola, & Biddinger, 2012).

Research has shown that noting past errors that occurred during emergency situations provides an excellent opportunity for learning (Loh, Andrews, Hesketh, & Griffin, 2013). As such, multiple programs have been developed to draw upon these lessons to help organizations improve their functions. One of the best known is the U.S. Army's After Action Review program, which utilizes After Action Reports (AARs) and serves as a comprehensive, reflective-learning process (Donahue & Tuohy, 2006).

Throughout the country, numerous emergency responders follow the AAR template in some fashion, which is basically employing either a formal or informal process in which an agency or set of agencies documents the occurrences of a disaster or exercise. These reports usually include accounts of actions taken and the results of those actions. They often also identify potential remedies to problems encountered (Donahue & Tuohy, 2006). The AARs help individuals and organizations create a tool for the accumulation of experiences, which then can be utilized by individuals to implement useful cognitive skills even under stress (Donahue & Tuohy, 2006). Skills in this area consist of, but are not limited to, framing the problem, developing mental models, and

engaging in sense making (Moynihan, 2009). Thus, these ideas form the foundation of this study, which, specifically seeks to identify the most common challenges that occur during EOC activations so that future training can focus on known challenges.

At this point, no literature has been published regarding the examination and comparison of multiple jurisdictional EOCs regarding common errors and challenges they face during an activation. Therefore, the result of this study could enhance EOC effectiveness and efficiency by highlighting those areas that are most frequently encountered. Furthermore, errors in individual EOCs can be identified in a fashion that is acceptable to those who operate within the discipline, and recommendations can be developed that are applicable to all EOCs.

**Problem Statement**

In order for organizations and individuals to improve their ability to perform tasks, they must be able to recognize where errors are occurring in their current level of performance. In public safety, this is critical because small errors can pose serious threats to the safety of first responders and victims (Jehn & Techakesari, 2014). According to Sinclair, Doyle, Johnston, and Paton (2012), "The quality of the response and recovery efforts is thus directly linked to the knowledge and skills possessed by staff working at disaster sites" (p. 2). This same premise holds true not only for first responders, but also for those who work within an EOC.

Mistakes made in the EOC can directly impact the ability of the EOC to provide support to those who are actively engaged in disaster operations. The goal of emergency management training is to develop the abilities of EOC personnel as they respond to the challenging and atypical demands of a disaster (Uhr , 2009). In order to improve

performance levels, those who are charged with the responsibility of organizing and/or managing an EOC operation need to have access to information that readily identifies the errors made in EOCs, as well as their causes. This will then provide them with the information they require to correct deficiencies and improve their ability to support responders in the field.

In past studies, researchers have shown how the process of learning from past errors has yet to manifest itself (Donahue & Tuohy, 2006). While the use of AARs has shown to be beneficial, the recommendations that can be found within the documents are not always recognized and/or implemented. Additionally, while documenting errors is useful and necessary in identifying deficiencies, no efforts to systematically examine and compare EOCs have been made to identify the most common challenges. Additionally, documentation may identify mistakes but not the process in which to correct them. Thus, actions that have been taken to correct these problems have not been shared, limiting the benefits that could be derived holistically, to only a few EOCs.

During a White House press conference, Assistant to the President for Homeland Security and Counterterrorism Frances Townsend stated that the President requested that the mistakes made in response to Katrina be corrected (Donahue & Tuohy, 2006). Specifically, she identified areas such as planning, situational awareness, and communications. While these issues may have been news to some, this did not come as a surprise to the emergency management community (Donahue & Tuohy, 2006), because these are the same issues practitioners have been battling for many years (Donahue & Tuohy, 2006), which is further evidence that problems have been identified but not corrected.

As stated by Thomas et al. (2004), "There is a growing realization that nearly all currently accepted disaster preparedness practices are based largely upon anecdote, and are lacking systematic study or objective validation (as cited in Sinclair et al., 2012, p. 517). In addition, although studies have been conducted to identify errors, many have focused on incident response organizations. While very useful for responders, they are not much benefit to those who are working within an EOC environment. Without highlighting the areas that need the most attention, improving the efficiency and effectiveness of EOC operations will continue to be difficult.

While some research has focused on issues such as coordination and information flow in EOCs (Militello, Patterson, Bowman, & Wears, 2007), studies have not focused on exploring AARs in an attempt to identify the most common issues as noted by EOC personnel. This study serves to build upon current research in an attempt to explore the most common errors found during EOC operations to help improve their operational capabilities and training programs, as well as to begin the process of gathering data by which improvements can be measured.

**Purpose of the Study**

The purpose of this study is to examine AARs created in examining the operation of an EOC in order to identify areas noted as needing improvement. Secondly, this study will help to identify the existence of trends in terms of areas for improvement documented in multiple EOC operations. Third, this study will offer possible solutions to the most commonly identified errors in EOC operations as noted in the AARs reviewed.

Not only will this examination serve as a foundation to help improve current EOC operations, exercises, and training courses, but it will also be beneficial as a template for

future evaluations of EOC operations. The study could be used as a guideline for future EOC assessments to measure progress in addressing errors specific to an EOC operation. Sinclair, Doyle, Johnston, & Paton, (2012), state that assessments are designed to incorporate two fundamental concepts: monitoring and evaluation. The monitoring component is a continual process that provides organizations with indications demonstrating compliance with responsibilities, and progress, or lack thereof, in the achievement of results. Evaluations are used to measure effectiveness by "comparing actual with intended goals, objectives, and targets" (Sinclair et al., 2012, p. 510), and provides a systematic context for interpreting these differences as well as providing a foundation for future training needs.

**Methodology**

The methodology to be utilized for this study will be a content analysis. Content analysis can be applied to wide variety of written text such as speeches, letters, journals, and reports such as AARs. Furthermore, Rose, Spinks, & Canhoto state that content analysis can be used to examine both the manifest and latent content of a text (Rose, Spinks, & Canhoto, 2015). Regarding this study, manifest content refers to the visible and countable components of the document. For this study, the methodology incorporates the systematic dissection of text into units that can be further examined to identify specific areas that present themselves as challenges. The study will identify those areas in which jurisdictions have identified as strengths, as well as include recommendations that have been included into the individual AARs. According to Franzosi, (2008):

> Four major functions of content analysis may be distinguished to produce increases in the degree of confirmation of hypotheses already generally presumed to be valid, and definitive disconfirmation of hypotheses already generally presumed to be invalid. To correct "optical illusions" which may

> be shared by most specialists. To settle disagreements among specialists as the truth value of certain propositions, and to permit the formulation and testing of hypotheses (Franzosi, 2008, p. xxiii)

The research process will utilize individual coding as well as submitting each AAR into a software program for further analysis in terms of frequency. Additionally, it will assist with coding (United States GAO, 1989; Rose, Spinks, & Canhoto, 2015) to enhance both validity and reliability.

**Significance of the Study**

The significance of this study is key in furthering the efficiency and effectiveness of EOC operations. While the study will focus on medium-sized communities, those with a population between 300,000 and 499,000 people, the results will be applicable to any EOC. This is due to the fact that the responsibilities of an EOC are to coordinate (Militello, Patterson, Bowman, & Wears, 2007) and support entities in the field, regardless of the population of the community impacted by a large-scale emergency or disaster. Whether the incident is natural, man-made, or technological in nature, large-scale incidents that extend for multiple days or weeks demand more resources in terms of personnel, general and specialized equipment, supplies, and commodities than any governmental, private, non-profit, or faith-based organization has on hand (Donahue & Tuohy, 2006). In order to address the response-driven as well as agency-driven demands that a disaster can have on a community, the EOC must be able to work as seamlessly as possible in order to get the right resources to the right people at the right time.

While this would be a challenge for the most seasoned emergency responders, it is even more so for those who have little if any experience working during a disaster (Militello, Patterson, Bowman, & Wears, 2007). One method of assistance to EOC

personnel is to establish an environment that is conducive to success. Through the identification of common errors, new or modified policies, procedures, training programs, and management structures can be developed to help reduce, or eliminate, the circumstances in which those errors occur. Within the EOC, managers "seek a lessons-learned system that provides good answers, solutions, and best practices. They want to hear what to do, instead of what not to do (Donahue & Tuohy, 2006, p. 13). This study will help to further the knowledge of the most common errors in EOCs, the situations that contribute to those errors, and the possible solutions that can be developed to eliminate them so the EOC can function at the optimum level of performance and provide the highest quality of service to the community.

While the results of this study can be used by practitioners to improve functions within the EOC environment, the findings may be useful in other arenas as well. Academic institutions could use this study to help design future curricula in a manner that is useful for enhancing institutional knowledge about EOC operations, common errors, and possible solutions to those errors. This study also could be used by private entities to enhance and improve their current training courses. Additionally, the study can serve as a template for state agencies as well as local jurisdictions, large and small, to conduct evaluations of their own EOC operations. In essence, the study can help enhance the learning experience and improve the overall efficiency and capability of EOCs and their personnel

**Organization of the Study**

This study will provide significant insight on the EOC environment, its operations, and common mistakes that occur during activations. The next chapter,

Chapter II, presents a review of the literature, which includes topical areas such as lessons learned, impacts of stress on decision-making, the significance of AARs, EOC management structure, EOC coordination, standards, and organizational learning. Following the literature review, Chapter III describes the methodology that will be used for this study, including the selection of AARs to be used in the study, the data collection process, and data analysis. It will also include the research questions that have been developed, along with the research hypotheses, and limitations of the study. Chapter IV will present the study's findings. This will include the answers to the research questions presented in Chapter I. Finally, Chapter V will provide a summary of the entire study. This will include a discussion of the findings of the analysis conducted, recommendations for enhancing current and future EOC operations, and recommendations for further research that can be conducted based upon the findings of this project and the needs identified in the multiple AARs.

# CHAPTER II

# LITERATURE REVIEW

The literature review for this study has been divided into four main sections. The first section is comprised of the introduction and history of emergency management. It highlights some of the federal laws that have had an impact on EOC operations. The second section describes the EOC of today and how this type of organization can be structured; some of the functions that are associated with an EOC include decision-making, and how staffing is a key component as it relates to the successful EOC environment. The third section outlines the lessons that have yet to be learned, even though they have been previously identified as deficiencies. The effectiveness of using AARs as research materials will be introduced, and how these documents can serve as excellent tools within the framework of knowledge management will be discussed.

## Section I

While the response to large-scale emergencies and disasters is a challenge, especially for those at the local level of government (Wolensky & Wolensky, 1990), improvements can and have been realized when using a structured approach. Emergency management has a long history of implementing practices to address the challenges that come with disasters, which is important to understand as scholars and practitioners both try to advance the field. This section will outline the history surrounding emergency management, highlighting the fact that while errors in disaster response have occurred,

the underlying reason for them is often hard to detect. This section also will show that while local governments are still the main component of a community's disaster response effort, the influence of the federal government has played a role in dictating how some of the response and recovery efforts are conducted.

**Introduction**

In much the same manner as previous research (FEMA, 2008c; Faith, Jackson, & Willis, 2011; Savoia, Agboola, & Biddinger, 2012), this study is being done to examine specific AARs to identify areas that need improvement, and to look for any errors that are common to multiple EOCs across the country. By reviewing and analyzing AARs, emergency management leaders can develop a data-driven approach for identifying key areas of concern that, in turn, will assist them in prioritizing their planning efforts (Savoia, Agboola, & Biddinger, 2012). In addition, they will be in a better position to develop more effective training and exercise programs. While training and exercising are vital tools in all high-risk professions, the fact that disasters are infrequent makes training and exercising especially important in emergency management (Sinclair et al., 2012). The need to understand the impact training has on operational issues resulted in the formation of the first research question, which is:

> RQ1: How often is training, or the lack thereof, recognized as being a source for mistakes, errors, or challenges experienced during EOC operations?

For many years, efforts have been made to address the importance of improving our ability to deal with large-scale emergencies, disasters, and catastrophes. Those involved in public safety have learned over the years that while the actual performance of tasks is critical to the success of any operation, the management of those who are

performing those tasks is just as important (Pidot, 2013; Roberts, 2009; Cigler, 2008). Emergency response personnel have seen how the establishment of a structure by which individuals can perform their tasks can be beneficial (Drach-Zahavy & Freund, 2007). The Incident Command System (ICS) is currently used by first responders throughout the country to manage emergencies, and is a prime example of a structure that helps accomplish tasks in an emergency-related environment (Carwile, 2005). This, in turn, leads to a more efficient response (Lalonde, 2011), and helps responders become better acquainted with their roles and responsibilities, which results in the reduction of errors in the performance of tasks as they become more and more proficient in their role (Weitz, O'Shea, Zook, & Needham, 2011). While some criticize using ICS in large-scale disasters (Sylves, 2008; Waugh Jr. & Streib, 2006), the introduction of ICS into response practices was not an accident and has been in place for over three decades (Neamy & Nevill, 2011).

The concept of ICS was developed more than thirty years ago, in the aftermath of a devastating wildfire in California. During thirteen days in 1970, sixteen lives were lost, seven hundred structures were destroyed and over one-half million acres burned. The overall cost and loss associated with these fires totaled $18 million per day. Although all of the responding agencies cooperated to the best of their ability, numerous problems with communication and coordination hampered their effectiveness. As a result, Congress mandated that the U.S. Forest Service design a system that would make a quantum jump in the capabilities of Southern California wild land fire protection agencies to effectively coordinate

interagency action and to allocate suppression resources in dynamic, multiple-fire situations. (FEMA, 2004, para.8)

To further the efforts being done to create a safer environment for those who serve as first responders and to improve the overall level of service to the public, this study is being conducted to take the idea of learning from past errors and apply it to those functions performed within the EOC environment. Much like the implementation of ICS into the public safety response domain, the basis for many errors is often difficult to determine since there can be multiple causes (Wilson, Dell, & Anderson, 1993). Errors fall into the realm of those items that are considered intangible. In essence, errors are caused by humans, and those actions, or inactions, are not abstract concepts (Hurst, Bellamy, Geyer, & Astley, 1991; Stewart, 1993; Busby, 2001). While the life safety threat to those who staff the EOC is in no way comparable to those who actually deal directly with the impacts of a disaster, their performance is just as important. These individuals are charged with the general coordination, communication, and collaboration needed to assist and support those who are in the field as well as the community in which they work (Perry, 1995; Comfort, 2007).

Managing the risk associated with a threat or disaster is often more important than managing the crisis (Cavanaugh, Gelles, Reyes, Civiello, & Zahner, 2008); this is often the role and function in which EOCs operate. While a national standard structure is in use in the field of emergency response to assist with managing efforts, no such singular standard framework for EOC operations is in place (Shouldis, 2010; Revere, 2000). In addition to having a standard by which to operate, past and current literature also has demonstrated that organizational performance can be enhanced with experience (Madsen,

2009; Biddinger, et al., 1974). Since the literature has indicated that an organization's performance can be enhanced through the experience of the personnel who staff the positions, this served to be the impetus in the creation of the second research question, which asks:

> RQ2: How often is lack of experience noted as playing a role in performance as identified in after action reports?

In viewing historical responses, dealing with disasters has gone through a series of processes and management policy changes over many decades (Henstra & McBean, 2005). Yet, one issue that has remained constant over the years is the seeming inability to learn from the mistakes of others (Wolensky & Wolensky, 1990; Donahue & Tuohy, 2006; Militello, Patterson, Bowman, & Wears, 2007; Faith, Jackson, & Willis, 2011; von Lubitz, Beakley, & Patricelli, 2008). Thus, because the history of dealing with disasters has had one constant associated with it, the inability to learn from mistakes, and understanding that in order for EOCs to operate with any semblance of efficiency requires good situational awareness (Boin & Hart , 2010), the first hypothesis for this study was established:

> H1: When EOCs are activated for real world or simulated natural, man-made, or technological incidents, situational awareness will be identified as a challenge/deficiency in a majority of after action reports.

Additionally, history has shown that depending on local government to be the flag bearer for disaster response and relief has been anything but successful (Wolensky & Wolensky, 1990).

However, the local government EOC has changed over time, and has faced some challenges in decision-making and staffing, as well as understanding how AARs can serve as a tool to help identify the most common errors. Since AARs serve as the primary source for this study, and the study is focusing on the most common errors noted in the AARs, the third research question was formulated:

> RQ3: In examining the operations of the EOC, what are the most common deficiencies that are noted in the after action reports?

Finally, training, exercises, and evaluation also are discussed to provide a perspective of their impact on improving performance and the considerations required to make them effective.

**History**

Responding to natural, man-made, or technological disasters has been a part of the world for a very long time. Historically, the explosion of the Krakatoa volcano on August 26, 1883, serves as the initial beginning of what is known today as the field of "disaster management." When the explosion took place, the sound traveled for over 2,900 miles, and produced the largest ever recorded tsunami (30 meters), causing over 36,400 fatalities. Overall, 165 villages were destroyed (von Lubitz, Beakley, & Patricelli, 2008). This particular event also marked the first time where the use of telecommunications was initiated as a method of spreading news of the disaster. It also was the catalyst for the first international relief effort (Winchester, 2003). For this incident, the response to meet the demands created by the explosion was guided by a Victorian sentiment, quite different from current scientific methodology (Hutchinson, 2000).

We have come a long way since the early style of emergency management first

appeared. While new knowledge has been created, and better systems implemented, they have gone through a cycle of being forgotten and then rediscovered, often at great expense (Hodgson, 2001; Thierauf & Hoctor, 2006). Despite the advances in many different areas of disaster management, the access to more response and relief organizations on both national and international levels remains much as it did in 1883 (von Lubitz, Beakley, & Patricelli, 2008).

Disasters have the ability to impact communities in a variety of ways, and have some general characteristics associated with them. First, they generally occur in a compressed timeframe. Second, many disasters are unpredictable in terms of the type and extent of their impact. Finally, they also inflict "equally unpredictable political, economic, and social consequences" (von Lubitz, Beakley, & Patricelli, 2008, p. 565). How a community is able to respond and recover effectively is often based upon the actions they have taken prior to the disaster occurring, including the steps taken to eliminate or reduce their vulnerability to the disaster (Lagadec, 1993). While some disasters cannot be mitigated against totally, communities can take actions to better prepare for, respond to, and recover from incidents in a more effective manner. However, some researchers have held the position that, at least at the operational level, the effectiveness and efficiency of disaster response is dependent more on the abilities of emergency organizations responding than on the state of preparedness of the individuals (Dynes, 1975).

While the history of how EOCs came into being, or how they emerged, has no clearly defined starting point, there is some evidence regarding the background of how emergency management itself has been created and has evolved over time (Wolensky &

Wolensky, 1990). While a formal EOC facility may not have been part of the equation when disaster management was undertaken, the tasks and responsibilities of providing assistance to the community impacted were still present. Inasmuch, the process of decision-making, task assignment, communications, and coordination still took place. To examine this further, Wolensky and Wolensky (1990) asked two questions surrounding the local government's role in managing disasters. First, how has local government managed the demands associated with natural disaster management, and secondly, what explanations have been offered for performance patterns observed?

In 1990, they conducted an examination of 100 articles dating between the mid-1950s and 1989, they focused on four areas: preparedness, short-term recovery, long-term recovery, and response. They discovered that local government was one of the most understudied institutions in the disaster literature until the 1980's "when researchers, particularly for public administration, political science, and political sociology, devoted more attention to the topic (Wolensky & Wolensky, 1990, p. 703). Thus, one of their first conclusions was that while some progress has been made in exploring the local government role in disaster management, further research was needed. It was their belief that one of the most important factors that influenced the government's ability to manage the disaster existed within the structural underpinnings of the organization that reflected the social and cultural shape of the community (Wolensky & Wolensky, 1990).

While they did address some mitigation and preparedness issues of the disaster cycle, the focus for their study was on their perspective of the response and recovery segments. Within the response phase, they identified four areas that were highlighted as being contributing factors to a poor disaster response effort. These included character,

experience and "quality" of local leaders with an unwillingness and inability to plan, the excessive demands placed on the community by a disaster, and finally the decentralization of governmental decision-making (Wolensky & Wolensky, 1990). In the recovery phase, they highlighted that recovery did not occur in the fashion that was anticipated by the community. This was because local government failed to provide any direction in terms of how recovery should be conducted (Wolensky & Wolensky, 1990).

The article continues to explain that in the 60's and 70's, local governments continued to lose further control because of the funding limitations imposed by the federal government. While this trend was somewhat reversed in the 70's and 80's, it was still a contributing factor to the ineffectiveness of local government in disaster response and recovery (Wolensky & Wolensky, 1990). Their research discovered that during the past 200 years, local government has been, and continues to be, the weak link in the system. Along with other factors, local government also has suffered from the attitude of "it won't happen here." Instead, government has continued to focus only on what is happening today (Wolensky & Wolensky, 1990).

While the central theme of this current study is focused on the identification of common errors across multiple EOCs, research has supported the notion that government entities at all levels still have difficulty learning from the past (Donahue & Tuohy, 2006; Faith, Jackson, & Willis, 2011; Kettl, 2006). According to Wolensky & Wolensky, the community in the earlier stages of disaster management looked to government to be the answer to responding to, preventing, and recovering from local disasters. The focus was, much like it is today, on looking to the outside for assistance in lieu of drawing from the social capital that may be present in the community (Wolensky & Wolensky, 1990; Pynes

& Tracy, 2007). While this area is beyond the scope of the study, the article does highlight that issues previously identified are still present today.

Much like the issues identified in the AARs collected for this project, understanding that errors may have a catalyst element in that one mistake may lead to another, helped to design the fourth research question, which is:

> RQ4: In examining the after action reports, which errors are identified as being coexistent? In other words, when one error is identified, what other error or errors will most likely also be identified in other after action reports?

As such, Brouillette and Quarantelli (1971) identified four internal factors that influence a local government's ability to respond to a disaster, which include: the nature of the demands as perceived by the organization; the bureaucratic structure; the emergency capabilities of the organization; and the perceived need for effectiveness and efficiency.

Although all levels of government are generally involved in disaster management for large incidents at some point, the roles and activities undertaken by the local government are the ones that are most critical to the community (Wamsley & Schroeder, 1996; Somers & Svara, 2009; Col, 2007). Of the many roles that local governments are expected to fulfill, the two most important ones, according to Drabek and Hoetmer (1991) are comprehensive emergency management and integrated emergency management. Additionally, O'Leary shares that regardless of the geographical size or location of a disaster, all disasters are experienced at the local level, where residents can expect to be on their own for at least the first 72 hours following the incident (O'Leary, 2004). One of the ways that local governments have attempted to gather the resources necessary to address the issues created by a large-scale emergency or disaster has been

through the establishment of an EOC.

While numerous papers have discussed local government response to disasters (Harrald, 2006a; Kreps & Bosworth, 1993; Kapucu, Arslan, & Collins, 2010; Cave, 2008; Mann, 2009), the influence that states and federal agencies has had on local capacities also has been noted (Wolensky & Wolensky, 1990). Researchers have stated that it is important for agencies to function in a role that they already know how to perform (Kreps & Bosworth, 1993). Additionally, while having an organizational structure in which to operate is also beneficial, it is more important for personnel to understand their role. (Helsloot, 2009).

**Federal Laws Effecting EOCs**

Laws and legislation have governed much of how local governments prepare, respond, and recover from disasters (FEMA, 2013a; Donahue & Joyce, 2001; Kweit & Kweit, 2006). While local jurisdictions may not be directly tasked from the federal of government to perform any function, they are influenced to perform in a certain manner. For example, many local level EOCs have adapted to using the federal Emergency Support Function (ESF) model for their operations (Shouldis, 2010) so that necessary interaction between the multiple levels of government could be conducted on a common platform. In addition, many government programs that offer reimbursement funds for disaster-related activities require that certain tasks be completed in a specific manner, and within a timeframe established by the federal agency overseeing the assistance funding (FEMA, 2015).

Throughout history, legislation has had an impact on EOC operations. For example, the National Response Framework (NRF) was created to provide a general

guideline as to how the federal government, along with the rest of the nation, is to respond to those incidents that involve the integration of multiple internal as well as external agencies, groups, and organizations (FEMA, 2008a). One of the main components of the NRF is the National Incident Management System (NIMS), (FEMA, 2015). One of the subcomponents of NIMS is Command and Control, which is the home for the Incident Command System (ICS) management structure. ICS has been included into the NIMS document to serve as a common structure that can be used to manage all types and sizes of events (FEMA, 2013a). The idea behind ICS is that resources from one part of the country can be used to carry out the activities necessary during a disaster response in any other part of the country under a similar management structure, which is often accomplished through the operation of the EOC (FEMA, 2013a).

Another legislative document that has had a direct impact on EOCs is the Robert T. Stafford Disaster Relief and Emergency Assistance Act (FEMA, 2013b). This document provides the groundwork for presidential declarations and gives insight into how the federal government will work with the states and local entities during response and recovery efforts (FEMA, 2013b). As an example, the Stafford Act calls for specific actions be taken for obtaining a local declaration, before moving on sequentially towards a presidential declaration (FEMA, 2013a). It also requires EOCs to work closely with state officials in order to initiate preliminary damage assessments, which are reviewed and approved at the federal level (FEMA, 2013b).

All of these activities are associated with a timeline in order to be eligible for relief funding, either through the Public Assistance or Individual Assistance programs. The Act also addresses items such as training, which helps local governments “conduct or

arrange, by contract or otherwise, training programs for the instruction of emergency preparedness officials and other persons in the organization, operation, and techniques of emergency preparedness" (FEMA, 2013b, p. 63). Thus, many jurisdictions use this as the platform to build their training programs (Donahue & Joyce, 2001).

As noted, several influences from the federal government level have found their way into EOC operations. Regardless, today's EOC needs to reflect the professionalism and calmness that is needed in the midst of chaos (Sager, 2005), and, at the same time, manage all the demands placed upon them to coordinate, communicate, and collaborate (Comfort, 2007). As a result, today's EOC continues to evolve and adjust, to become the facility that can perform expected tasks from outside entities.

## Section II

### The EOC of Today

According to FEMA (1981), the EOC is the central location for the coordination of emergency operations, and it can also serve as the central point for disseminating information to personnel who are performing emergency operations (FEMA, 1981). An EOC gains its distinctive characteristics by the activities conducted within its walls. However, often the EOC is confused with the organizational structure that is actually managing the event itself (Kreps & Bosworth, 1993), thus, this section will clarify that the EOC of today is the central point for the coordination of disaster operations. While the roles of those who operate within an EOC are significantly different from the first responder entities, the lines between their areas of responsibilities are sometimes confused.

This section also will identify that while having a common operating picture is

crucial for EOC personnel, and the usage of modern technology can assist with this endeavor, the fact remains that not all EOCs are created equally. Also, research has shown that communications play a significant role in EOC operations, and provide further assistance to those staffing the EOC. The review also will highlight that a while a standardized organizational structure is helpful in accomplishing tasks, no such standard structure for EOCs currently exists. Additionally, EOC functions and staffing are discussed, as well as how decision-making is expected not only of the leadership in the EOC, but of all personnel called in to fill positions.

The EOC by its very nature does not manage the incident. Clark, Hooper and Gibbs (2011) distinguish the difference between a Command Post (CP) and the EOC. A command post delivers specific assignments from the site to units in the field without direct correlation between assignments and resource movement. In an EOC, management decisions are made to support operations in the field (Clark, Hooper, & Gibbs, 2011). The authors add that while a distinction between a field command post and an EOC may be evident, circumstances may result in the command post being located in the EOC (Clark, Hooper, & Gibbs, 2011), which may serve as the basis for some of the confusion surrounding the actual operational differences between the two.

Operationally, the EOC is the most suited facility in which to coordinate response and recovery activities, as well as keep vital records associated with the incident (Bryan, 2011, p. 69). Many times, the flow of information that is entering and leaving the EOC can be too much for any one person to manage. Bryan (2011) explains how the use of modern technology can enhance real-time information gathering and sharing, which is a critical component of any EOC. Portable radios, cell phones, pagers, emails, and all other

types of communication media can be used to contact those who may work in the EOC but who are not at their desk (Bryan, 2011). In addition, the EOC is not only responsible for sharing information with internal partners, but they also have a responsibility to keep the public informed as well (Spence, Lachlan, & Griffin, 2007; Perry, 1995).

In addition to technological aspects, in order for an EOC to operate effectively, personnel must be able to have a common operating picture (Comfort, 2007), and must have an environment that is conducive to seamless action and timely decision-making. Decision-making behavior is considerably affected by the dynamics of environment (Kowalski-Trakofler & Vaught, 2002). Sager (2005) states that the EOC should reflect the required "professionalism and calmness that is needed in the midst of chaos and uncertainty" (p. 119). As such, the operations within an EOC need to be deliberate, and carried out with skill and sensitivity. Perry (2003) argues that the EOC is also where technical experts and political figures convene to formulate the foundation of a decision-making body that helps direct and coordinate the resources necessary in response to an incident. Yet, as he explains, the usage of the EOC is sometimes sporadic and poorly understood.

To be effective in their role, participants in the EOC must have situational awareness (Boin & Hart , 2010). This means that each person who is staffing a position in the EOC must have the capacity to understand what has happened, what is trying to be accomplished in terms of goals and objectives, and what actions have been taken to meet them (Militello, Patterson, Bowman, & Wears, 2007). Although the function itself appears simplistic in nature, the actual activities can be overwhelming to those who are not exposed to disaster-related functions on a regular basis (Huang, Wang, & Lin, 2011).

Additionally, there may be times when understanding the basis for errors is not apparent, although recognizing erroneous actions such as omissions or miscalculations can be quite evident (Wantanakorn, Mawdesley, & Askew, 1999). Understanding that while the location of the EOC may not be ideal, and the circumstances under which it is activated may be less than optimal, personnel are still expected to carry out the functions for which they are called upon to perform. For instance, when the EOC in downtown Grand Forks flooded, it had to be relocated to the campus of the University of North Dakota (Kweit & Kweit, 2006). Also, Fischer and Harr (1994) describe how an EOC in Pennsylvania had to be established in a storefront (Fischer & Harr, 1994). Yet, expectations of performance remained the same. Quarantelli (1978) has argued that EOCs should be designed to accomplish six crucial functions; coordination, policymaking, operations, information gathering, public information, and the capability to host visitors (Quarantelli, 1978; Perry, 1995). Thus, whether the EOC is physically located within a 10,000 sq. ft., specially-designed-and-equipped facility, or operating from back of a warehouse, the tasks still need to be conducted and completed in a manner that meets already established expectations.

As identified, communications are key components to EOC operational effectiveness. Looking specifically at the public information function as recognized by Quarantelli (1978), one of the overarching themes of EOC operations is that if all else is fails, the EOC still needs to be able to serve as the hub for communications with public officials, governmental agencies, and the public (Perry, 1995). The communication goals are to initiate action, inform crisis decision-makers, and set the tone for handling the crisis (Spence, Lachlan, & Griffin, 2007; Garnett & Kouzmin, 2007; Covello, Peters,

Wojtecki, & Hyde, 2001). Essentially, the EOC manages the information being disseminated to reduce confusion and frustration (Donner, Rodriguez, & Diaz, n.d.). A well-defined process for sharing information can reduce the challenges the EOC faces (Perry, 1995). Personnel in the EOC also will need to ensure that communications, both internally and externally, are ongoing and accurate (Quarantelli, 1986).

Internally, during normal non-crisis situations, communications between organizations is conducted in a non-formal fashion, and occurs between individuals who generally are familiar with each other. During a crisis, this may not be the case. Often, new contacts must be established and maintained with individuals who occupy positions of authority within organizations that had not established contact prior to the incident (Quarantelli, 1986). Even in the best of circumstances, this can prove to be difficult, which leads to the study's second hypothesis:

> H2: When EOCs are activated for actual, real-world or simulated natural, man-made, or technological incidents, communications will be identified as a challenge/deficiency in a majority of after action reports.

Within the EOC environment, the perspective must be one whereby individuals maintain a "global view". This enables the EOC staff members to maintain a vision of how the disaster incident, or incidents, has affected the many components that make up the community. The goal is not to address the specifics of any one activity that may be garnering much of the attention during a disaster response, but to view that particular event, or events, as potentially having other cascading effects outside of the immediate incident scene. Lettieri, Masella, and Radaelli (2009) shared a concept espoused by Quarantelli, (1997), who stated "good disaster management does not involve the

mobilization per se of personnel and resources – that will happen anyway. Effective, means that a desired and intended result has been produced" (p. 129). EOC staff may sometimes need to step back to maintain a community-wide vision so that the whole community can still have their needs met.

In understanding the concept of a global perspective, research also has focused on how EOCs operate (Carwile, 2005; Faith, Jackson, & Willis, 2011; Huang, Wang, & Lin, 2011; Savoia, Agboola, & Biddinger, 2012), and how these operations are viewed by others. Many times, those who are not members of the emergency management organization do not understand the premise for how operations take place or are structured in the EOC (Perry, 1995). Often, a large-scale incident presents policy-makers as well as EOC staff with challenges and operational dilemmas that could be considered impossible-choice dimensions. Boin and Hart (2010) share that in regards to EOCs, "Everybody looks at them to 'do something', but it is far from clear what that 'something' is or whether it is even possible without causing additional harm" (p. 358). In the grand scheme, the EOC really serves as the conductor and coordinator during a large-scale incident or disaster response and recovery (Perry, 1995; Engelmann & Fiedrich, 2009; Revere, 2000).

While the staff in an EOC do not direct the activities that take place out in the field, they are often responsible for providing the logistical support necessary for those activities to be done safely and successfully. However, the skillset necessary for those who staff an EOC may not be reflective of their daily roles in an organization (Revere, 2000). Thus, the challenge for the emergency manager is to accentuate the skills that each EOC staff member brings to the operation, and provide an environment in which they

have a good chance of performing at a very high level in a new environment (Shouldis, 2010). Without a standard platform, and in order to carry out all of the demands placed upon them from a variety of entities, EOCs often attempt to find the best organizational structure in which to operate (Boin & Hart , 2010; Dynes, 1970).

**EOC Organizational Structure**

Emergency conditions place extraordinary demands upon public service personnel for accurate and timely information to make the best use of limited resources under urgent constraints (Comfort, 1985). As such, many internal as well as external agencies look to the EOC to be their base for support. In order to fulfill this expectation, personnel in the EOC must be able to organize vertically, and to work horizontally (Kettl, 2006). Today, as in the past, there are no jurisdictions that have all the materials, equipment, personnel, and supplies they desire when it comes to dealing with a disaster. Even on a good day, agencies and organizations are in a constant battle for resources just to carry out the tasks they normally perform. However, during a disaster, these resources become even more scarce (Donahue & Tuohy, 2006). Add to this the level of stress that will accompany any EOC operation, and the ingredients necessary for multiple errors to occur are in place (Wheeler & Riding, 1994).

Undoubtedly, there is a difference between those who coordinate the activities of a variety of disaster response and support agencies, and those whose role is to direct the disaster response (Waugh, 1991). Yet, unlike first responder agencies who typically work and conduct their tasks under the Incident Command System (ICS), one standard organizational structure that EOCs are expected to implement to help them with their role has not been created (Shouldis, 2010; Perry, 1995; Drabek, 1985). The question then

becomes, what type of organizational structure is best to implement in order to ensure that tasks in the EOC arena are successfully completed? With this environment as a backdrop, the third hypothesis was formed.

H3: The lack of EOC organization will be identified in multiple EOC after action reports as being the source of errors committed during an EOC activation.

One study conducted to examine governmental organization suggested that the best strategy is to base the organizational structure on the actual function to be performed (Dean, 1981). Then:

- fit the agency's current structure to its desired purpose
- group the related programs
- acknowledge that even good personnel cannot overcome a bad structure
- provide the administrative head with broad authority
- permit span of control
- decentralize the operational decision-making
- delegate authority for service delivery coordination, and
- avoid attempting coordination through a collective interagency committee.

In an attempt to accomplish this goal, EOCs have adopted several organizational frameworks that are essentially based upon the preference of the jurisdiction (Shouldis, 2010; Drabek, 1985).

In looking at organizational structures, Drabek (1987) has suggested five principles that local jurisdictions should adopt to help guide their emergency management structure selection. These include making sure that the mission of the agency is consistent with the public's perception in term or priorities; find the supportive

niche within the local government; demonstrate organizational ability; increase interorganizational linkages; and become involved with constituent relationship building activities (Drabek, 1997). The issue in essence comes down to balancing authority with flexibility. As such, the conditions of urgency that EOCs face require adaptability and coordination of effort. While the tendency would be to centralize authority and control during a disaster, theory would suggest a more organic approach to building the organizational structure under which these types of activities would be managed may be more appropriate (Waugh, 1991).

One type of structure utilized by local governments is built upon the configuration used by the federal government in their role as a support agency in times of disaster. This structure is labeled, the Emergency Support Function (ESF) (Kamoie, 2005). ESFs provide the organizational assignment structure that a jurisdiction can use for coordinating interagency support for response to an incident. Similar to the manner in which the federal government is organized, they serve as mechanisms for grouping functions most frequently used to provide support (FEMA, 2008b). Each ESF has a primary agency and several supporting agencies. The role of the primary agency is to ensure that resources associated with their specific ESF are integrated to provide the optimum level of support to those disciplines on the incident scene(s). ESFs are composed of functions such as transportation, public works, firefighting, law enforcement, public health, search and rescue and multiple other function based upon the determination of the jurisdiction (Shouldis, 2010).

Another structure that may be found within an EOC is the Multiagency Coordination Group Structure. Often referred to as a MAC Group (Shouldis, 2010),

which is made up of organizational, agency, or jurisdictional representatives who are sent to the EOC to serve as representatives for that entity. Each representative is provided with the authority to speak on behalf of the body that he/she represents. They have the ability to commit resources (material, personnel, and funds) as they deem appropriate (Shouldis, 2010). The success of the MAC Group is dependent upon the representatives who are present at the EOC. While some organizations that need to be at the EOC are obvious (such as law enforcement, fire rescue, emergency management, etc.), other important groups that should be represented, may not be present. These include personnel from volunteer agencies, faith-based charities, non-profit organizations, and the business community. While they may not have the large number of resources to commit, "their contacts, political influence, and technical expertise are the foundation for a collaborative effort" (Shouldis, 2010, pp. 74-75).

The establishment of the Major Management Activities Structure is another one of the organizational frameworks that can be found within an EOC (Shouldis, 2010). The components of this organization consist of a Policy Group, which is made up of upper-echelon individuals such as elected officials and department heads, whose role is to address the overarching objectives and priorities of the community (Shouldis, 2010). The decisions that come from the Policy Group help to set the direction for the objectives to be operationalized. This segment is carried out by the Coordination, Resource, and Operations Groups (Shouldis, 2010).

The Coordination Group is comprised of individuals whose role is to be responsible for collecting and analyzing the incident information such as the extent of damage, resource status, and expenditures data. They also are charged with conducting

planning for future activities that may need to be accomplished (Shouldis, 2010). The Resource Group is charged with supplying resources necessary to the incident scene, while the Operations Group is responsible for all portions of the response or recovery function. While the overall structure is simple, there is no one-to-one match between the organization of the on-scene incident command structure, and the EOC organization. This could hamper the coordination of efforts (Shouldis, 2010).

Finally, much discussion over the years has centered on the use of the Incident Command System (ICS) in the EOC (Waugh, 1991; Shouldis, 2010; Donahue & Tuohy, 2006; Bigley & Roberts, 2001). ICS is structured to provide for operational effectiveness through fourteen different elements. These include:

- common terminology
- modular organization
- management by objectives
- reliance on an Incident Action Plan
- chain of command and unity of command
- unified command
- manageable span of control
- pre-designated incident locations and facilities
- resource management
- information and intelligence management
- integrated communications
- transfer of command
- accountability and

- deployment (FEMA, 2005).

While the use of ICS in field operations has been fairly well accepted as a standard of practice, it has not been well received in the academic community as being a good management platform for large-scale disasters (Lutz & Lindell, 2008).

Some researchers have suggested that the ICS cannot be used in formats other than military or paramilitary organizations such as fire rescue or law enforcement (Wenger, Quarantelli, & Dynes, 1990). Additionally, some researchers also contend that organizations with normal civilian structures, such as public works and social services, cannot operate as effectively under such a structure (Lutz & Lindell, 2008). Others maintain a position that the system neglects volunteers and emergency groups (Drabek, 1985; Drabek, 2005; Neal & Phillips, 1995; Schneider, 1992; Trainor, 2004).

However, in an article by Waugh and Streib, (2006), they state that the appropriateness of ICS for the EOC is an issue to be examined further (Waugh & Streib, 2006). They share that it may not be the structure that is at the center of the issue, but more of a misunderstanding of emergency management (Waugh & Streib, 2006). Another perspective is that it may not be the system itself but rather the ineffective implementation of ICS that is the real issue (Hansen, 2007). In the study conducted by Lutz and Lindell (2008), their findings did not necessarily confirm or contradict the position that ICS is better than some previous management structures used. However, they did expand upon this more by stating that the way that ICS is currently structured and trained upon is not effective. Accordingly, the issue of not using ICS correctly appears to be more of a training issue, and not so much a structural one (Lutz & Lindell, 2008).

Since training was identified as a significant issue when it comes to utilizing the ICS format correctly, the fourth hypothesis was advanced. It states;

> H4: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, training will be identified as a challenge/deficiency in a majority of after action reports.

This is a logical conclusion since many of the people who staff EOCs are not public safety or traditional first responders. Their comfort level with the ICS structure, or any of the other organizational structures that have been identified, may be tenuous at best. Thereby, it makes sense that their ability to work within the system is not as efficient as it could be if they were to utilize the structure on a regular basis.

Regardless of the type of organizational structure in place, each person who comes to the EOC has a function to carry out (Boin & Hart, 2010). Supporting the functions that are conducted out in the field requires just as much activity be conducted within the EOC. For responders in the field to be successful, operational objectives must be accomplished. This is done with the support provided by personnel in the EOC (Boin & Hart, 2010). The positions filled in the EOC are critical to the success of any disaster field function (Drabek, 1985; Perry, 1995). The next section will examine some of the most important roles that EOC staff fill during an activation.

**EOC Functions**

Regardless of the types of organizational structure used to manage the activities conducted within an EOC, specific activities must be undertaken in order for the EOC to be effective. In remarks made at a conference on industrial emergency management, Quarantelli (1986) stated that the primary problems that occur during a disaster are not

associated with the victims of the disaster themselves, but can be traced back to the organizations who are charged with the responsibility of responding to the disaster. Therefore, it is imperative that the actions performed in an EOC result in a positive outcome. Prior studies have shown that success in disaster management is the result of organizations coping well with problem areas (Quarantelli, 1986).

To start, one of the most important functions within the EOC is collaboration. Beginning in the 1990's, local community emergency managers became more defined as individuals who could interact effectively with outside governmental and non-governmental entities (Drabek, 1987; Sagun, Bouchlaghem, & Anumba, 2009; von Lubitz, Beakley, & Patricelli, 2008). At the local level, collaboration is a required skill during disasters because of the necessary community involvement (Waugh & Streib, 2006). Successful EOC operations are dependent upon the integrated and interdependent collaboration of both public and private organizations. By doing so, they are able to create a solution to a problem larger than any one organization can handle on their own (Kapucu, Arslan, & Collins, 2010). This requires a level of trust that many organizations may not be familiar with because during their day-to-day functions, interacting with outside entities may not be part of their typical operation (Uhr, 2009).

Often the other component that goes along with collaboration is coordination. Unfortunately, the larger the disaster, and the larger number of organizations involved in the response, the less likelihood of achieving success in overall organizational coordination (Quarantelli, 1986). This is mainly due to the different levels of the social structure and the dissimilar mix of public and private organizations involved (Quarantelli, 1986). Nonetheless, the EOC staff must do all they can in order to achieve the highest

level of coordination possible given the circumstances in which it is to be obtained. A coordinated response requires the subtle weaving together of forces from a variety of functional areas and from differing levels of government (Kettl, 2006). Accomplishing such a task can be a daunting challenge.

Since the concept of team members working together for a common outcome is the goal of the EOC. EOC staff must be able to "cooperate throughout all stages of the task" (Kapucu, Augustin, & Garayev, 2009, p. 299). During an activation, several important objectives may need to be accomplished. Prioritizing those objectives may prove difficult, especially if competing objectives seem to be present. Often these are difficult because of the perceived difference of their importance, or because of individual management philosophies (Bryan, 2011). However, these difficulties need to be resolved in order for effective coordination to occur.

Additionally, while many agencies may have the internal capabilities and resources to deal with the myriad of issues they face on a daily basis, in terms of disaster response, these same resources are most often not enough to address all of the unique hurdles presented (Kweit & Kweit, 2006). Addressing the needs of first responders as well as the unmet needs of the community requires the combination of multiple groups, organizations, and agencies (McEntire D. A., 2002). It takes the combination of a variety of resources, garnered from multiple organizations, all coordinated in a structured system to realize a successful outcome.

Donahue and Tuohy (2006) provide some insight as to the challenges of coordination in their review of the federal-level response that occurred in the aftermath of Katrina. They shared how the multiple command operations centers that were activated

(not only in DHS but in other federal agencies as well) exposed serious organizational flaws. In their findings, they argue that clear operational or organizational roles and responsibilities were not established. This inaction led to further confusion and the overlapping of functions (Donahue & Tuohy, 2006). Furthermore, they share that without a strong coordination environment, assignments will be missed, tasks will be duplicated, and resources wasted (Donahue & Tuohy, 2006), all of which will result in a decreased level of service to not only the first responders who are depending upon the support of the EOC, but to the community as a whole.

The importance of coordination espoused by Donahue and Tuohy is also highlighted by Lettieri, Masella and Radaelli (2009). They stress that coordination is not only important during the response phase of a disaster, but during recovery as well. Inadequate coordination can lead to conflicts, in addition to the wasting of resources and time. In the end, the outcome has the potential of unnecessary loss of human life and property (Lettieri, Masella, & Radaelli, 2009). Drabek (1997) highlighted that much like communications, repeated mistakes in coordination occur, many of which were found during the review of the response to 9/11 and are not unique. In fact, the same issues that agencies identified in the terrorist attack were the same problems that had been recognized and documented in other localities following a disaster (Drabek, 1997).

As demonstrated, communication, collaboration, and coordination all have a significant function in the EOC. Yet, another function that must occur within the EOC is that of planning. Much like the planning process that is conducted prior to a disaster occurring, planning during a disaster must anticipate the need for resources. Like any other human activity, planning depends on the resources, skills, and motivation of those

that engage in that activity (Perry & Lindell, 2003). Within the EOC, the development of a plan of action is often difficult given the fact that the disasters are dynamic in their nature. The planning process seeks the most efficient way to use essential resources in order to satisfy urgent or chronic needs under conditions of extreme duress (Alexander, 2003). At the end of the planning process, the document created should adequately specify the roles and activities of each and every participant in the risk management and emergency operations activities being discussed (Alexander, 2003).

The planning process has many components. Yet, it is essential that each one be properly included. The outcome being that lives and property could be saved (McLoughlin, 1985). While every emergency is unique, there is enough common ground to make forecasting, warning, and planning, feasible tasks (Alexander, 2003). The personnel in the EOC must make sure that the planning function is carried out in a manner that creates an environment for a successful outcome.

When it comes to EOC functions, regardless of how complex or simplistic, performing unfamiliar tasks with agencies that are not part of one's normal method of conducting business can lead to errors and reduce the efficiency of the entire operation. However, these can be used as learning opportunities, much like within high-performance organizations (Boin & Hart , 2010). Looking at the overall functionality of an EOC, Huang et al. (2011) identify several important characteristics that could be troublesome, such as discrepancies between concepts and objectives, competition between agencies to demonstrate superior performance, and sectionalism, all of which are driven by each agency's differing specialties (Huang, Wang, & Lin, 2011). These characteristics are not isolated to any one segment of agencies or geographical location. While they may seem

to be significant obstacles, they can be corrected. By doing so, errors that may be perceived as unforeseen, can be remedied. As such, the selection of personnel who will be selected to staff the EOC could be one possible remedy.

## EOC Staffing

At the local level, EOCs are not activated on a regular basis. Inasmuch, they are staffed with personnel who will be asked to perform tasks that they are most likely not familiar with. In fact, when a large-scale emergency or disaster affects a community, the majority of the people who will report to the EOC do not have any relevant experience in disaster management (Canton, 2007; Militello, Patterson, Bowman, & Wears, 2007). Local emergency management officials hold the EOC as the nucleus of response operations where representatives of public safety, fire and rescue, law enforcement, local public health, and water districts meet to ensure that necessary information is communicated in a timely fashion (Kapucu, Augustin, & Garayev, 2009). For the most part, the staff in a local governmental EOC is typically at the forefront of response management in disasters (Sinclair, Doyle, Johnston, & Paton, 2012). Selecting personnel to fill these roles can be almost as challenging as addressing the demands of the disaster itself (Mann, 2011).

Whenever a large-scale emergency or disaster occurs, emergency managers and those who staff an EOC must be able to think quickly and critically in order to identify and anticipate situations. They must be problem solvers, be willing to assume as well as manage risk, and protect their community from potential harm (Peerbolte & Collins, 2013). The EOC environment can present difficult and complex situations, while at the same time, incorporate substantial restrictions. These include but are not limited to issues

such as time constraints, and working with highly uncertain information (Palomares & Martınez, 2014). Conducting these types of operations with staff who come from diverse professional backgrounds brings additional challenges. Also, managing individuals with strong personal preferences "makes it more difficult to reach consensus in the group within a reasonable time period" (Palomares & Martınez, 2014, p. 2091). While each individual may bring a level of expertise, individual talent does not guarantee success in a team-oriented environment.

The type of individuals who staff the EOC positions during a disaster must be able to look at the entirety of the situation. They must be able to take a global perspective on how the disaster may not be only impacting an immediate area, but how it may be impacting service delivery to other segments of the community that were not directly impacted by the event. These are referred to as agent and response-generated demands (Perry, 1995). Agent-generated demands are problems resulting from the disaster itself and appear as the disaster unfolds. Some examples include the placement of sandbags to prevent flooding, the opening of shelters for those who may be displaced, and restoring vital services such as electricity as soon as it is safe to do so (Perry, 1995).

Response-generated demands are those needs that become apparent as individuals and groups attempt to meet the needs produced by the agent generated demands (Perry, 1995). They become more recognizable as people try to deal with the impact of flooding, earthquakes, or other hazards. Acquiring sandbags, finding locations for shelters, or obtaining needed equipment are examples of response-generated demands. In essence, response-generated demands deal with the logistical issues pertaining to the response of people and organizations to agent-generated demands (Perry, 1995).

Another set of factors that staff within the EOC must be able to deal with are normalcy-generated demands and mitigation-generated demands (McEntire, 2007). Normalcy demands are associated with the pressure on personnel to restore the community back to the conditions that existed prior to the disaster occurring. This includes getting residents back into the homes, restarting businesses that may have shut down and getting the economic vitality back into the community (McEntire, 2007). Mitigation demands, on the other hand, arise from the desires and expectations of both community members and jurisdictional leadership to prevent the disaster from happening again. This may include, but not be limited to, enhancing current building codes, revising land development plans, or relocating homes and businesses (McEntire, 2007).

Unfortunately, these last two sets of demands may run in opposition of themselves (McEntire, 2007). While residents may want to be placed back into the original home, the mitigation demand may call for them to be relocated, which can create a very intense environment. While many of these issues will have the final outcome determined well past the closing of the EOC, the initial reaction by the community may be an issue that the EOC staff will need to address.

The staffing of the EOC is usually done by individuals who drop their normal day-to-day duties to come and serve next to those who may work in emergency situations regularly (Sager, 2005). Often these individuals are not selected based upon their daily roles, but on the functions that the EOC needs to perform (Perry, 2003). Many times the policy decision-making body is made up of various departments and jurisdictional leaders who work with the EOC manager. This can include technical experts based upon the type of situation being addressed, such a nuclear incident, a weather-related event, or a

terrorist type of scenario (Perry, 2003). Subject matter experts can be very useful to provide guidance and direction that may not normally be part of the EOC staffing makeup.

What cannot be lost is that while EOC staff are trying to solve problems on one hand, they may be trying to push aside fears of what may have happened to their own home at the same time. Additionally, they are reporting to perform a role that they may have never performed before, in a place in which they have never worked. Selecting the right person is a task that the EOC manager needs to approach with a very keen sense of the type of individual that can work both independently, and as part of a team - traits that are sometimes hard to find.

While challenging, the expectations remain that the EOC will find a way to get the help that is necessary to provide the level of support required for those in the field. Unfortunately, according to Donahue and Tuohy (2006), many first responders view the EOC as ineffective. They see those who have been sent over to the EOC to function as their support structure, as individuals who lack any capacity to make decisions or take appropriate or effective action. Often they are viewed as individuals (or organizations) who cannot get along with others, and have trouble garnering enough effort to even focus on the singular goal of how to make a decision as a group (Donahue & Tuohy, 2006). Many outside of the first-response community also find that the government can be slow, ineffective, and misguided (Schneider, 1992). This then translates into the perception of inadequacy within the EOC environment.

As a general rule, organizations typically do not communicate and/or coordinate with each other on a daily basis to the same level that is required with the EOC

environment. Therefore, when they are summoned to come together to work as a highly efficient and skillful group during a disaster, which is expected by first responders and the community, they are not usually successful (Huang, Wang, & Lin, 2011). Additionally, EOCs are usually overcrowded, which can result in the EOC function becoming less efficient (Quarantelli, 1978). While there is much that is taking place in terms of identifying and prioritizing issues and decision-making, many of the people who staff the EOC are second and third-level types of employees who come to the EOC with limited decision-making capabilities (Quarantelli, 1978). While department official heads will occasionally drop by to see what is going on, they usually don't stay (Quarantelli, 1978). If higher-echelon officials cannot be reached, personnel at the middle and/or lower echelons often make decisions they do not normally make (Drabek, 1997).

While some of the personnel that report to the EOC may have little experience in the decision-making process, it is a task that most will be asked to perform as part of their function. Unfortunately, when it comes to local jurisdictions, prompt decision-making is not a common occurrence normally found within the confines of these types of public institutions. This is especially true for democratic systems that are particularly not well designed for this purpose (Rosenthal, 1990). Rather, these governmental structures are noted for their emphasis on the formal consultation, deliberation, and more often than not, complex process and accountability procedures (Rosenthal, 1990). This adds an additional layer of unfamiliarity that the staff of the EOC will be expected to overcome.

Additionally, aside from the fact that the staff of the EOC is mostly comprised of internal jurisdictional personnel, key private-sector partners should have a direct link to emergency managers. They should also be part of, and at times thoroughly integrated

into, the decision-making process. Strong integration into response efforts can offer many benefits to both the public and private sectors (FEMA, 2013a). Staffing of the EOC must include those from the private sector so that all members of the community who have a stake in the outcome, have a place in which they can voice concerns, offer support, or provide resources. All elements of the community must be brought in and integrated into the response and recovery phases of the disaster (FEMA, 2013a).

While doing something may be seen as a good indicator of progress, it is important that the right "something" be done. EOC staff are often expected to accomplish something as soon as they get to the EOC. However sometimes it is best that instead taking the approach of hurry-up- and-do-something, EOCs take the time to stop and do nothing (Canton, 2007). It is important that any decisions made, be done not only on purpose, but with a purpose.

**Decision-Making**

The increasing occurrence and severity of disasters require a more efficient and effective disaster management system in order to reduce the costs of disaster to society (Cutter, Emrich, Mitchell, Boruff, Gall, Schmidtleine, & Melton, 2006). Additionally, with the increased prevalence of technological, manmade, and natural disasters, "the public increasingly expects better public sector leadership before, during, and after catastrophic disasters than has been seen in the past" (Kapucu and Van Wart, 2003, p. 279). Despite the associated challenges, emergency managers and the staff in the EOC must think critically. Each member of the team must be able to identify, anticipate, and evaluate risks as the incident unfolds so that they are in a position to solve problems, make decisions, and assess information in the proper manner (Peerbolte & Collins, 2013).

As noted by Sagun, Bouchlaghem and Anumba (2009), the disaster management process entails critical thinking, sound decision-making, and continuous effort.

Decision-making during times of crisis is influenced by ever-changing conditions, uncertain and/or missing data, constant time pressure, and the need for real-time reaction. Comfort, (1985), stated that "the critical importance of information for optimal decision-making increases geometrically with the scale of the disaster, the scope of the geographic impact, and the number of people involved" (p. 155). Without good information, situations can arise which can lead to ill-defined tasks and goals, as well as significant consequences for mistakes (Engelmann & Fiedrich, 2009). Therefore, personnel who staff the EOC should have a good foundation from which decisions can be made. If not, they can start to question their own abilities. Furthermore, they will begin to question the effectiveness of the plan (Grant & Hoover, 2003). If they are not comfortable with what they perceive as progress, such as getting necessary supplies to those who are in need during the recovery process of a disaster, people will start the process of trying to find alternative solutions to make the situation work (Grant & Hoover, 2003). Critical components of the decision-making process include effective communication and understanding the roles of the multitude of agencies and organizations involved in a disaster response. These play a role as it pertains to establishing and building upon interorganizational relationships (Mann, 2009). These relationships can help to improve decision-making.

The decision-making process for staff within an EOC is not a simple task, and it takes knowledge, skills and abilities, along with strong relationships to ensure an effective process is put into place (Sagun, Bouchlaghem, & Anumba, 2009; von Lubitz,

Beakley, & Patricelli, 2008; Sinclair et al., 2012; Lester & Krejci, 2007). Decision-makers must be able to constantly distinguish between important and unimportant pieces of information so that unimportant segments are discarded from the decision-making process (Kiisel & Vihalemm, 2014). The strategic orientations of decision-makers about what to consider meaningful also helps them to form the basis for their construction of situations of risk. However, working with other team members in an EOC environment offers other challenges. One being that the subject matter experts and lay people may have different perceptions of what is or is not relevant and/or important (Kiisel & Vihalemm, 2014).

One of the ways that staff within an EOC can use information to help with the decision-making process is through the gathering of what is termed situational awareness (Caymaza, Akyonb, & Ereneic, 2013). As shared by Römer et al. (2014), a critical requirement for an effective response by public entities with the task of management of the response and relief effort during disasters, is the availability of current situational information (Waugh, 2007). However, there is currently a lack of a comprehensive operational system that allows for real time collection, visualization, and/or provision of situational information (Römer, et al., 2014). This lack of resources does not, however, negate the need for having accurate information to help staff take the needed steps to manage risk and protect the citizenry from harm, and to reduce property damage (Peerbolte & Collins, 2013).

While no comprehensive system is currently in place, independent systems are being employed to help with decision-making. For instance, former Honolulu Mayor Jeremy Harris recognized the importance of Hawaii's Global Information System (GIS),

and shared that they had lacked some of the fundamental tools necessary for good decision-making. With the integration of GIS, that situation changed (Prizzia, 2009). He stated that they currently have the system deployed in an enterprise-wide operation of the city to help decision-makers.

Harris explained how just about everything they do takes advantage of GIS. He emphasized that every decision that they make really effects every other decision. GÍS now provides them with the opportunity to see all of the community, understand what is going on, and how it works (Frencica, 2004). All of which are important elements to decision-making in the EOC. Decision-making also extends to how communications with those in the community will be handled. In today's culture, what guides an individual in their responses to warning messages is often predicated by their previous experience (Kiisel & Vihalemm, 2014). According to Luhmann (1995), individuals cannot determine meaning in point-to-point correspondence from one person to another. Individuals operate by processing meaning.

In explaining his position further, he distinguishes between two types of individual observations, direct and indirect (Luhmann, 1995). As a direct observer, the individual treats the world as a set of facts (reality and objects), and assumes that situations can be treated as taken-for-granted. Demands by the public for better information, more information, or information that is being withheld exemplify the belief of the direct observer that the information about the state of things is a "given", already correctly interpreted for efficient use (Kiisel & Vihalemm, 2014). The indirect observer is an individual who relies on other's accounts of an event. This individual has to consider the aims of different messages and the facts that the communicator may not feel relevant

and may not transmit. Thus, the second-order observer needs to use knowledge and understandings of direct observers and their experience and skills to interpret the message (Kiisel & Vihalemm, 2014).

Understanding how messages are being received requires that the EOC decide the best methodology to implement to gain the desired result, which often calls upon the usage of differing types of media in order to be effective with the largest number of community members as possible. Additionally, the EOC must anticipate the response of the community to the message. Realizing that even when they trusted the warning and its source, individuals are still willing to ignore some of the advice if it conflicts with their practical concerns (Kiisel & Vihalemm, 2014).

Another one of the largest challenges to decision-making is the fear of making the wrong decision. Many decisions are made without an abundance of information. Yet, action can be taken to help reduce some of the uncertainty that may come with differing disaster scenarios. For example, in China's Qinglong County, the county leader, upon becoming aware in 1974 that his community was susceptible to a possible earthquake in the near future, obtained academic publications and studied about the theories of earthquakes and their natural signals (Col, 2007).

Armed with this new knowledge, he was able to interpret data that he was presented with in 1976 to assist the county committee in their decision-making process to initiate mitigation and preparation programs in the jurisdiction. The result, when the Tangshan earthquake struck in Qinglong County, there were no fatalities in the county, even though more than 240,000 people died in the earthquake zone, of which Qinglong belonged (Col, 2007).

While the preferred outcome of the decision-making process is the realization of a desired goal, this cannot be guaranteed. However, this does not mean that when faced with a similar situation later that individuals are limited to making the same decision and experiencing the same outcome. Unfortunately, history in disaster management and decision-making does not shed a positive light on the willingness to move beyond doing just that (Wolensky & Wolensky, 1990). In regards to decision-making, one truth that has remained consistent over the years is that the quality of the immediate local response is one of the most important factors in determining if the outcome of the response to the disaster will be deemed a success in terms of saving lives and protecting property (Lennquist, 2004).

Time and speed in disasters also present issues. However, the real challenge that individuals face during a disaster is the pace of both the information flow, and the speed with which decisions need to be made (Cavanaugh, Gelles, Reyes, Civiello, & Zahner, 2008). Nowhere is this more evident that within an EOC, where information is being gathered and verified to assist in the decision-making process. The road to providing better service to the communities being served is long. While the importance of collaboration, communication, coordination, and decision-making is evident, the mistakes made during each event are not being corrected.

## Section III

While the desire to learn from the past has always been a goal to help improve future operations, this section will show that some of the same mistakes are still being repeated. The literature will provide examples of where and when these instances are occurring. Arguments will be proposed that past and current solutions are not working,

and how the solution may be found through the use of AARs.

Multiple articles will highlight the value of AARs, and how they have been used effectively in the past by multiple organizations. The review also will show how they can be instrumental in improving the overall learning process. Knowledge management is an arena that is discussed as part of the learning endeavor, and several authors share how the gathering of information contained in the AARs can be helpful in furthering efforts in this area. This section brings forth the value of conducting this study utilizing the methodology outlined with regards to including AARs as the primary source for gathering data.

**Lessons Learned and Repeating Mistakes**

In 2010, over 80 disasters were declared in the United States. Although for the most part, the response system employed worked as configured, actions did not always go according to plan (Faith, Jackson, & Willis, 2011). Faith, Jackson, and Willis noted that mistakes made during small-scale incidents often could be compensated for because the jurisdiction, or discipline, had the resource capacity to overcome the errors, making them appear relatively minor in nature. However, the same mistakes that may occur during a large-scale response or recovery effort could result in significant property damage and/or loss of life (Faith, Jackson, & Willis, 2011).

Individuals working in crisis-affected systems operate in an interdependent operational environment and therefore experience a collective uptick in organizational stress because the already onerous demands on their performance have been magnified by the critical situation (Cavanaugh, Gelles, Reyes, Civiello, & Zahner, 2008). Since the implementation of the Disaster Recovery Act of 1950, several attempts have been made

to correct repeated errors, yet, the same problems repeatedly arise (Faith, Jackson, & Willis, 2011). While the value of lessons learned should be recognized, learning from past mistakes is an action that calls for a deliberate and honest appraisal, which is not always an easy undertaking. In a study conducted by Donahue and Tuohy, (2006), first responders observed that:

> Many problems encountered repeatedly are solved anew each time, suggesting that it should be possible to inculcate improvements across time and agencies. It should be possible to solve at least some of these problems once and for all, rather than time and again (p.10).

The pattern of repeating the same mistakes needs to be corrected if there is any desire to improve upon current field and EOC operations. To change old patterns of action, or to initiate new action, requires a conscious re-examination of the meanings involved in the action. Without this conscious process of learning, individual behavior is likely to remain routine (Comfort, 1985). Militello, Patterson, Bowman & Wears, (2007), explain how the areas of concern that were found during Katrina can be found not only in real-world events but in training/exercises as well. For example, in a tornado exercise, observers noted how the flow of information throughout the EOC was fragmented, resulting in poor situational awareness, much like the situation that developed during the response to Katrina.

During the response to the terrorist attacks on the World Trade Center on September 11, 2001, the issues experienced with communications and coordination efforts may have resulted in the deaths of both first responders and civilians (Faith, Jackson, & Willis, 2011). Yet, some four years later, in response to Hurricane Katrina, these same issues caused the delay of rescue efforts for the victims of the storm in New

Orleans. Furthermore, these same sets of issues were identified as problem areas during the response to Hurricane Andrew, which occurred in 1992 (Faith, Jackson, & Willis, 2011).

Donahue and Tuohy uncovered that of the 14 major incidents that occurred between 1995 and 2005, all of the response components were hindered by a lack of leadership, lack of planning, poor public relations, and mismanagement of resources (Faith, Jackson, & Willis, 2011). Problems in the areas of communications, logistics, and training also were evident. Empirical results have shown, and are consistent with the perspective that, organizational learning from prior large-scale emergencies and disasters is often a complicated process that is multifaceted and involves learning at the individual, organizational, and institutional levels (Madsen, 2009).

It would seem that drawing from experiences to make improvements in current and future operational activities would be a simple process. Yet, Davidoff (2002) shares that often shame is a significant hindrance to improvement, and that some individuals will view improvements as personal criticism of one's ability to perform. Further, some may believe that no matter how good their efforts may be, they may feel they are not good enough (Davidoff, 2002). However, while some may feel offended or ashamed, the cost of not taking action to correct deficiencies that are routinely repeated is formidable.

As we have witnessed thus far, attempting to overcome and correct issues in an unstructured manner has proven to be inadequate (Deverell & Hansen, 2009; Donahue & Tuohy, 2006; Savoia, Agboola, & Biddinger, 2012). While much of the focus has been on the inability to learn from large disasters, it is not limited to just those large disaster-type scenarios. In an article about mine safety, Madsen (2009) reports that the U.S Senate

declared that as a country, learning from the experiences of past mining tragedies must occur in order to find better ways to respond to mining accidents (Madsen, 2009). However, earlier literature espoused that similar accident investigations invariably follow the same pattern with similar pronouncements made about the need to learn to avoid future disasters (Carroll, 1998).

While learning from the past is necessary, recognizing that learning is an ongoing process is important. The tsunami disaster that occurred only a few years ago has shown that while some old lessons may have been forgotten or never completely learned, new lessons have to be learned (Lennquist, 2004). However, the concept of incorporating lessons learned can be a positive experience (Madsen, 2009; Birkland, 2009; Deverell & Hansen, 2009; Donahue & Tuohy, 2006). One of the most important goals is to reduce the instances of repeating those same errors (Donahue & Tuohy, 2006). For this study, the goal is the same, looking for the challenges that the EOCs face and specifically identify the errors committed.

To improve upon efficiency in EOC operations, as with any evaluation conducted to enhance performance, areas identified for improvement must be acknowledged. This is true for not only real-world events but in training and exercise scenarios as well. As stated by Paton (1999), "It is therefore important that local government organizations and personnel operating within the EOC understand the assessment methodologies available for evaluating and monitoring exercises and which can serve to provide input into future training needs analyses" (as stated in Sinclair et al., 2012, p. 508).

Much like the actions that led to the introduction of the ICS structure, the point at which errors are occurring must be recognized before they can be addressed (Donahue &

Tuohy, 2006). For those in emergency management, one of the best ways to accomplish this critical component is to review current operations, and critically evaluate how they execute their functions during a real-world or simulated disaster response (Birkland, 2009). Evaluations of local incidents, as well as lessons drawn from exercises that are based on comparative analysis of experiences in other jurisdictions, encourage those who are in the role of disaster management to explain why the system they utilize performs in the manner it does. It also provides them with the information they need to identify shortcomings and improve how they conduct business (Boin & Hart , 2010).

What can be stated with confidence is that learning from past experiences is valuable. According to Madsen (2009), "one of the most robust findings from the organizational learning literature is that organizations tend to improve their performance in a domain as they gain experience in that domain" (p. 862). Thus, improvements in the efficiency and effectiveness in EOC operations can be achieved. While not always an easy task, gathering information from previous disaster operations, from sources such as AARs, is a worthwhile approach (Savoia, Agboola, & Biddinger, 2012). As stated by Kettl, (2006), "If the nation does not learn the lessons that both Katrina and September 11 teach, we will suffer the same consequences, over and over. In that case, the worst is yet to come" (p. 274).

**Use of After Action Reports (AARs)**

Historically, AARs have played a significant role in the learning process for organizations (Donahue & Tuohy, 2006; Bergeron & Cooren, 2012; Savoia, Agboola, & Biddinger, 2012). For example, the United States Fire Administration (USFA) develops annual reports on selected major fires throughout the country. The reports are created for

incidents that usually involve multiple deaths, or a large loss of property (FEMA, 2008c). While the selection of specific incidents is based upon established parameters such as the number of fatalities, and/or loss of property, the primary criterion for deciding to construct such a report is whether the report itself will result in significant "lessons learned." The premise being that in some cases, these lessons bring to light a new understanding, or discipline knowledge, associated with fires, such as the impacts of building construction and/or their contents or human behavior. At other times, "the lessons are not new, but are serious enough to highlight once again because of another fire tragedy" (FEMA, 2008c, p. 3).

This body of work is then distributed and utilized throughout the fire service community to provide decision-makers, and those who develop policies, an instrument with which they can examine how they can improve their department's performance in emergencies. By implementing actions to correct errors, the decisions made can affect several areas such as the allocation of resources, inclusive of both material and personnel (FEMA, 2008c). They also can cause a reexamination of current training practices and operational concepts that may need to be modified based upon newly-discovered empirical findings. Alternatively, they may be used to build upon current public education and outreach programs to help the community become better prepared in terms of fire safety (FEMA, 2008c).

Regardless of the manner in which they are used, the importance of AARs cannot be overstated. They provide the basis for positive change in any discipline for which they are designed, and support the foundation to build upon for improving future actions and policy decisions (Cave, 2008; Biddinger, et al., 1974). Furthermore, one of the tools most

commonly used by organizations, including the military, who have participated in numerous disaster situations to correct noted deficiencies is through the creation of AARs (Birkland, 2009; Donahue & Tuohy, 2006; FEMA, 2008c; Faith, Jackson, & Willis, 2011; Savoia, Agboola, & Biddinger, 2012). These AARs have served as a key component in addressing both the strengths and weaknesses of activities undertaken, and decisions made, during actual and simulated events. In the United States, formal AARs are now required by several agencies and organizations that fund, oversee, or regulate aspects of public health and healthcare emergency preparedness and response such as the Centers for Disease Control and Prevention (Savoia, Agboola, & Biddinger, 2012).

In addition to serving the needs of jurisdictions to improve performance, AARs have also been used in prior research (Faith, Jackson, & Willis, 2011; Savoia, Agboola, & Biddinger, 2012; Waugh, 2007). In a study by Savoia et al. (2012), "descriptive statistics were performed to determine the recurrence of the themes by each capability from all AARs. Frequencies of subthemes were calculated using the total number of subthemes identified within the pool of statements derived from each theme" (p. 2952).

Organizations often learn through the experience and actions of individuals (Stern, 1997). Savoia et al., (2012), posit that by taking the time to review AARs, individual leaders as well as organizations can improve their own internal capacity and perform at higher levels. They conclude that AARs can serve as potential tools that can, and should be used, to learn from past mistakes, regardless of whether they occur during simulations or real-life events. As such, to gain the most value from these documents, a systematic method of synthesizing the information must be developed so that a lessons-learned type of knowledge management structure can be identified (Savoia, Agboola, &

Biddinger, 2012).

AARs can be useful on many fronts when it comes to the EOC. Whether it comes in the form of how the EOC is activated, determining if the level of staffing is appropriate for a specific type of incident, how the coordination between entities will be accomplished, or which staff management structure is put into place, AARs can highlight many areas to be studied. The implementation of sound decisions based upon lessons learned from past experiences, either real world or simulated, can lead to sound action being taken (Hosseini & Izadkhah, 2010). "The quality of the response and recovery efforts is thus directly linked to the knowledge and skills possessed by staff working at disaster sites and their ability to put them into practice in a range of hazard events" (Sinclair, Doyle, Johnston, & Paton, 2012, p. 508).

To be effective, emergency management organizations must engage in critical self-examination to provide those agencies directly involved with on scene activities the support necessary to be successful. They need to base their future direction on evidence-based and reflective lessons (Boin & Hart, 2010). Moynihan (2009) looks at the crisis learning process and explains that an after-action report created after an incident can systematically collect and examine relevant information. Based upon these findings, the report can then offer recommendations for the future and suggestions for better performance or appropriate policy decisions (Moynihan, 2009). Lagadec (1997) furthers this concept by sharing that learning from a difficult situation should come from a constructive perspective so that the experience itself is treated as a learning opportunity, and not so much as a situation by which blame is placed. How errors are framed affects

how effectively people will learn a complex, dynamic task (Loh, Andrews, Hesketh, & Griffin, 2013). Based on this premise, the fifth research question was developed.

RQ5: What are the most common recommendations and strengths identified in after action reports?

Individuals charged with the responsibility of training need to develop a process by which exact training needs can be addressed (Wilson, 2000). Part of this analysis should include a review of past practices as well as a review of areas that are identified as needing improvement. Utilizing AARs for this purpose is an effective way in which these areas can be recognized. The goal is to be able to provide relevant and useful training. To accomplish this "effective training requires that the training be pertinent" (Wilson, 2000, p. 8). AARs serve as an excellent source for providing the data and observations needed for this to occur (Biddinger et al., 1974).

AARs draw their findings from events (real world and simulation) that virtually any EOC, regardless of size, geographical location, or resource capacity has the potential to face at some point in the future. Thus, building curriculums from these resources can make future EOC training sessions meaningful. The usage of AARs to help improve EOC operations is an exercise in implementing knowledge management. EOCs strive to depart from being reactive to become more proactive. In order to do so, they will rely on their knowledge, skills, and abilities to help move the organization forward.

As part of the overall learning process, once these expanses have been addressed, further action is then needed to place corrective steps into observable action to ensure that these areas for improvement have truly been corrected (Savoia, Agboola, & Biddinger, 2012). To take action to improve performance and learn from experience, enhancements

must be tested through the iterative cycle of planning, testing, measuring, and improving. In the same manner, in order for EOCs to improve their level of capability, they must utilize assessments that identify those areas in which improvements can, and should be made. Borodzicz and van Harperen (2002), state that assessment processes function to enhance organizational learning in relation to the expected improvements in capacity and capability. They also support accountability in ways that contribute to overall emergency management effectiveness and contribute to the process of informed decision-making (Sinclair et al., 2012).

**Knowledge Management and the Importance of After Action Reports**

Once assessments have been made, and the data has been derived from documents such as AARs, effective and data-based training programs can be developed. Although, within the emergency management discipline, this is a significant challenge. While many public safety entities perform their response roles in a fairly regular fashion, this is not the case for those involved in EOC operations. Paton et al. (1999) share that just by their very nature, the infrequent nature of hazard or disaster incidents creates problems for the training needs analyses that would normally underpin this process. As such, Sinclair et al. (2012) found that "each individual organization's training and assessment program was unique to that organization, suggesting that processes are developed in ad hoc ways and are not making effective use of the relevant literature and ideas" (p. 517).

Studies, such as the one currently being undertaken, could help to bridge that gap by identifying a process by which common errors are identified in a systematic fashion. While beyond the scope of this study, this could then lead to the creation of a common framework to conduct evaluations by using AARs that are constructed in a consistent

manner. As stated by Stern (1997), "by emulating the successes and avoiding the failures of others, one should be able to garner the benefits of experience without paying the costs entailed by the more negative experience" (p. 70). AARs, such as those being used for this study, can accomplish this goal by further indicating their value as training, exercise, and real-world evaluation tools, and as a source in which formal studies can be conducted.

Knowledge is a powerful tool that can be shared and improved upon. Knowledge can also help to minimize the amount or repeatable errors that EOCs are presently experiencing (Kettl, 2006), which is best accomplished by looking at performance both holistically and critically. While witnessing success is enjoyable, identifying shortcomings and learning from errors creates efficiency and effectiveness. Taking the broad overview approach of using multiple AARs from differing communities across the United States eliminates the stigma of focusing on any one group.

## Section IV

### Learning as a Process

This final section will discuss how the learning process takes place, how important it is to learn the right lesson, and how up to this point, that process has not been successful. The literature recognizes the value of the current procedures used to teach concepts and ideas, as well as implementing a practical application of those lessons. Thus, the articles expand upon the influences that training programs have (both positive and negative) on those who are expected to perform specific tasks. As a part of the discussion, the infrequency of disasters, as mentioned in the previous section, is highlighted as being one of the challenges that are faced by those who are charged with

developing effective training programs for disaster operations.

This section further develops the concepts of bringing multiple organizations together for both training and exercise scenarios, much like they are brought together to work within the EOC. Finally, the value of exercises as part of the overall training program is presented. This section brings home the concept of how using AARs to identify the most common errors committed in EOCs can be the basis for evidence based future training programs. The result of this process may be providing a better program to train those who will be working in the EOC to perform their roles more effectively, efficiently, and with fewer mistakes. Helping to reduce the trend of repeating errors that has been such a large part of disaster response history.

Learning is an activity that should be a continual process, which is especially true in the maturing discipline of emergency management. "Learning in all situations can usefully be understood as complex and relational, with no simple lines of cause and effect, and no factors or influences that are self-evidently more significant or foundational than others" (Hodkinson, 2005, p. 116). From an overarching perspective, individuals seem to inadequately prepare for and/or respond to disasters (Canton, 2007). Canton, a former emergency manager, argues that while multiple studies over the decades relating to disaster management have been conducted, the process of learning must continue (Canton, 2007). Stern (1997) argued that "over the long-term, differences in the rate of learning or forgetting are influential in determining whether competence-building or competence-decline is taking place" (p. 70).

Previous studies focusing on past concepts of organizational learning from a crisis have been developed in a piecemeal fashion (Elliot, 2009). Much of academic

literature has dealt with factors that inhibit, or impede, organizational learning, or issues regarding why individuals should not expect a learning process to emerge from responses to disasters. This narrowly-defined format has led to a gap between scholarly studies on organizational learning, and the high consequence issues that practitioners struggle with routinely (Deverell & Hansen, 2009). Elliot (2009) explains that the normal pattern of correcting errors has been to create new rules and regulations by which actions are to be undertaken. However, while the intent of these new guidelines has been to improve some specific aspect of an operation, they are not always well received, with the misconception being that the newly-created documents will seamlessly flow into operation (Elliot, 2009). As history has shown, this is not the case. Deverell (2009) agreed with this concept and stated that:

> Distinguishing between the processes of observing lessons and implementing lessons is related to the distinction between cognition and behavior. Most definitions of organizational learning agree that learning entails both cognition (change in states of knowledge) and behavior (change in organizational outcome) (p. 182).

Research findings have shown that if the separation is made from cognition and behavior, it may cause concern when real-world events and processes are to be examined (Deverell, 2012). As shared by Elliot (2009), the false sentiment is that individuals are learning the right lessons. Yet, this apparent learned-lesson effect has yet to manifest itself in terms of an actual measurable improvement in performance.

Up to this point, a clear understanding of organizational learning has been elusive. Many scholars have found defining and measuring organizational learning to be very difficult (Deverell, 2009). In addition, others have drawn attention to the lack of team-performance measuring tools that could be used to evaluate performance and

subsequently assess training effectiveness (Sinclair et al., 2012), which further identifies the need for a study such as this to be conducted. Research findings could help better define areas that need attention so that training programs can be developed and implemented to improve team performance.

Unfortunately, learning must often be initiated during some sort of crisis (Deverell, 2009; Moynihan D. P., 2008). Crisis learning primarily sets its parameters around activities associated with prevention and response. Much like the Deverell (2012) explanation, preventative actions are designed to understand the cause of the crisis in order to ensure that it does not happen again. The desired result is to avoid being placed into a similar situation in the future. The response component strives to address actions undertaken to minimize the consequences of a disaster by improving the crisis management capacities of the structures in place that are charged with managing the resources required to combat the impacts of the event (Deverell, 2012). Thus, since providing resources is a major component of the activities associated with an EOC function, the fifth hypothesis was created.

> H5: When EOCs are activated for real-world or simulated natural, man-made, or technological incidents, resources will be identified as a challenge/deficiency in a majority of after action reports.

Wildavsky (1988) argued that a strategy of resilience, which is, learning from previous errors on how to bounce back after accidents and crises, is a more efficient use of time and resources than expending efforts searching for preemptive measures to implement. The primary purpose would be to prevent these types of incidents from occurring in the first place (as stated in Deverell, 2012). However, the line between

minimizing risk and minimizing consequences is thin at times (Deverell, 2012). Understanding the correlation between the two aspects is important so that the right attention is given to those issues that specifically address one area or the other. Such a perspective recognizes the importance of context (Elliot, 2009).

One of the best methods for individuals and organizations to gain knowledge is through effective training (Wilson, 2000; Revere, 2000; Lagadec, 1997), which can provide both the basis upon which learning can occur, and also the opportunity for personnel to put their newly-acquired knowledge to use. However, training is not just a matter of putting people in seats or having them perform tasks. Good training must be designed as a program and not just a singular event. It must have a purpose and be applicable to those who receive it. There is more to learning and training that just the activity (Lagadec, 1997).

**Training**

Since the infrequent occurrence of disasters that require EOC operations prevents the evaluation of direct EOC role performance in the traditional manner, differing approaches are required to identify training needs (Sinclair et al., 2012). To fill this gap, exercises are conducted to simulate disaster incidents so that those who staff an EOC have an opportunity to practice their role. These simulated incidents allow individuals to work within the EOC facility and perform their roles in a much more non-threatening environment, and still experience the challenges that will be found during real world activations. As indicated by Williams, (2011), emergency training is most effective when frequent exercises allow employees to use their skills.

According to McEntire and Myers (2004), “emergency management training is

intended to develop people's capacity to respond to the new and atypical demands presented by a disaster, as well as developing norms of carrying out a job or exercising a specific skill" (as cited in Sinclair et al., 2012, p. 509). However, there is currently no standardized process by which training programs are designed, developed, and implemented (Revere, 2000). Additionally, there is also no standard by which all organizations must evaluate their programs. Yet, as indicated earlier, these activities are useful and provide beneficial learning opportunities. When determining the level of preparedness within a organization, exercises and simulations can provide some indication that learning has taken place since the last crisis occurred (Stern, 1997). Although the value that exercises and simulations serve has been demonstrated, the approach to incorporating the data gathered into useful future training has been less than optimal.

Burstein (2006) argued that, "in our haste to train everyone, a lot of the wrong people are getting the wrong training in the wrong way" (as cited in Rutty & Rutty, 2012. P. 92). Hodkinson (2005) also stated that curriculum content and design are critical components of the learning process (Hodkinson, 2005). When planning an exercise, organizations must consider whether the primary purpose of the simulation is the identification of gaps or education. Once determined, a defined pathway for planning, delivery, and evaluation can be established (Rutty & Rutty, 2012). Thus, a prime target for those in the emergency management profession is to identify the most common errors attributed to EOC operations so that a strategic approach can be taken to improve overall EOC effectiveness. By drawing upon the experiences of others, even vicariously, it is likely to facilitate the retrieval of schemata, allowing a pathway to be developed that

leads to adaptive expertise (Joung, Hesketh, & Neal, 2006).

Much like climbers who are tethered together, they face risks in which any given action, or any mistake that may be viewed as minor, can take on major symbolic importance and result in a general collapse (Lagadec, 1997). To eliminate these errors, training and exercises are used to help personnel be able to recognize the environment in which errors may occur. By understanding the most common errors, improvements to the overall management of resources can result in safer operations.

Training EOC staff takes on renewed importance when it is understood how critical decisions directly influence the safety of others. A lack of knowledge, skills, and abilities both in the emergency arena and in the EOC can lead to personal and organizational failure (Revere, 2000). Developing mental models that can be shared among those in the EOC about what a disaster response will entail, while at the same time understanding the limitations and capabilities of each team member, are just a couple of the benefits that can be obtained through a comprehensive training program (Sinclair et al., 2012). In contrast, developing training programs on an ad hoc basis is not an approach that can elicit confidence that improvement in skills and capabilities will occur (Sinclair et al., 2012).

At some point in time, a feature needs to be in place to reduce the number of times that errors are repeated. Learning is a process that "entails an inseparable amalgam of rational thought, affective or emotional dispositions, and actual embodied practice" (Hodkinson, 2005, p. 111). As mentioned earlier, one of challenges that this presents for the EOC is the fact that they are not activated very often, and those who staff the EOC are not involved in this type of environment on a regular basis. However, this is a known

condition that can, and should be, addressed through effective training programs, which offer personnel an opportunity to work together during a crisis. Thus, training results in individuals becoming familiar with one another in a more relaxed atmosphere (Williams, 2011). In this manner, learning can occur on both an individual as well as an organizational level, which is necessary in reducing the number of repeated errors (Deverell, 2012; Elliot, 2009; Moynihan, 2009; Deverell & Hansen, 2009).

While still considered a part of the training program, exercising provides the opportunity for individuals and organizations to demonstrate their skills. If done in the proper context, exercises themselves can be useful training adjuncts that just add more value to the overall training program. Allowing personnel to actually perform a task provides them the confidence to know that they can perform successfully and carry that confidence into actual disaster scenarios (Sinclair et al., 2012).

**Exercising and Evaluations**

Often, professional experience is typically gained on the job through incidents or simulations. However, those who are brought in to staff the EOC, while they may be well experienced in their own disciplines, will probably have little, if any, knowledge of the administrative and/or command skills required during and activation. This includes issues such as planning, prioritizing, logistics, and incident command (Revere, 2000). Mistakes also are more prone to occur in those situations where tasks are cognitively more demanding (Loh, Andrews, Hesketh, & Griffin, 2013). Emphasizing the need to have a fundamentally-sound training and exercise program in place to assist those who may be new to the EOC.

Another challenge is that individuals who may participate in the same experience,

such as an emergency management exercise, may not relate to the real-world situation in similar fashions because of their respective backgrounds and their day-to-day functions (Bergeron & Cooren, 2012). Yet, experience has value regardless of whether it is obtained through real-world events, or simulated scenarios. As noted by Sagan (1993), "virtual experience, such as that generated through training drills, simulations, role play, scenario and case exercises, may stimulate learning at relatively low cost compared to trial and error" (as cited in Stern, 1997, p. 71). The challenge for emergency management is that too often, those who possess a considerable amount of EOC experience are routinely lost through staff turnover. The result is that, as much as organizations learn, they also forget (Stern, 1997).

Often, it is politically dangerous for an agency, or a leader, to actually accept and take responsibility for mistakes. Therefore, any lessons to be learned from such errors are often documented in a manner that is seen as being less than actionable, resulting in reports that are much less meaningful (Donahue & Tuohy, 2006). However, learning from mistakes needs to be a process that is undertaken after every incident, exercise, drill, or training session. As shared by McEntire and Myers (2004) "exercising provides opportunities to test the knowledge, skills, and the abilities of first responders and government officials, assess participant perceptions of teamwork, training adequacy, response network effectiveness, job risk, and equipment adequacy" (as cited in Sinclair et al., 2012, p. 512).

While training and exercising are factors in virtually any high-risk occupation, the fact that most localities do not experience incidents that require an EOC activation on a regular basis emphasizes the reality that training and exercising are especially important

in the emergency management discipline (Sinclair et al., 2012). As noted in the Fort Worth tornado response, while errors were made in some aspects, those organizations associated with the response phase of the incident were well aware of the tasks that needed to be undertaken as well as the value of working with others in a cooperative and collaborative manner during disaster types of incidents (McEntire, 2002). This is associated with the interaction these organizations had previously experienced through working together on other similar scenarios.

While the value of sound training in these situations is evident, the assessment of training, and for that matter exercises, should not be confused with an overall assessment of how well an organization can respond to a significant event. In order to make such an observation, the training and exercises themselves should be part of the evaluation process (Sinclair et al., 2012). "Ensuring that training provides a return on investment for communities, responders, and organizations makes including an evaluation component in the planning process essential (Wilson, 2000; as cited in Sinclair et al., 2012, p. 508). This same process should be incorporated in the deliberate examination of the tools utilized to provide such training, thereby ensuring that individuals are gaining both a valuable experience as well as increasing their level of EOC knowledge. Using AARs to identify common EOC errors can serve as the context by which training programs, including the component of exercises, can be improved, and EOC performance enhanced.

## Summary

The EOC is tasked with performing a variety of functions. Lettieri, Masella, and Radaelli (2009) explained how the vision of those who work within the EOC is different from that of the traditional first responder. Mainly, they are concerned with how the

incident, or incidents, is influencing the remainder of the community. One of the biggest challenges with this is that while first responders are, for the most part, very familiar with the activities they undertake to address the incident, the staff in the EOC do not generally have this same level of comfort or experience in the roles they are cast into at a moment's notice.

Those who staff the EOC are directed to work together during an activation to not only obtain and deliver resources for those on the incident scene, but support the needs of the community as well (Militello, Patterson, Bowman, & Wears, 2007). This can be a difficult role for seasoned professionals, let alone those who may have never before been asked to do this function. The opportunity to commit errors is understandably higher in these types of situations. One of the goals of this study is to attempt to identify the most common, specific errors, and seek solutions to help those in the EOC perform their roles in the safest and most efficient manner possible. Additionally, to examine if commonalties exist between challenges/errors, which led to the final hypothesis that states;

> H6: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, several challenges will be identified as being co-existent.

Huang, Wang, and Lin, (2011) state that in terms of managing human resources, they must be provided the training and equipment necessary to perform well in their assigned roles. In addition, the leadership of senior managers, the continuing learning of the group members, and the good use of technology can all be used to help improve the operations during a disaster response (Huang, Wang, & Lin, 2011). Those who staff an

EOC during an activation face a multitude of challenges. Boin and Hart (2010) list these challenges as;

- sense making (understanding what is going on)
- meaning making (interpreting what is happening)
- decision-making (choosing a course of action)
- coordinating (organizing activities)
- circumscribing (constricting the range of activity)
- consolidating (combining many actions or resources into smaller units)
- account giving (being responsible for actions taken and/or decisions made)
- learning (gaining knowledge) and
- remembering.

To provide these individuals with the best opportunity to execute their roles with minimal errors requires that training, exercising, and learning all be a significant component of preparedness.

Although much has been written, and many scholars have contributed to the scientific community regarding multi-organizational emergency response, only parts of the complexity associated with the topic have been revealed (Uhr, 2009). There is much more that needs to be done at both the academic and practitioner levels. In addition, the usage of resources also must be considered when gathering data from specific disciplines in order to gain an accurate picture. The United States Fire Administration state that in regards to critiques, which are also termed AARs, "The process should be considered an important tool for improving firefighter safety and health, as well as a means for ensuring that the public is receiving quality services" (FEMA, 2008c, p. 1). This same perspective

is applicable to the emergency management discipline as well. The goal is the same — promote safety in all that is done, while at the same time, providing the best service to the public. The use of AARs is an excellent way to help identify areas where improvements can be made in performance.

Designing, developing, and instituting such a program in a cost-effective manner requires that detailed attention to the contents of a program (Sinclair et al., 2012). People are empowered when they have a secure sense of knowing of what is happening and where things are going (Cavanaugh, Gelles, Reyes, Civiello, & Zahner, 2008). When a disaster strikes, things can spin out of control, and people will be looking to their leaders for direction. Thus, the EOC leader, with the EOC staff, must focus on predictability and help each other to see the direction they are going, and feel confident that the desired outcome will be achieved (Cavanaugh et al., 2008).

While numerous articles have been written about learning from previous errors (Lester & Krejci, 2007; Donahue & Tuohy, 2006; McEntire D. A., 2002; Birkland, 2009; Deverell & Hansen, 2009), no studies have taken the initiative to gather data from multiple locations to identify some of the most common errors that are occurring in EOCs during activations. A large number of scholars and researchers argue, "Learning from man-made and natural disasters is an inseparable part of the disaster life cycle" (Sawaiha, 2014, p. 319). Previous articles also have shown that while an attempt to learn from past mistakes has been made, the history of correcting errors has enjoyed limited success at best (Henstra & McBean, 2005; Wolensky & Wolensky, 1990). Research also has shown that it would be naıve to assume that disaster events act as a common enemy that induce seamless and harmonious linkages between all the organizations (Boin & Hart , 2010).

Therefore, identifying common errors will only help to enhance EOC operations.

This study is intended to be a part of that process by completing the research outlined through the use of AARs, and developing possible recommendations to help reduce and/or eliminate commonly-repeated errors that occur within the EOC environment. As shared in an article by Middaugh (2012), the military is known for conducting post-action reports so that their leaders and troops reflect on what they learned. Sharing these lessons saves lives. Sharing and learning from our lessons can as well (Middaugh, 2012).

# CHAPTER III

# METHODOLOGY

This study illuminates the various challenges that confront EOCs during an activation. The terminology challenges, mistakes, and errors will be used interchangeably throughout this study. This analysis will identify specific challenges, trends among the challenges, and the relationships between the challenges. More specifically, the study will examine numerous AARs from multiple jurisdictions to highlight the most common challenges faced. After conducting an extensive review of the literature, an examination regarding the operational characteristics of EOCs, and the most common challenges they face, has been conducted.

EOCs face various challenges during an activation, regardless of the nature of the incident itself. One of the main purposes of this study is to discover the most common challenges so that future training programs can be developed that are constructed on evidence-based data, and not perception. While there are training programs in place at this time, the literature reviewed has indicated that mistakes are often repeated (Donahue & Tuohy, 2006; Wolensky & Wolensky, 1990; Militello, Patterson, Bowman, & Wears, 2007). Through evidenced-based training programs, the desired outcome is to reduce the frequency of mistakes, or preferably, eliminate them by developing new skills through improved training curriculums. The other benefit of this study will be to identify these challenges so that future training programs can be built upon documented findings in lieu

of designing programs on an ad hoc basis (Sinclair, Doyle, Johnston, & Paton, 2012), and not upon what curriculum designers may perceive will assist EOCs improve efficiency in operations.

Many tools are used to evaluate organizational operations (Paton, Flin, & Violanti, 1999), and the changes made to correct deficiencies. As such, they serve as the foundation of evidence-based practice. It can be measured as easily as analyzing what went right, what could have been done better, and lessons that were learned by individuals (Middaugh, 2012). Using AARs to serve as the principal tool for identifying errors is a good approach that has been successful utilized in previous studies (Savoia, Agboola, & Biddinger, 2012).

Historically, AARs have been used by organizations in their effort to identify components within their environment where improvements can be made, as well as serving as an important tool in the overall learning process (Donahue & Tuohy, 2006; Bergeron & Cooren, 2012; Savoia, Agboola, & Biddinger, 2012). While AARs do have limitations, they have proven to be valuable documents in examining actions taken during disaster operations as evidenced by their use in both public safety and military organizations. Both of which have extensive disaster experience (Birkland, 2009; Donahue & Tuohy, 2006; FEMA, 2008c; Faith, Jackson, & Willis, 2011; Savoia, Agboola, & Biddinger, 2012). Their importance in identifying areas of improvements have been recognized to the extent where they are now required by several agencies and organizations that fund, oversee, or regulate aspects of public health and healthcare emergency preparedness and response such as the Centers for Disease Control and Prevention (Savoia, Agboola, & Biddinger, 2012). AARs provide the foundation from

which positive changes can be incorporated in activities undertaken as well as policy development (Cave, 2008; Biddinger, et al., 1974). Thus, they are also appropriate for use in this study of EOC operations to provide direction in the identification of areas where improvements should be focused in current and future training programs.

**Content Analysis**

Quantitative research uses statistical analysis to provide a numerical evaluation of a given situation. The use of statistics allows researchers to define the concept of "unusual" while also looking for the evidence of probability, which is used to express the likelihood of the observed event outcomes in relation to the researcher's expectations (Giventer, 2008). The statistical data is used to represent observations for the purpose of describing and explaining the phenomena that those observations reflect (Babbie, 2004; Camp, 2007). Quantitative methodologies are used in multiple disciplines such as a psychology, sociology, and physics (Camp, 2007). Woodrum (1984) also contended that the content analysis methodology "provides methods for measuring the characteristics of both manifest and latent communications" (Cheng, Fleischmann, Wang, & Oard, 2008, p. 3). Thus, this is an appropriate approach to use in analyzing the AARs collected for this study.

Among other methods, one of the most common means of summarizing data in a quantitative fashion is by looking at frequencies among them (United States GAO, 1989) in terms of content. The methodology of content analysis relies on both the categories created, and the interpretative process of fitting text into these categories (Franzosi, 2008). Thus, it is vulnerable to the subjective view of the researcher creating the categories. To overcome this, many content analysis studies employ the use of intercoder

reliability testing to ensure that the content being analyzed is done so in a consistent manner, and interpreted in a similar fashion. However, for this study, the use of single coder required the use of a test-retest validity process, explained later in this chapter.

Content analysis can be viewed as a method of data collection. More specifically, it is a technique of measurement that is applied to text whereby the coder serves as an instrument of measurement (Franzosi, 2008). Thus, with a purpose of using statistical analysis to provide numerical value to the textual content, such as associated with frequencies of occurrences, content analysis is simply a data collection method, which is no different from survey research (Franzosi, 2008). Historically, counting frequencies was the main activity of content analysts in the 1930s and 1940s. For many people, that is how content analysis was defined (Franzosi, 2008).

In regards to frequency analysis, absolute frequency may represent the actual number of times words, statements, or issues are found in the data collected as compared to relative frequency, which could represent frequency by a percentage of the sample size. Similar to the process used for this study, researchers are able to use this information to compare one category's frequency to the average frequency for all categories (United States GAO, 1989). This method helps to provide a more comprehensive review of the statistical data found in the documentation collected for examination.

For the purposes of this study, the quantitative analysis utilized will be constructed to demonstrate a basic frequency distribution (Holcomb, 2011). The frequency distribution statistical table will demonstrate the number of times a statement or sentence is found in the analysis of the AARs reviewed. Additional comparison also

can be done with multiple AARs to show the number of times these types of statements or sentences appeared among all the documents collected. The process will be inclusive of conducting a content analysis and the use of descriptive research to determine the trends identified within each AAR. The study will utilize a content analysis to identify the most common errors/challenges associated in EOC operations in both real-world activations as well as simulated incidents, which are mentioned in multiple AARs.

The foundation of this type of study is based upon the premise that using a quantitative approach can provide statistical evidence to confirm the areas within EOC operations that should be addressed in terms of current and future training. Areas that are performing well also will be highlighted. Identifying strengths as well as weaknesses is important in the overall analysis of actions carried out in the performance of a task. The basis for this examination of strengths is described later in this chapter to demonstrate its value in addressing challenges.

Generally, a content analysis is introduced and applied to written text, and also often is used to examine the manifest content of a text. Manifest in this sense will refer to the visible and countable components of the message (Rose, Spinks, & Canhoto, 2015). While developing a frequency table is beneficial, analyzing text also involves discovering both themes and subthemes (Ryan & Bernard, 2003). This process has also been used in other similar studies (Savoia, Agboola, & Biddinger, 2012)

Berelson (1952) defines content analysis as "a research technique for the objective, systematic and quantitative description of the manifest content of communication" (p. 18). However, others provide no such restrictions on the quantitative description. They prefer to define content analysis as "any technique for making

inferences by objectively and systematically identifying specified characteristics of messages" (p.2, as stated in Cheng, Fleischmann, Wang, & Oard, 2008).

These communications can be analyzed at various levels, thus creating a variety of research opportunities (Kolbe & Burnett, 1991). The use of content analysis as a research methodology is an example of the use of language to study human cognition and communication, and is based on the assumption that the analysis of text is a way for researchers to understand how people make sense of the world around them (McKee, 2003). Content analyses allow for unobtrusive appraisals of communications (Krippendorff, 1980), which can be particularly valuable in situations when direct methods of inquiry might yield biased responses. Content analyses also can provide an empirical starting point for generating new research evidence about the nature and effect of specific communications (Kolbe & Burnett, 1991).

Popping (2000) identified three approaches to text analysis. The first is the thematic text analysis. Texts are quantified as counts of words and phrases that were classified according to a set of content categories, which offer the researcher an opportunity to determine the concepts as well as their frequency within texts (Popping, 2000). The second method is a semantic text analysis, which involves not only the identification of concepts, but also the relationships among them. In this analysis, a coding process is needed to acquire a semantic grammar that specifies the relationship among themes. Then the texts' themes are coded according to the relationship specified in the semantic grammar (Roberts, 1997; Popping, 2000). After the coding process, the semantically-coded data can be used to make inferences from the texts (Popping, 2000).

The third approach is the network text analysis that is developed from the

semantic linkages among various concepts. As Popping (2000) explains, after a researcher has coded semantic links among concepts, networks of semantically-linked concepts can be built. When the concepts are depicted as networks, the researcher now has more than just the frequency at which specific concepts are linked; the researcher also is able to characterize concepts and linkages relative to their position within the network (Popping, 2000). To provide a more comprehensive view of the data within the AARs, both the second and third methodologies have been applied to this study in the analysis of the AARs.

**Conceptual Framework**

A conceptual framework should serve as a platform from which a guide can be developed to connect the identification of the problem being researched, and the possible solutions to that problem (Kumar & Antonenko, 2014). In essence, the conceptual framework for this study has been designed to help organize the pathway to be used for the exploration of the problem at hand (Shields & Tajalli, 2006). Since this study will employ quantitative research, it is a good practice to institute a framework that not only identifies the research that will be conducted, but how the quantitative component will be employed and utilized. The conceptual framework will provide the how and why to the statistical analysis of the project. This will then provide the substance to the study to help deliver a more comprehensive look at not only the problems identified by the circumstances in which they occur, but include recommendations for future research to be conducted that can be employed to reduce or eliminate them in the future.

The conceptual framework for this study is based upon the idea that unless errors are corrected within EOC operations, which has been highlighted in earlier research

(Paton, Flin, & Violanti, 1999; Donahue & Tuohy, 2006; Militello, Patterson, Bowman, & Wears, 2007), the performance of the EOC, as an organization, cannot improve. In addition, the performance of individuals also will be limited if the most common errors committed are not identified and either minimized, in terms of possible occurrence, or eliminated from the learning environment. Sawaiha (2014) concludes that major accidents are generally "the result of more than one mistake, and if the chain of mistakes is not resolved rapidly, damage and loss will become irrecoverable and irreversible" (pp. 312-313).

This same notion can be applied to the EOC environment. Today, various motives may serve as the catalyst to protect the organization's image by covering up performance failures. Such cover-ups may take place even in organizations, which culturally, are committed to the idea of being viewed as a highly-reliable organization (Stern, 1997). Only through the identification of errors can progress can be made. Yet, focus should shift from failure and casting blame and be re-directed toward learning from failure. "This kind of learning is essential to organizational learning and adaptation, and a necessary complement to studies of learning from success" (Baum & Dahlin, 2007, p. 368).

The conceptual framework for this study serves to assist in the formation of the research questions (Green, 2014). In order for EOC operations to improve, the issues or items that are serving as obstacles to achieving the desired goal of better performance must be identified. As such, it is important to uncover whether the issues themselves are unique, or if certain deficiencies are correlated. While identifying challenges that inhibit effectiveness is important, understanding the causes is critical as well. Far too often,

lessons from previous mistakes are not being learned, but repeated (Militello, Patterson, Bowman, & Wears, 2007; Donahue & Tuohy, 2006; Drabek, 1997), which could be indicative of training shortfalls and may be identified as a cause in the AARs.

**Overview of Review Process**

While the AARs collected for this study contain a wealth of information that can be used to improve multiple areas within not only the discipline of emergency management, but public safety as a whole, not all of the information will be relevant to this study. As part of the examination of the documents, the following overarching process, which will be described in further detail later in this chapter, was implemented. Initially, as part of a quality control process, if the portions of the information gathered from the AARs were not directly or indirectly related to EOC operations, they were disregarded from further use in the analysis. This was determined by examining the documentation and identifying those areas where discussions of activities, challenges, strengths and recommendations were associated with actual incident scene operations or activities conducted outside of the EOC function.

Once this initial review was conducted, a preliminary coding procedure was created to help create and delineate categories, themes, and sub-themes. After the initial coding, another review of the structure was conducted, taking the time to re-examine the multiple categories, themes, and sub-themes created to make certain that the data collected has been placed in the appropriate category/theme. Once completed, another third review of the categories, themes and sub-themes was conducted. If necessary, additional themes and/or sub-themes were created (Lunenburg & Irby, 2007). Once this was completed, a final review of all the documents was conducted to ensure that all the

relevant information was included into the categories that were used for the analysis.

As identified earlier in the coding strategy implemented, each AAR was examined for the repetition of similar statements and sentences, since some of the most obvious themes arise from topics that occur and reoccur. In conjunction with this step, a constant comparison technique was employed to identify similarities and differences in the data collected while searching for the meaning of words, sentences, paragraphs, and how they are similar or different from previous text (Ryan & Bernard, 2003). The generation of word lists and coding sheets were employed to help to identify the concepts, ideas, issues, and terms that were most prevalent among the AARs collected.

**Detailed Review Process**

Content analysis is a process that "attempts to characterize the meanings in a given body of discourse in a systematic and quantitative fashion" (Franzosi, 2008, p. xxi). As with other quantitative approaches, this methodology begins with design. The framework implemented for this study follows the guidelines established by Rose, Spinks, & Canhoto, (2015), and depicted in Figure 3.1. The aim is to predict the outcome or effect of the document being analyzed (Neuendorf, 2002).

Briefly, the design begins with the identification of relevant concepts and formulation of hypotheses in response to the research questions developed to guide the study (Rose, Spinks, & Canhoto, 2015). After the research questions and hypotheses have been created, sampling is conducted. Sampling involves identifying and selecting the material to be analyzed. At the same time, the coding units to be utilized are developed, which can include words, phrases, sentences, images, paragraphs or whole documents (Rose, Spinks, & Canhoto, 2015).

Once the coding units have been identified, a coding scheme is created, which is the process of creating developing classification rules to assign to the coding units developed (Rose, Spinks, & Canhoto, 2015). For example, assigning the numerical code '1' to a variable within a category that identifies the main subject as being male. Subsequently, using the numerical code of "2" if the main subject is female. These coding rules are outlined in a codebook that details how each variable to be analyzed was coded (Rose, Spinks, & Canhoto, 2015). The codebook for this study can be found in Appendix D.

*Figure 3.1* Content Analysis Review Process

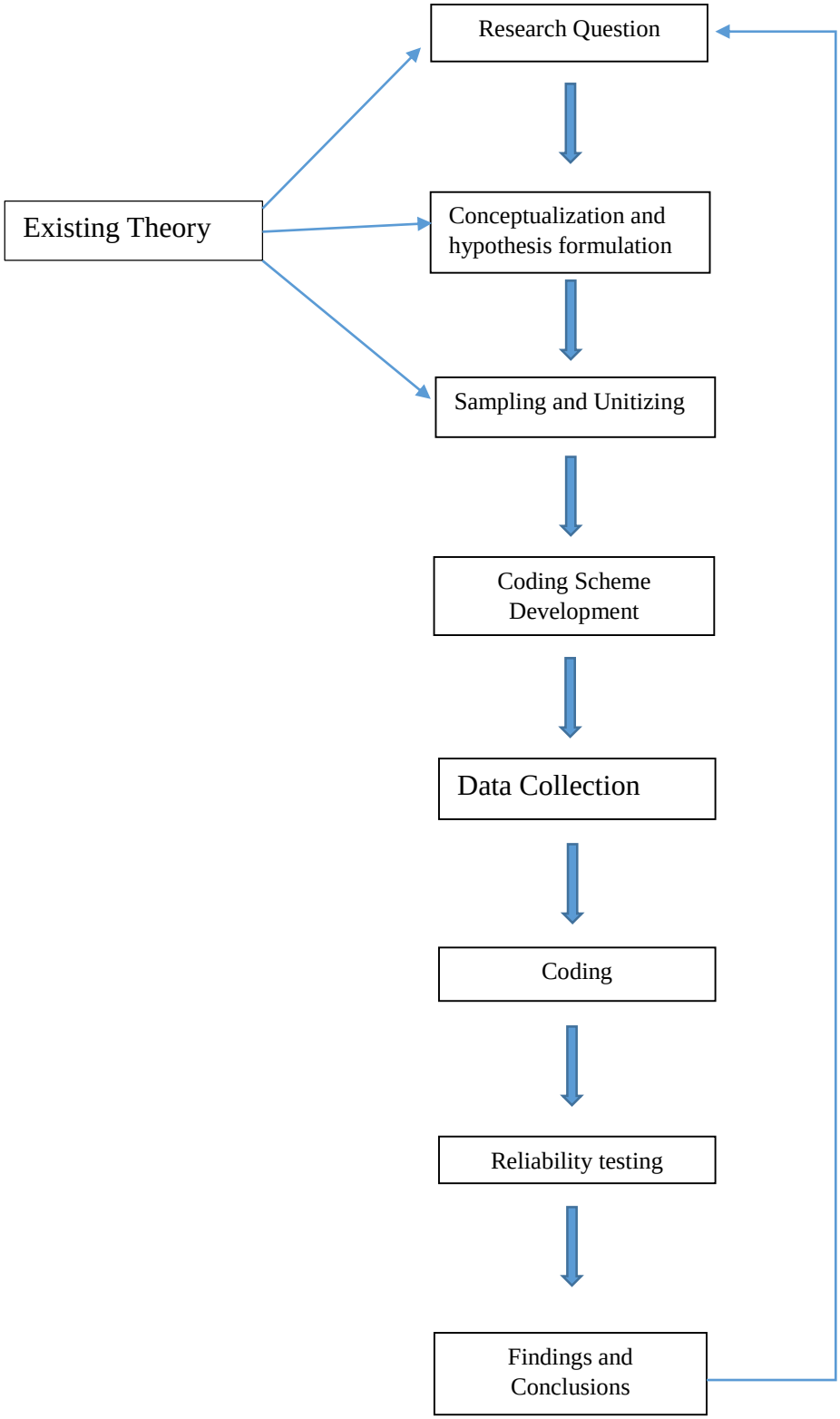


*Figure 3.1*: Content Analysis Process (Rose, Spinks, & Canhoto,

The collection of data, along with the coding of the data and analysis are then performed. Finally, the application of reliability testing, the drafting of the findings, and the writing of the conclusion complete the process (Rose, Spinks, & Canhoto, 2015). Each of these phases of the content analysis process is detailed within this section. However, while the process identified for this study is inclusive of the specific steps to be completed, they should not be interpreted as to imply that each one must be completed prior to the next step being initiated. For this study, the collection of AARs occurred simultaneously as the drafting of the codebook.

### Existing Theory

**Theoretical Construct.** A theoretical construct is a logically structured representation of the concepts, variables, or relationships involved in a scientific study with the purpose of clearly identifying the idea that will be explored, examined, measured, or described (Desjardins, 2010). In reviewing the literature associated with this study, several recurring deficiencies were noted (independent variables) within responses to large-scale emergencies or disasters, including those operations within the EOC (Lutz & Lindell, 2008; Militello, Patterson, Bowman, & Wears, 2007; Donahue & Tuohy, 2006). These independent variables serve to impact the overall efficiency and effectiveness of the overarching function of the EOC operation, which for the purpose of this study, served as the dependent variable. The study uncovered the most common independent variables identified in a majority of the AARs examined, which was similar to the study conducted by Savoia et al. (2012). The study also uncovered any relationships the independent variables had in regards to co-existence. In essence, this portion was inclusive of exploring the circumstances in which two or more variables are

present in multiple AARs.

The theoretical construct, upon which this study is partially based, and is explained later in this section, helps to further the effort within the emergency management community to improve EOC operations by creating an evidence-based study, which can be used to develop future training programs. These programs are critical since EOCs are not activated on a regular basis, and are staffed by those who often are tasked with performing unfamiliar roles within a time-constrained environment (Militello, Patterson, Bowman, & Wears, 2007; Huang, Wang, & Lin, 2011). While this study is only being conducted within mid-sized communities, or cities with populations of 300,000 to 499,000, the benefits can be realized in other jurisdictions, regardless of size, since community-based EOCs are activated for similar types of incidents. However, it is noted there may be differences relative to the size of the community which is not addressed in this research, and this is recognized as a limitation within this study.

**Organizational Theory.** This study is guided upon the fluid, and often-times debated, organizational theory (Shafritz, Ott, & Yong, 2015) model, which incorporates a variety of perspectives from disciplines such as psychology and sociology. Organizational theory focuses on the comprehensive examination of organizations, and incorporates multiple methods of analysis (Suter, et al., 2013). By taking this approach, organizational theory is able to be inclusive of both the detailed examinations of groups at the micro level while exploring the concepts and management structures found at the macro level (Suter, et al., 2013).

Organizational theory is not a collection of assorted facts, but rather a way of thinking about how resources and people (also referred to as resources in portions of this

study) are organized to accomplish a goal. Studies for exploring how various organizations are designed can aid in helping to improve their overall efficiency (Daft, 2012). The premise of the theory, or theories, deals with how organizations affect their environment, and how the environment affects the organizations. However, there is no one established theory, but rather a variety of theories that attempt to explain and predict how organizations and the people in those organizations will behave within various structures, cultures, and situations (Shafritz, Ott, & Yong, 2015).

This is an important consideration when viewing the EOC as an organizational structure created to make time-sensitive decisions while dealing with unfamiliar yet critical information that may determine the success or failure of response and recovery efforts to a large-scale emergency or disaster. One of the organizational theories that can be associated with this study includes the contingency theory, which considers the influence of various components of the environment that could play a role in regards to the performance of the organization (Birkinshaw, Nobel, & Ridderstrale, 2002).

To understand an organization, one must understand the contingency factors and the organizational structures in which they were placed (Suter, et al., 2013). Birkinshaw, Nobel, and Ridderstrale (2002) explored the variable of knowledge as a potential contingency factor. They argue that with the recognition of knowledge as an organizational asset, this variable could be a factor that significantly influences an organization's performance (Birkinshaw, Nobel, & Ridderstrale, 2002). As it relates to this study, knowledge is key in helping EOC personnel perform at a level that would be perceived by the community, and jurisdictional leadership, as successful. Inasmuch, for these staff members to achieve the desired results, they must be trained in a manner that

enhances their capabilities to perform in roles in which they do not often have the opportunity to exercise.

Another sub-set of organizational theory that is applicable to this study looks at how technology plays a role within an organization. The Socio-technical theory looks to address the issues that are often found when new technologies are introduced into an organization, and the problems that may be associated with such an introduction to that organization (Trist & Bamforth, 1951). The theory itself has a focus on ensuring that people and technology work together to have a positive effect within an organizational structure (Trist & Bamforth, 1951). The two main principles of this theory are centered on the ideas that the interaction of social and technical subsystems creates the conditions for successful (or unsuccessful) organizational performance. As such, work processes and procedures involve interaction within the social and the technical subsystems. Secondly, "if optimization of only one subsystem occurs, then there is a likelihood of unpredictable organizational performance" (Suter, et al., 2013, p. 60). It is interesting to note that while this study was conducted in the early 1950's, it still holds value today.

One final organizational theory that is appropriate to consider when examining EOC effectiveness is the Stakeholder theory, which argues that when making decisions at the organizational level, managers and other staff leaders should consider all of the stakeholders of the organization. Specifically, stakeholders are any groups (large or small), or individuals who are directly or indirectly impacted by the achievement of the organization's goals and objectives. These will include individuals and units such as employees, stockholders, customers, as well as local and national governmental bodies (Jawahar & McLaughlin, 2001). The stakeholder theory is a popular method of

management because it encourages collective input and shared responsibility (Suter, et al., 2013).

These organizational theories provide a sound basis and foundation for the purpose of this study. While EOC operations are not typically part of the standard day-to-day function of local government, they are one of the most important components of any jurisdiction's preparations as they relate to response and recovery activities associated with any large-scale emergency or disaster. The organization that is put into place within the EOC must function at a very high level and be prepared to do so for extended periods of time. Disasters are not defined by their geographical size or duration. They have no political association or cultural ties. They occur many times with no pre-determined boundaries, and the extent of their impact is directly related to the vulnerability and social capital of the community.

As part of understanding how organizations are designed, this study examines the most common errors and the most apparent challenges so that possible corrections to current EOC organizational designs can be modified to improve their operational effectiveness. Currently, EOCs are not designed based on standard organizational structures. Each jurisdiction selects a design that they feel is most appropriate for their organization (Shouldis, 2010). While beyond the scope of this study, the findings may be used to help communities to implement an organizational design that helps eliminate the most common errors faced by EOCs during an activation that will improve their ability to perform at a higher level of efficiency and effectiveness.

## Research Questions

According to a paper written by the United States General Accounting Office (GAO) (1989), the questions developed for a content analysis should be "based on a clear

understanding of project needs and the available data. Precisely worded questions provide the focus for data" (p. 8). According to Franzosi (2008), "the best studies will not just report percentages one category at a time. They will correlate the results across categories" (p. xxxvii), Based upon the literature reviewed, the following research questions have been developed to help guide the study towards the desired outcome:

1. How often is training, or the lack thereof, recognized as being a source for mistakes, errors, or challenges experienced during EOC operations?

2. How often is lack of experience noted as playing a role in performance as identified in after action reports?

3. In examining the operations of the EOC, what are the most common deficiencies that are noted in the after action reports?

4. In examining the after action reports, which errors are identified as being coexistent? In other words, when one error is identified, what other error or errors will most likely also be identified in other after action reports?

5. What are the most common recommendations and strengths identified in after action reports?

## Hypotheses

The formulation of the following hypotheses has been done in conjunction with the research questions outlined above. The process of developing the hypotheses has been undertaken to establish the rationale behind this study (Rose, Spinks, & Canhoto, 2015). These hypotheses have been created to avoid the risk of only doing the content analysis to achieve a desired number of outcomes in order to satisfy a "word crunching" exercise (Insch, Moore, & Murphy, 1997). As a basis from which the research questions have

evolved, the following hypotheses have been formulated:

H1: When EOCs are activated for actual real-world or simulated natural, man-made, or technological incidents, situational awareness will be identified as a challenge/deficiency in a majority of after action reports.

H2: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, communications will be identified as a challenge/deficiency in a majority of after action reports.

H3: The lack of EOC organization will be identified in multiple EOC after action reports as being the source of errors committed during an EOC activation.

H4: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, training will be identified as a challenge/deficiency in a majority of after action reports.

H5: When EOCs are activated for real-world or simulated natural, man-made, or technological incidents, resources will be identified as a challenge/deficiency in a majority of after action reports.

H6: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, several challenges will be identified as being co-existent.

## Sampling

### Selection of Jurisdictions for the Study

The selection of metropolitan areas to be studied was based upon several factors. The main focus was to examine the challenges that faced local level EOCs. Initially, the 2010 U. S. Census Bureau data was utilized to identify metropolitan areas located within

the United States. According to Census Bureau data, there were over 290 metropolitan areas with populations over 100,000 (Commerce, 2015). Examining AARs from a sample population this large would be beyond the capability of this study due to the limited resources available to review such a large number of reports. While the usage of a computer to assist with the analyzing and coding of data is employed, this does not replace the need for human interface regarding analysis and coding. To create a manageable number of reports to review, while at the same time gathering information that is reflective of no one specific area of the country, metropolitan areas were broken down in three groups small, mid-size and large. This was done in order to break down the total number of communities into manageable segments that could be examined within the time and resource constraints of the study. The parameters of the groups to be considered were set as follows:

- Metropolitans areas with a population between 100,000 and 299,000
- Metropolitan Areas with a population between 300,000 and 499,000
- Metropolitan areas with a population above 500,000

The group with a population between 100,000 and 299,000 was not selected because it included over 200 communities. Even with a modest AAR submission rate of only 15%, reviewing this many AARs was again beyond the resource capability of this study. Of those metropolitan areas with a population of 500,000 and above, approximately 48% received Urban Areas Security Initiative funding in 2013 (Department of Homeland Security, 2014). This is in comparison to only approximately 33% of the group with a population between 300,000 and 499,000, who also received similar funding. These funding sources could be used to enhance technology, provide

additional training opportunities and possibly support the acquisition of personnel to assist with the staffing of positions within the EOC during an activation. Thus, serve as a resource that a majority of EOCs across the country do not have the ability to utilize.

The third group to be considered served as a type of middle ground between both lower and higher population centers. This group also provided a good sample size for use in the study. Thus, the determination was made to use metropolitan areas with a population between 300,000 and 499,000. This resulted in having 27 metropolitan areas to be included as part of the study. Another positive attribute of the population selected for this study is the fact that this segment of communities provides a good representation of the country in terms of geographical location. Specifically, communities with populations between 300,000 and 499,000 include 18 states covering regional areas from the Mid-Atlantic, Southeast, Midwest, Central, West, and far West regions of the country. While not representative of every state, this sample population does reflect a good diverse reflection of the country (Figure 3.2).

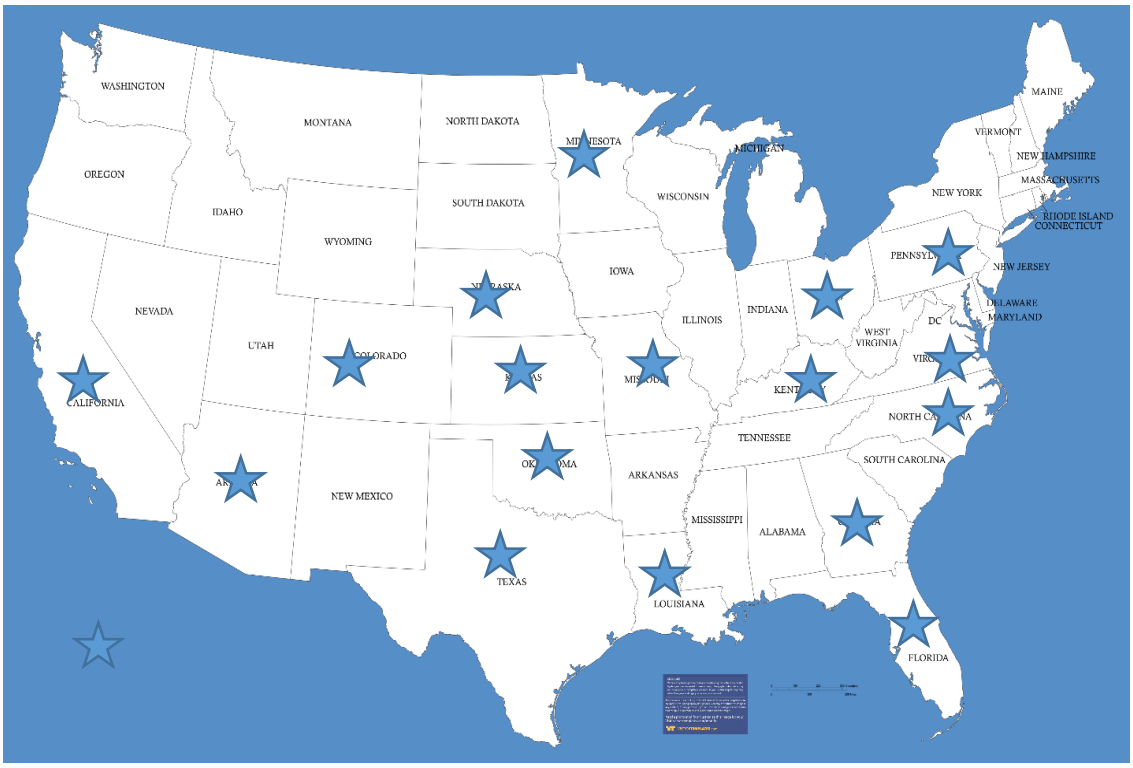


*Figure 3.2* Map of Populations between 300,000 and 499,000

**Unitizing**

Unitizing is also known as unit coding. Unit coding is a determination of how the content of the documents selected for the study will be examined. Context units help to set limits on the portion of written material to be examined for categories of words or statements (United States GAO, 1989). For example, units may consist of words, phrases, sentences, paragraphs or entire documents (Rose, Spinks, & Canhoto, 2015). For this study, units were comprised of statements, words, sentences, and paragraphs. For coding purposes, sentences and statements were selected. In this way, the context in which specific items are used can be identified. In addition, frequencies that illuminate how many times a particular sentence or statement was used in one document, as well as across all documents included in the study, provided a more comprehensive perspective.

This unitizing process took into account the research questions developed for this study (Rose, Spinks, & Canhoto, 2015).

While using the entire AAR collected from each jurisdiction may seem more appropriate, many of the AARs addressed more than just EOC operations, Thus, those sentences and statements that were included in areas that were not within the scope of the study were discarded. For example, training may have been listed as a factor in the performance of personnel on an incident scene as well described personnel who were working within an EOC within a later section of the same AAR. While the factor of training as it related to those on the incident scene may have some impact, it was not relative to the questions asked within the study and thus not included. To identify such differences in the use of the word "training" the author needed to examine a smaller content unit (United States GAO, 1989). However, individual words were not counted as part of the frequency analysis.

**Coding Scheme Development**

In the development of the coding scheme, steps were taken to ensure that the categories were exhaustive and mutually exclusive (Rose, Spinks, & Canhoto, 2015; Franzosi, 2008). In conducting content analysis, the ideal process would endeavor to be totally exhaustive in the development of categories. Nevertheless, there may be practical difficulties of achieving such a level of exhaustiveness. Thus, only empirical exhaustiveness may be possible (Franzosi, 2008). However, the author did take steps to develop a dictionary that could be used in helping to identify the exclusive nature of the units and terms used for the coding process. This dictionary assisted in specifying the "range of concepts and the words or phrases that are indicators of those concepts" (Rose,

Spinks, & Canhoto, 2015, p. 4)

**Dictionary.** One of the most important components of the content analysis conducted was ensuring that each AAR was explored in a structured and systematic fashion. In examining the AARs used for this study, it was imperative that the categories created, along with the coding implemented, were based upon consistent interpretation of the content analyzed. The dictionary used for this study was created to better define the parameters of the words utilized to describe specific nouns, verbs, and adjectives used in each of the AARs. Multiple sources were utilized for creation of the definitions developed due to the nature of the study itself, and the ways in which common terms are used in the sense that typical day-to-day communication may be different from the manner in which the same word may be understood as it relates to emergency center operations functions.

For example, the word "exercise" is defined by Merriam-Webster as a physical activity that someone will do in order to become stronger and healthier (Merriam-Webster, 2015). However, as defined by the Homeland Security Exercise and Evaluation Program (HSEEP), the term "exercise" is defined as an instrument that is utilized to train for, assess, practice, and improve performance in prevention, protection, mitigation, response, and recovery capabilities in a risk-free environment (Department of Homeland Security, 2013). For the purpose of this study, the definition provided by HSEEP is the most appropriate. For clarification, the definition itself, along with the source for each definition listed is provided in Appendix E

**Codebook**. In addition to the dictionary, a codebook was created, which includes information such as a description of the study as well as sampling data, including the

population studied, sampling, and response rate. The codebook addresses how the data is organized relating to the variables identified and the format utilized, while also ensuring a systematic and replicable coding of the data (Rose, Spinks, & Canhoto, 2015). The description of the codebook developed for this study is provided below, and the actual codebook itself is located in Appendix D.

The codebook was developed in association with the study being undertaken to identify the most common challenges that are found within EOCs during activations. The codebook is constructed to correspond with the issues identified in the research questions and hypotheses developed for this study. Each AAR has been coded against multiple variables (themes) that have been developed to address the questions and hypotheses. For example, under the category of Challenges, if the jurisdiction identified that a lack of situational awareness had a negative impact on their EOC operations, it was coded as a "1". If the jurisdiction did not identify that the lack of situational awareness had a negative impact on their EOC operation, it was noted as a "2". An example of the coding is provided below (Figure 3.3)

| | | |
|---|---|---|
| Challenge | Did the jurisdiction indicate that the lack of situational awareness had a negative impact on EOC operations? | 1=Yes 2=No |

*Figure 3.3:* Example of Coding for Situational Awareness

Once all the jurisdictional AARs were examined and coded, the frequency analysis was conducted to indicate if a majority of AARs indicated that the lack of situational awareness had a negative impact on their EOC operations. An example of this analysis is provided in Table 3.1

Table 3.1 *Descriptive Statistics Identifying Lack of Situational Awareness Impacting EOC Operations (RQ #3/H#1)*

| Situational Awareness | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Situational Awareness had a negative impact on the operation of the EOC | 6 | 100% | 54.5% |

Additionally, calculations have been done within some main themes to identify frequencies of subthemes in order to provide a more in depth analysis of the data. The analysis has also identified the most common strengths and recommendations noted in the AARs examined. Finally, the codebook helps to identify and compare the data across multiple jurisdictions to highlight any possible relationships between challenges.

**Data Collection.** Data to be analyzed for this study was in the form of AARs collected from multiple jurisdictions across the country with a population between 300,000 and 499,000. The reason for using AARs for this study is that they are commonly used to capture successes and failures that organizations experience during an emergency response (Faith, Jackson, & Willis, 2011). An AAR encourages self-efficacy to understand and trust intuitions based on experience, expertise, and demonstrated competence. While not a guarantee, candid dialogue in an AAR promotes assessment of knowledge, judgment, decisions, and actions among adults as a learning experience (Moilanen, 2015). The use of AARs as an appropriate source of information has also been established in other research projects (Savoia, Agboola, & Biddinger, 2012)

With the advent of the Homeland Security Exercise and Evaluation Program (HSEEP), a template for how to construct an AAR after an exercise was created. With some editorial modifications, this same template can, and has been used, by some

jurisdictions to create AARs for real-world events as well. While there is no set process for the construction of AARs for real-world events, the use of the HSEEP exercise AAR template has promoted the concept that AARs should be created to help organizations better identify operational issues. AARs are now a mainstay for many non-military organizations, businesses, public safety, and public health agencies. They are "used as tools for gathering and documenting evaluations of key processes during the response to both real-incidents and fictional exercises" (Savoia, Agboola, & Biddinger, 2012, p. 2950).

Locales were asked to submit AARs as part of a study to identify the most common errors/challenges that their EOC faced during an activation. The initial component of this request for data consisted of phone calls to each of the jurisdictions selected to be part of the study. If a positive response was obtained from the locale, a follow up letter was provided. The main goal of the phone call was to explain the purpose of the project and to ask for their assistance by participating in the study. Additionally, the benefits to be gained from the data collected were discussed, and the assurance that the jurisdiction would remain anonymous in the study. It was also explained that the AAR could come from a real world incident or a simulated event. As noted in the literature review, AARs generated from exercises, as well as real world incidents, are beneficial for examining performance (Sinclair et al., 2012).

If the jurisdiction agreed to be part of the study, a follow-up letter (Appendix F) was sent to again explain the purpose of the study, request the AAR, and provide contact information should the jurisdiction have any questions. Although the level of detail that may be contained in AARs will vary according to the jurisdiction and author, AARs do

contain a valuable source of information that can be used to enhance an organization's ability to respond and manage large-scale emergencies and disasters (Faith, Jackson, & Willis, 2011).

The data coded for this study has been derived from eleven (11) AARs that were submitted by jurisdictions with a population size between 300,000 and 499,000. The total number of jurisdictions within this population range located within the United States is twenty-seven. Thus, the number of jurisdictions participating in this study represents 40.7% of the eligible participants. Each AAR selected for the study was reviewed for content to be analyzed according to the research questions developed for the study.

**Detailed Coding Process**. As explained in the earlier section on sampling, both computer and human coding were implemented for this study. While coding can be performed by multiple researchers, for this study, coding was conducted solely by the author. The procedure of open coding was applied to each AAR. Open coding is the process of reading the text line-by-line and finding ideas and text to code. As such, broad coding categories were divided into broad themes (Siccama & Penna, 2008). For the coding process, this study utilized both manual coding along with computer software to assist with the collection and analysis of the coded data.

The utilization of computers and software programs can assist researchers to overcome difficulties related to coding reliability in content analysis (Evans, McIntosh, Lin, & Cates, 2007). However, coding rules must be explicit to ensure the reliability and comparability of results across multiple texts (Duriau, Reger, & Pfarrer, 2007). In a study conducted by Morris (1994), she tested the validity and reliability of both the manual as well as the computerized approach to coding. Her findings showed that the results from

the computerized coding process, and the coding done by individuals, agreed at an acceptable level. Additionally, the computerized coding yielded an acceptable level of semantic validity (Morris, 1994).

Computers and the usage of software can reduce the time and cost of undertaking content analysis projects (Nacos, Shapiro, Fan, & Young, 1991). Additionally, they are appropriate for recurrent and repetitive tasks. One of the benefits from using these systems can be found in the reduction of coding tasks, coder training, and inter-coder reliability checks (Carley, 1997). In addition, the use of computers can potentially provide more uniformity to the analysis. Finally, ambiguities and uncertainties can be reduced through a standardized approach to content analysis process (Krippendorf, 2004).

The coding procedure itself consisted of the transformation of the nominal data into numerical equivalents so that a count and comparison of the variety of text identified in each of the AARs could be conducted, which was accomplished by initially listing the variables in SPSS as “string” variables. A "string" variable is categorical in nature and includes items such as names, locations, colors, etc. However, “string” data in itself cannot be analyzed statistically. Thus, for this study each piece of the data (letters and/or numbers) was treated as text (Hole, n.d.). However, while numerical codes are used, they are not treated as numbers in the statistical sense, such as adding or subtracting, but instead are labels (Hole, n.d.).

As described earlier, a codebook was created to identify how each of the jurisdiction’s documented, or did not document, how the various elements identified in the research questions and hypotheses developed for this study created for this study impacted their EOC operation. Yet the codebook was also developed to outline the

specific assignment of terms to the SPSS numerical identification that was used in the statistical analysis. The computer software SPSS was implemented to conduct a statistical textual analysis in the form of frequency tables of each AAR.

Similar to the study conducted by Savoia et al, (2012), the content analysis of the AARs was performed in an attempt to identify common themes and subthemes experienced by EOCs (Savoia, Agboola, & Biddinger, 2012). Initial coding resulted in the creation of over 90 separate categories, main themes, and sub-themes. After additional analysis, these were then broken down into the following study areas, which are identified as Categories. The specific categories were Challenges, which addressed research questions 1 through 4. Then,  Recommendations, and Strengths, which addressed question 5.

The area of Challenges was the primary focus for this study and within this area, 40 separate themes and sub-themes were identified. The second area of Recommendations revealed 27 themes and sub-themes. Finally, the third area of Strengths uncovered an additional 27 items. Once this initial phase was completed, a second round of reviews was conducted, which included the process of data cleansing and the formal creation of main and sub-themes.

**Data Cleansing**. Once the initial coding was completed, the process of data cleaning was performed. Data cleaning, which is sometimes referred to as data cleansing or scrubbing, is the procedure implemented to detect and remove errors and inconsistencies. Thus, improving the overall quality of the data used for the study (Rahm & Do, 2000). For this process, all research documents were re-read to ensure that all of the applicable data was included in the first round of coding. In addition, data that would

bring no added value to the research was eliminated. Each of the categories were examined for any duplication of data, which would ultimately alter the results of the statistical study. As a result of this process, final categories were confirmed. These were based on the purpose of the study as well as any findings discovered in examining and coding the material contained in the AARs that were relevant to the research project.

## Categories

### Challenges

Main themes for the category of *Challenges* faced during EOC activations, which are examined in relation to six hypotheses created for this study are: (a) *Communications;* (b) *Organization*; (c) *Resources*; (d) *Situational Awareness*; (e) *Training* and (f) *Experience*. Within some of these main themes, sub-themes were created to provide additional insight and detail associated with each main theme.

Under the main theme of *Communications*, the sub-themes communications equipment and communication procedures were identified. Equipment was inclusive of both hardware and software utilized for the communication process. Procedures included those processes that were necessary for both internal and external communications necessary to communicate effectively. Under the category of *Organization*, the subthemes coordination, equipment, facility, policies, and procedures were identified.

Coordination included actions that were related to the interaction between individuals, departments, and organizations to conduct mutual activities without conflict. The sub-theme of facility included those items where the facility (including equipment and supplies) itself served to have an impact on the operation of the EOC. Under the sub-themes of policies and procedures, a distinct difference was noted, which resulted in the

creation of these two items. Policies included the overarching framework under which the EOC operated, whereas as procedures addressed specific tasks that needed to be carried out. For example, a policy could state that the EOC will operate under the Incident Command System (ICS) structure. The procedures would identify the specific steps that need to be taken in order to be in compliance with the policy to operate under the ICS structure.

Under the main themes of *Resources*, *Situational Awareness*, *Training* and *Experience*, no sub-themes were identified. Under the theme of *Resources*, both equipment as well as non-equipment related items, which included personnel, were included for this study. The theme of *Experience* included participation in past real-world or simulated events for the purposes of gathering data for the study.

While the primary focus of this study is to identify the most common challenges that EOCs face during an activation, secondary areas to examine include strengths that AARs identified during these same activations as well as recommendations for the future. To maintain consistency, the same process of identifying both main and sub-themes was followed.

**Strengths**

Under the main category of *Strengths*, the following main themes were identified: (a) *Communications*; (b) *Organization*; (c) *Relationships*; (d) *Exercises*; (e) *Situational Awareness*; (f) *Training*; (g) and *Experience*. These were also identified in associations with the hypotheses 1 through 5 developed to provide a more comprehensive perspective of how both strengths and challenges can be found within similar categories. Under the theme of *Communications*, the sub-themes communication with personnel and

communications with the public were created. These sub-themes are inclusive of the various aspects that make communications possible, such as equipment, policies, procedures, and trained personnel. Under the category of *Organization,* the sub-themes developed included resources, collaboration, coordination, and personnel performance. Resources are inclusive of both equipment and non-equipment related items. Collaboration is recognizing the behavior associated with cooperation between entities and/or individuals. Coordination uses the same criteria as indicated in the *Communications* theme under the *Challenges* category. The item of personnel performance addresses how individuals working within the EOC performed his/her task regardless of whether the individual was performing the task as an individual or as part of a group.

Under *Relationships*, it has been stated that one of the most important elements of emergency management is the relationship between all of the emergency services. Having a strong and productive relationship translates into a more efficient emergency management performance during a disaster (Emergency Management EDU, 2015, para. 2). This is the basis from which this category was created. However, these relationships are not limited to just public safety entities, but are inclusive of the entire community. No sub-themes were created under this main theme. *Exercises* took into account the participation of EOC personnel in previous external and internal exercise opportunities, but no sub-themes were identified. Additionally, under *Situational Awareness*, *Training*, and *Experience*, no sub-themes were created.

**Recommendations**

Under the main category of R*ecommendations*, the following main themes were

identified: (a) *Communication*; (b) *Conduct Exercises*; (c) *Resources*; (d) *Training*; (e) *Organization*. Under the theme of *Communication*, the sub-themes communication with staff and communications with the public were created. These recommendations are associated with hypotheses 2, 3, 4, and 5. They show what the jurisdictions themselves indicated as areas needing to be addressed in relation to what areas were most likely to be identified in the hypotheses developed. These included various types of communication media, procedures, and personnel resources. Under *Conduct Exercises*, no sub-themes were developed. Under *Resources*, the following sub-themes were identified: identify resources needs (equipment), identify resource needs (non-equipment) and resource tracking. Under *Training*, no sub-themes were developed. Finally, under *Organization*, the following sub-themes were developed: coordination, facility, procedures, and policies.

The final breakdown of main themes and sub-themes is as follows. In the category of Challenges six main themes and nine sub-themes were developed. Under the category of Strengths there were eight main themes and eight sub-themes created. Within the category of Recommendations, five main themes and another nine sub-themes were developed. The number of themes under each category is consistent with the general guidelines regarding the number of categories that should be created for a study of this nature. According to Gibbs (2013), more than 10 categories is not necessary. Categories beyond any meaningful groupings does not bring much added value to the study. This has been maintained not only in the creation of categories, but in the number of main themes and the number of sub-themes under each main theme as well.

Similar sub-themes can be found under each of the categories. Since these sub-

themes are associated only within the categories in which they are identified, and the analysis of the data is not across the three (3) categories of *Challenges*, *Strengths*, and *Recommendations* that have been created for this study, each meet the criteria of being exclusive, which is necessary for content analysis. For example, the frequency table created to statistically analyze the number of issues related to communications, under the category of *Challenges*, did not include data analyzed in the study of communications under the category of *Strengths*. Thus, the exclusive nature of categories that is required within a content analysis study was maintained.

## Validity and Reliability

One of the most important aspects to the content analysis process is reliability. Especially when more than one coder is involved and the need to establish consistency between coders exists (Rose, Spinks, & Canhoto, 2015). The underlying theme is that unless the coding scheme has been applied to the examination of the documents in a consistent manner, then the results of the analysis will be unreliable (Rose, Spinks, & Canhoto, 2015; Franzosi, 2008). For this study, the author elected to be the sole coder and employ the assistance of a computer analysis because the software has the ability to reduce the errors that human coders may make.

Additionally, human coders may be inconsistent because they may read connotative meanings instead of denotative ones. The computer-assisted program reads the text in a straightforward fashion because computers are not sensitive to changes regarding cultural contexts. Hence, computers improve research methods because computers help to achieve reliability (Camp, 2007). While human interaction is necessary in the content analysis process, using computer software to assist helps to reduce the

possibility of error.

However, the use of computers does have limitations. If the content analysis were being done exclusively through computer software, the computer program that performs the analysis would require very specific categories. For example, using a computer generally confines the analyst to words as recording units. This means that every word being coded has to be listed in the computer's memory. As such, preparing a dictionary may turn out to be more difficult than formulating categories (GAO, 1989). In addition, because a word can take on different meanings in different contexts, a subtlety that computers cannot detect but people can, the results of computer coding may lack some validity (GAO, 1989).

For this study, the author also conducted additional testing. In order to determine further reliability, a Test-Retest process was conducted. Test-retest reliability is one of the most common measures of reliability (Williams, 2015; Trochim, 2006). As the name indicates, to measure the test-retest reliability, an individual is provided the same test on two separate occasions. The scores achieved by the individual on the two separate occasions are then correlated. The correlation between the two tests is known as the test-retest-reliability coefficient, or the coefficient of stability (Williams, 2015). For the purpose of this study, the author examined the initial assignment of codes to a specific jurisdiction and then recoded that same jurisdiction after a period of time.

In the context of test-retest methodology, the closer the codes assigned during the second phase match the codes that were initially assigned, the more reliable the measure and the higher the coefficient of stability. For this test, a coefficient of one (1) indicates that each of the coding processes are perfectly correlated. In other words, the coding

conducted in the second phase matched exactly with the coding done initially. On the other end of the spectrum, a coefficient of zero (0) would indicate that the coding done in the second phase did not match any of the coding done during the first phase. Thus, there would be no reliability in the coding process (Williams, 2015).

For this study, two separate tests were conducted using a sample AAR. The first examined if the same units (sentences and statements) that were identified for coding during the initial coding process were again selected during the second phase in a sample AAR. For this component, a score of .77 was produced, which is considered an acceptable level of reliability (Williams, 2015). For the second part, again using a sample AAR, an examination of the codes assigned to the segments selected for coding was reviewed (ex: communications, procedures, policies, etc.). For those items that were listed in both coding phases, a score of .94 was achieved. This indicates an excellent level of reliability (Williams, 2015).

To determine validity, several steps were taken to ensure that the research project tested what it was designed to test (Rourke & Anderson, 2004). These steps followed an outline as described by Rourke and Anderson. First, the purpose for coding the data was established. For this study, the codes indicate whether a specific function was performed, and whether or not that function was influenced by specifically-defined variables. The coding also allowed for the statistical counting of variables to determine frequency to be measured against previously-established hypotheses. The second step recognized behaviors against the construct. In reviewing the documents, the behaviors either occurred or did not occur, and were thus coded accordingly.

Next, each category established for this study was done in accordance with the

research question and hypotheses developed. In addition, a dictionary was created to clarify the specific meanings of terms used so that a consistent interpretation of the data could be performed, which ensures both validity and reliability. Notably, however, establishing content validity is largely a subjective operation that relies on the judgment of experts (Rourke & Anderson, 2004). Continuing with the guidance, as demonstrated in the Test-Retest explanation, a preliminary analysis of the coding and categories was successfully completed within acceptable research standards.

Finally, the codebook that was created provides information regarding the description of the study, sample population, how the data is organized, identification of variables, and sample collection. It also provides direction on how to interpret the codes and can be used in conjunction with the developed dictionary, for replication of the study. For external validity, the sample used in this study is representative of 40.7 percent of the identified population selected for this study. Using survey response criteria, this percentage is an acceptable level for this project (Systems, 2012).

## Analysis

Descriptive statistics were utilized to summarize the findings and implemented to validate or invalidate the hypotheses established (Rose, Spinks, & Canhoto, 2015). To start, traditional software was used. The specific software used in conjunction with SPSS was NVIVO 10, which was selected due to its capabilities to display and develop rich data in dynamic documents (Richards, 1999). The utilization of this software allowed for the analysis of each document to identify sections of the AARs that were applicable to this study. As mentioned earlier, each AAR not only addressed issues within the EOC, but also highlighted the areas of concern and strengths with those who were performing

their roles on the incident scene. While this was important information to capture for the report, it needed to be excluded from this study since the focus for this research was limited to EOC operations.

In a study using both manual and computer-based analysis techniques together, Welsh (2002) said that "in order to achieve the best results it is important that researchers do not rely on either electronic or manual methods and instead combine the best features of each" (Welsh, 2002, para. 9). Welsh (2002) also acknowledges that if the data set were relatively small, such as the data that has been collected for this study, it would be possible to use only manual methods. However, the researcher would then be exposed to possible human error in searching for simple information on the whole dataset (Welsh, 2002). Thus, this served as the basis for the chosen approach.

The NVIVO 10 software allowed for nodes to be established that were used to categorize areas for study, creating themes for analyzing and sub-themes for further detailed exploration. This was inclusive of words, statements, and sentences that indicate both positive and negative attributes associated within a study area. Gibbs (2002) suggests utilizing case nodes to help with the organization of the data collected for study. Nodes can be either free nodes, which are independent with no clear connection to other nodes, or they may be created as tree nodes, which allow for a hierarchical structure, moving from a general category (known as the parent node) to a more specific category (known as a child node) (Bazeley & Richards, 2000; QRS International, 2008). This hierarcal type of structuring allows for better organization of coding, demonstrates the growth of the conceptual framework, and helps to form the structure needed for matrix searches (Gibbs, 2002).

Another strength of using NVIVO 10 software is the ability to assign attributes to the data. Attributes serve as information about the participants, and can be assigned to case nodes. They are then used for asking comparative questions about the coding, representing other concepts and categories in the project. They also enable the researcher to compare and contrast the concepts and categories in the project. Additionally, they are able to compare and contrast the contents of cases based upon the attribute values assigned (QRS International, 2008).

A variable-focused strategy was utilized to look for themes across the AARs (Miles & Huberman, 1984). The coding was refined by using axial coding to explore connections between the categories and to analyze the data for specific relationships (Siccama & Penna, 2008). Using the software helped to identify areas that may have otherwise gone undetected if the study utilized solely a manual content analysis method. Understanding the context in which terms are used assists in better defining positive and negative attributes, which, in turn, make the quantitative statistical analysis more meaningful.

The usage of the software also assisted with helping to reduce the amount of time necessary to analyze the documents collected. Manual textual coding can take large amounts of time when multiple sources are used for analysis (University, 2015). Another contributing factor in the selection of this software was the fact that it has been designed specifically for this type of research methodology, and can produce various reporting formats for ease of interpretation and the presentation of findings. This proved to be helpful with expanding upon the results of the quantitative segment, and provide a much more comprehensive picture of the findings resulting from the analysis.

Using both software programs, a systematic analysis of the AARs was conducted. Each of the three categories was examined based upon the research questions and hypotheses developed for the study. Within each of the categories, each of the themes along with their sub-themes was examined. Each of the eleven reports was analyzed to see if the jurisdiction indicated that a specific theme or sub-theme had a negative or positive impact on their EOC operation. Once each jurisdiction had their data coded and recorded, an analysis comparing the number of themes and sub-themes identified across all eleven jurisdictions was undertaken.

The results of the analysis were identified as percentages, which indicated how many of the jurisdictions who participated in the study indicated that the specific theme or sub-theme being examined had impacted their EOC operation. This process was conducted within all three categories. Once the process of analyzing the various themes was completed, a case summary of all the responses was created to identify common themes among multiple jurisdictions. While numerous percentage parameters could be established for this portion, this study focused on those themes in which were found to be co-existent in multiple jurisdictions. This is not to belie the importance of lesser percentage rates, but was done simply to identify the co-existence of a challenge that occurred in all jurisdictions.

Another component of the analysis included creating a table indicating the breakdown of each jurisdiction's response to the various themes and sub-themes. The table identifies the theme, the jurisdictions that indicated either a challenge or a strength with that theme, and the number of sentences or statements that they included within their AAR specific to that theme or subtheme. While the main purpose of creating tables for

this study was to compare how many jurisdictions indicated either a challenge or strength in a particular theme or sub-theme. These additional tables provide more insight by showing just how many comments with each theme or sub-theme each jurisdiction documented in their AAR. For example, while jurisdiction 1 was noted as having a challenge in the area of communications in main table, the second table allows the researcher to see that jurisdiction 1 actually had four comments all related to communications issues that they experienced in the EOC that impacted their operation. This provided more in-depth examination of the quantitative data that may be useful for future research considerations. Similar tables were created for the categories of strength and recommendations as well, and are located in Appendices A, B, and C respectively.

## Findings and Conclusion

In the next chapter, the results of each of the tests conducted are presented as frequency tables so that the answers to the research questions can be provided, and subsequent test of each hypothesis can be conducted. Each hypothesis has been addressed individually and each was found to be either confirmed or not confirmed based upon the findings indicated within the frequency analysis table. The conclusion summarizes the results of study and includes recommendations for areas of future research. A table listing a summary of the results of the hypothesis testing is provided below.

*Table 3.2 Summary of Hypothesis Testing*

| Hypothesis # | Hypothesis | Status |
|---|---|---|
| H-1 | 54.5% of AARs indicated that the lack of situational awareness did have a negative impact on EOC operation | Confirmed |
| H-2 | 100% of the jurisdictions reported that they had issues with communicating, which had a negative impact on their EOC operation | Confirmed |
| H-3 | 100% of the jurisdictions reported that the lack of organization did have a negative impact on EOC operations | Confirmed |
| H-4 | 63.6% of the jurisdictions reported that the lack of training did have a negative impact on the EOC operation. | Confirmed |
| H-5 | 63.6% of the jurisdictions reported that the lack of resources did have a negative impact on the EOC operation | Confirmed |
| H-6 | Multiple similarities were highlighted to provide evidence in support the hypothesis. | Confirmed |

# CHAPTER IV

# RESULTS

## Categories and Descriptive Statistics

The purpose of this study has been to identify the challenges and errors that are most often experienced during an EOC activation. The goal is to begin the process of establishing a foundation from which future training programs can be developed that are built upon empirical evidence and not simply from perceived deficiencies. The study utilized a content analysis process to examine AARs from metropolitan areas with a population between 300,000 and 499,000. Of the 27 jurisdictions contacted, eleven were willing to submit an AAR to be included in the study. This represents a participation response rate of 40.74%.

As part of the study, three categories, along with their themes and sub-themes where appropriate were created for exploration. The N/A designation indicates that no sub-theme created (Table 4.1).

Table 4.1 *Table of Analyzed Themes and Sub-Themes*

| Theme | Challenges | Strengths | Recommendations |
|---|---|---|---|
| Communication | Equipment<br>Procedures | With personnel<br>With the public | With personnel<br>With the public |
| Experience | N/A | N/A | N/A |
| Organization | Coordination<br>Facility<br>Policies<br>Procedures | Resources<br>Collaboration<br>Coordination<br>Personnel<br>Performance | Coordination<br>Facility<br>Procedures<br>Policies |
| Resources | Equipment<br>Non-equipment | N/A | Identify resource needs (Equipment and non-equipment)<br>Resources Tracking |
| Training | N/A | N/A | N/A |
| Situational Awareness | N/A | N/A | N/A |
| Exercises | N/A | N/A | N/A |
| Relationship | N/A | N/A | N/A |

The first category, Challenges, was the main emphasis of the study and included areas such as communications, organization, resources, situational awareness, training, and experience. Of the eleven jurisdictions reporting issues under the category of Challenges, 100% reported issues within communications (Table 4.2), 100% reported issues in the area of organization (Table 4.2), 81.8% reported issues in the area related to experience, 63.6% reported issues within the area of resources (Table 4.2), 63.6% reported issues in

the area of training (Table 4.2), and 54.5% reported issues in the area of situational awareness (Table 4.2).

Table 4.2 *Descriptive statistics of issues reported under the category of Challenges*

| Variable | Issue | N | Percentage |
|---|---|---|---|
| Challenge | Communication | 11 | 100% |
| Challenge | Organization | 11 | 100% |
| Challenge | Experience | 9 | 81.8% |
| Challenge | Resources | 7 | 63.6% |
| Challenge | Training | 7 | 63.6% |
| Challenge | Situational Awareness | 6 | 54.5% |

Communications is inclusive of processes and procedures as well as equipment used to exchange information. Additionally, the category includes the communications conducted with internal as well as external partners, stakeholders, and the public. Organization incorporates the activities, policies, procedures, and structures implemented to manage the EOC. Experience was inclusive of the experience personnel who staffed the EOC had gained either through prior incidents and/or through exercises. Resources included materials, equipment, supplies and personnel to operate the EOC. Training examined the area of EOC training personnel had received. Situational awareness was inclusive of the ability of personnel to be aware of the dynamic circumstances of the incident and the impact any actions implemented had on the situation.

The second category focused on the area of Strengths, which demonstrates those areas in which jurisdictions felt they had performed well. Successful performance is important when looking towards future training initiatives so that items that fall into this category can be explored further to uncover areas where current training practices are successful and can be further developed to continue the trend towards improving EOC operations. Additionally, this category serves to be a standard from which other areas can

be measured, such as commonalities among multiple jurisdictions. While the main focus will be on identifying trends in the area of challenges across multiple localities, it is important to recognize where EOCs are strong as it relates to operations. Also, if a jurisdiction has both a challenge and a strength documented in any particular area, this may indicate that the weakness can be eliminated by the application of a process that resulted in a strength in the same segment. As part of finding solutions to challenges, a locality may only need to understand how to adapt a strength to correct a challenge.

The same approach was applied to this category in terms of analyzing the data. The category was further delineated into smaller issues, or themes, for the purposes of this study, for a more detailed review. Under the category of strengths, 90.9% reported strengths in the area of organization (Table 4.3), 72.7% reported strength in the area of communications (Table 4.3), 54.5% reported strength in the area of relationships (Table 4.3), 45.5% reported strengths in the area of situational awareness (Table 4.3), 45.5% reported strength in the area of experience (Table 4.3), 36.4% reported strengths in the area of exercises (Table 4.3), and 36.4% reported strengths in the area of training (Table 4.3).

Table 4.3 *Descriptive statistics of issues reported under the category of Strengths*

| Variable | Issue | N | Percentage |
|---|---|---|---|
| Strength | Organization | 10 | 90.9% |
| Strength | Communications | 8 | 72.7% |
| Strength | Relationships | 6 | 54.5% |
| Strength | Experience | 5 | 45.5% |
| Strength | Situational Awareness | 5 | 45.5% |
| Strength | Exercises | 4 | 36.4% |
| Strength | Training | 4 | 36.4% |

Much like the Challenges category, many of the themes in the area of strength examined the same areas. The exception in this case was to highlight those areas where jurisdictions indicated they saw these themes as strengths within the EOC during the activation. Organization examined the activities, policies, procedures, and structures implemented to manage the EOC. Communications again was inclusive of the processes and procedures, as well as equipment, used to exchange information. As before, this theme included the communications conducted with internal as well as external partners, stakeholders, and the public.

The area of relationships highlighted the previous interaction of personnel that was gained prior to the EOC activation being examined in this study that showed to be a strength in the activation. Experience was again inclusive of the experience personnel had gained through either prior incidents, and/or exercises. Situational awareness was inclusive of the ability of personnel to be aware of the dynamic circumstances of the incident and the impact of actions taken to address the situation. Training examined the area of EOC training personnel had received. Exercises were those activities that personnel had been exposed to prior to this incident, which provided them the opportunity to simulate the roles they would be expected to perform during an activation.

The third and final category created for this study was Recommendations. This component was created to serve multiple purposes. First, because part of the study sought to discover trends between jurisdictions, such as common challenges that each locale faced during an activation, the area of recommendations that were contained in the after actions reports were explored to determine if locales shared similar recommendations. Additionally, since the goal of this project is to help ensure future training programs are

more beneficial to those who manage and operate within an EOC, the recommendations offered within an AAR were reviewed to find similarities of the challenges or strengths that the jurisdiction noted during the activation. The table below shows those themes that were identified in both Challenges and Recommendations. Additionally, themes that were both identified as a Challenges and Recommendation.

Table 4.4 shows the comparison between the number of jurisdictions who reported challenges in specific themes as compared to the number of jurisdictions who offered recommendations in those same themes. Table 4.5 highlights a similar comparison, showing the relationship between the number of jurisdictions reporting strengths within specific themes against the number of jurisdictions who suggested recommendations in these same areas.

Table 4.4 *Comparison of Challenges to Recommendations*

| **Challenge** | **# of Jurisdictions indicating a challenge in this theme** | **# of Jurisdictions offering recommendation within this same theme** |
|---|---|---|
| Communications | 11 | 11 |
| Organization | 11 | 11 |
| Resources | 7 | 11 |
| Training | 7 | 7 |

Table 4.5 *Comparison of Strengths to Recommendations*

| **Challenge** | **# of Jurisdictions indicating a challenge in this theme** | **# of Jurisdictions offering recommendation within this same theme** |
|---|---|---|
| Communications | 8 | 11 |
| Organization | 10 | 11 |
| Training | 4 | 7 |
| Exercises | 4 | 3 |

Much like the previous two categories, many of the same themes were examined. However, this category captured those areas that jurisdictions indicated they would like to have addressed in order to improve their capability in the EOC. Communications included processes and procedures and equipment used to exchange information. Similarly, this theme included the communications conducted with internal as well as external partners, stakeholders, and the public. Resources, as it pertained to this category, again included materials, equipment, supplies and personnel used to operate the EOC. The theme of Organization again examined the activities, policies, procedures, and structures implemented to manage the EOC. Training indicated those jurisdictions that indicated additional training in some area (equipment operation, personnel management, resource management, etc.) was necessary to improve their EOC operation. Finally, exercises highlight those locales that wished to have more exercises conducted to improve their ability in the EOC during an activation.

How errors are framed plays a significant role in how they are interpreted (Loh, Andrews, Hesketh, & Griffin, 2013). In order for improvements to be made in the area of correcting challenges, they must be viewed as constructive for learning to take place (Lagadec, 1997). Yet, as was identified and discussed in Chapter Two, many times errors that are committed are not documented as actionable because it may be politically unfavorable to see errors clearly identified (Donahue & Tuohy, 2006). Viewing recommendations in association with the challenges that have been identified within the same AAR may give an indication that some influence has been incorporated to minimize the findings outlined. Or, no recommendations about a challenge may be presented at all,

which could be a further indication of some influence to detract from some level of deficiency that may have been identified. While this study does not go into depth with regards to the relationships found between challenges identified and recommendations, it does conduct a macro-level exploration of how recommendations align with documented challenges to provide a more comprehensive review of the quantitative data.

The same methodology was applied to this area of interest as was done in both the categories of challenges and strengths. The category was delineated into themes for a more detailed examination. Under the category of recommendations, 100% offered recommendations in the area of communication (Table 4.6), 100% of the localities offered recommendations in the area of resources (both equipment and non-equipment) (Table 4.6), 100% of the jurisdictions offered recommendations in the area of organization (Table 4.6), 63.6% offered recommendation in the area of training (Table 4.6), and finally 27.3% offered recommendations in the area of exercises (more specifically the recommendations were to conduct more exercises) (Table 4.6),

Table 4.6 *Descriptive statistics of items offered in the area of Recommendations*

| Variable | Issue | N | Percentage |
|---|---|---|---|
| Recommendation | Communications | 11 | 100% |
| Recommendation | Resources | 11 | 100% |
| Recommendation | Organization | 11 | 100% |
| Recommendation | Training | 7 | 63.6% |
| Recommendation | Exercises | 3 | 27.3% |

As was outlined in the proposal for this study, the jurisdictions were offered a choice to provide AARs on real-world events or exercises that resulted in the activation of their EOC. Of the reports submitted, two (18.2%) came from exercises conducted and the remaining 9 (81.8%) came from real-world events Figure 4.1. The types of events

were relatively equally separated between those that were man-made and those which were natural (5 and 6 respectively) (Figure 4.2). The creation of the reports themselves was conducted either by personnel who worked for the jurisdiction or by a third party. Eight (72.7%) of the reports were drafted by jurisdictional personnel and three (27.3%) were developed by a third party (Figure 4.3). Many of the reports submitted were confidential in nature and thus none of the jurisdictions submitting AARs for this study will be identified other than by numerical reference.

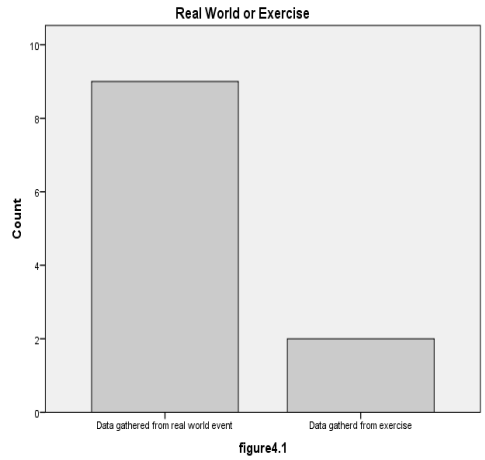


*Figure 4.1* Real World Event v. Exercise

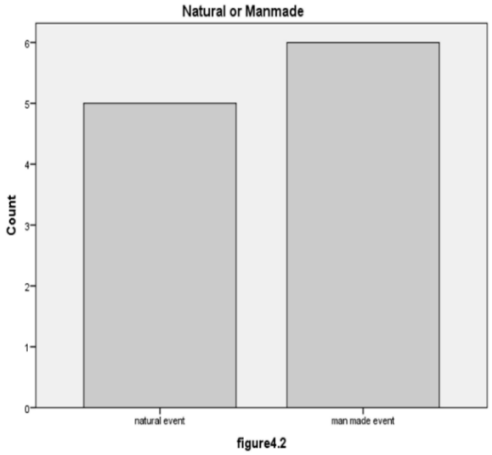


*Figure 4.2* Natural v. Manmade

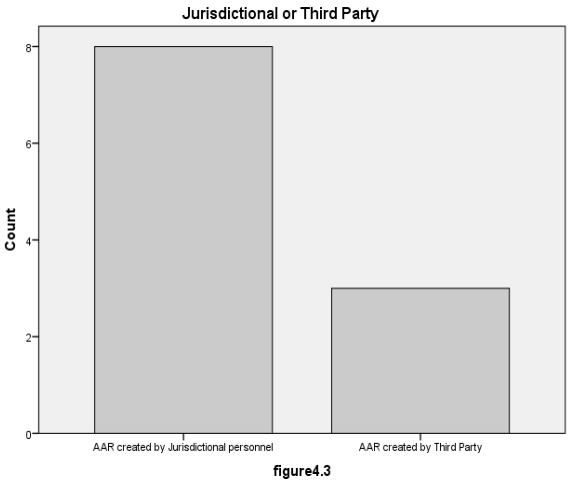


*Figure 4.3* AAR created by Jurisdiction v. Third Party

## Discussion of Research Questions

As discussed in Chapter Two, the study of performance at an individual and organizational level helps to identify if any areas need to be corrected to improve performance (Paton, Flin, & Violanti, 1999). The study also should highlight those areas that are strengths so that good practices can be recognized and continued. Furthermore, studies help to set a course of direction for a jurisdiction to move forward in their desire to improve performance related to specific operations (Paton, Flin, & Violanti, 1999; Savoia, Agboola, & Biddinger, 2012). Thus, the goal of this study was to examine reports from multiple jurisdictions to help identify the most common challenges that EOCs face during an activation, so that future training programs can be developed that address those challenges most often encountered. In this context, more EOCs will benefit from improved training programs that are designed to correct common deficiencies as determined by a systematic, evidence-based, and purposeful examination of EOC operations.

Based upon these desired outcomes, the following research questions were developed for this study:

1. How often is training, or the lack thereof, recognized as being a source of mistake/errors/challenges experienced during EOC operations?
2. How often is lack of experience noted as playing a role in performance as identified in after action reports?
3. In examining the operations of the EOC, what are the most common deficiencies that are noted in the after action reports?
4. In examining the after action reports, which errors are identified as

being coexistent? In other words, when one error is identified, what other error or errors will most likely also be identified in other after action reports?

5. What are the most common recommendations and strengths identified in after action reports?

The first question helps to establish the importance of training. The question itself, *how often is training, or the lack thereof, recognized as being a source of mistake/errors/challenges experienced during EOC operations,* was designed to explore if jurisdictions recognize training as being a key component to the success of their EOC operation. Also, it was designed to examine if they are able to identify areas where training, or the lack thereof, played a role in the ability of personnel to perform at a level that is considered acceptable. Training has been a constant issue, especially at the local government level. Very strict personnel rules and regulations, along with a lack of training, plague some jurisdictions (Kweit & Kweit, 2006).

While there may be constraints to conducting training, this does not belie the importance of it being conducted. Within local jurisdictions, emergency management training needs to be created to develop or enhance an individual's capability to respond to new, and for the most part atypical, demands that a large-scale emergency or disaster will present (Sinclair et al., 2012). The training program needs to include personnel who will be working in the EOC as well as key officials who can impact EOC operations. The training must focus on the procedures that will take place in the EOC (McEntire & Myers, 2004). An effective training program needs to be comprehensive and designed to address specific needs.

According to Sinclair et al, (2012), a solid and effective program should be built in a specific manner and follow a defined course. Wilson (2000) outlines a basic training program that incorporates seven steps, which include: (1) identify the training needs; (2) identify those who need training; (3) identify the training method to be used; (4) prepare the training materials; (5) deliver the training program; (6) evaluate the effectiveness; and (7) audit the process for future modification (Sinclair et al., 2012, p. 509). Building such a program based upon findings such as those from this study will improve the capabilities of EOC staff.

The second question asks *how often lack of experience is noted as playing a role in performance as identified in after action reports*. Experience does play a role in the performance of individuals within an EOC environment (Madsen, 2009; Biddinger, et al., 1974), thus, this question was designed to examine whether experience was highlighted in a majority of the jurisdictions, in only a few locales, or even documented at all. In 2013, Mann surveyed emergency managers in cities with populations of 50,000 to 249,999 and asked them to what extent they agreed with the statement, "The representatives from other departments have had experience with previous disasters". Of the 224 respondents who answered the question, 68% agreed or strongly agreed. In addition, emergency managers were asked to what extent they agreed with the statement, "The representatives from other departments understand their roles and responsibilities when the emergency operations center is activated," to which 64% either agreed or strongly agreed (Mann, 2013). Thus, experience as well as training assists in the performance of specific functions.

Experience can be obtained either through real-world incidents or simulated

events. Regardless of the reason an EOC is activated, the experienced gained by performing a function that is not performed very often will be valuable. Sagan (1993) states that whether the experience is gained through training, exercises, or actual incidents, learning occurs (as cited in Stern, 1997, p. 71). EOCs are not activated on a regular basis and thus gaining experience through such real-world incidents is not a promising venture. Of course, the real challenge for drawing upon the experience of those who report to the EOC is the fact that turnover of personnel has made this difficult. In the end, as much as an organization gains through experience, they also lose (Stern, 1997).

One of the key aspects that comes from experience is the ability to apply lessons learned. Unfortunately, the history in actually applying these lessons learned from real or simulated disasters is not strong. Many articles and studies have discussed the failures to learn from past mistakes (Faith, Jackson, & Willis, 2011; Donahue & Tuohy, 2006; Lennquist, 2004). This study serves to explore if any of the lessons learned from previous incidents (either positive or negative) were applied to the current EOC activation, and whether any lessons learned in this activation need to be addressed in future operations. As already documented, incorporating lessons learned can be a positive experience (Madsen, 2009; Birkland, 2009).

Another component that arises from experience and lessons learned comes from previous training, where individuals first learn how to perform a function. With the lack of actual real-world activations, training may be the only activity that actually provides them with any experience in performing an EOC function. Thus, the experience they can obtain from training activities can help prepare for a crisis or disaster.

Although a separate category for lessons learned was not created for this study,

the issue of experience was captured. Lessons learned from real-world events, exercises, and training all go toward an individual's broad category of experience. One factor to consider is that if the training of personnel does not correct previously-identified challenges and allow for obtaining experience, the opportunity to apply that lesson may escape, and thus no improvement in EOC operations will occur.

The third question looks into the principle area of this study. It asks, *in examining the operations of the EOC, what are the most common deficiencies that are noted in the after action reports?* This question serves to be the basis from which the evidence to be used for future training programs can be drawn upon. EOCs are activated for large-scale emergencies and disasters. This is a commonalty across the country, thus the question was designed to investigate commonalities among activations so that priorities can be established and common challenges/errors can be reduced, or preferably, eliminated. Not only for those jurisdictions that participated in this study, but for all EOCs.

This study follows along the same idea as another research effort that was initiated to create a model for the elimination of mistakes in disaster response at a strategic level (Caymaza, Akyonb, & Erenelc, 2013). This study looks to accomplish similar outcomes at a tactical level. Breaking down EOC operations into areas of focus can help to impact EOC operations in a manner that is realistic and doable. Trying to improve EOCs only from a strategic level may appear overwhelming to some. However, focusing on one area at a time will make the task less daunting.

While the main focus of the study is to identify common challenges among EOCs, it would also be a good practice to look for challenges that occur together. Thus, the fourth question examines the possibility of having challenges that are co-existent.

Specifically, the question asks, *in examining the after action reports, what errors are identified as being co-existent?* In other words, when one error is identified, what other errors will most likely also be identified within the after action report? By examining the data from this perspective, challenges that were catalysts for the occurrence of other errors during an EOC activation can be uncovered.

For example, if communications with the public did not follow a specific procedure, did this frequently result in a delay in the delivery of that information? Thus, it would be prudent to underscore that while providing information in a timely manner was a challenge, the reason behind it was a lack of a procedure. To prove this co-existence on a consistent basis would serve to indicate that the main problem was the lack of an established procedure to carry out this function. This would assist a jurisdiction with focusing resources in the correct manner in lieu of trying to figure out why this function just isn't working as well as it should.

This examination also helps to possibly eliminate any myths about the co-existence of challenges. The jurisdiction may feel that poor decisions are being made because of a lack of situational awareness on the part of the decision makers. However, looking at a study of this nature may show that decision makers are gathering good situational awareness before any decisions are made. Thus, the challenge, or area of concern that has been identified may actually be found in another component of the decision-making process. Thereby, negating the perception of the problem being with situational awareness. This in turn could save the organization from dedicating resources on a problem that empirically does not exist.

The final question for this study incorporates two parts. The first deals with

identifying recommendations while the second analyzes strengths. The question asks, *what are the most common recommendations and strengths identified in after action reports?* As stated earlier, recommendations are provided to help improve an operation and should be offered in a constructive manner such as suggestions to assist individuals as well as organizations to improve what they do (Moynihan, 2009). Furthermore, they can be viewed as learning opportunities and not just disguised criticisms that are being used to place blame (Lagadec, 1997). This study examines some of the most common recommendations suggested across multiple jurisdictions. Again, looking for trends that can be identified to help with creating more effective training programs.

The other part of the question looks for strengths in the EOC. In other words, what did they do well? AARs may be viewed as documents that are only used to correct mistakes, yet, they can serve to be much more. They also can show the areas in which individuals and organizations performed well. While identifying strengths has been partially discussed earlier, other benefits should be highlighted as well. As an example, Huang and Wang (2011) share how the member's desire to participate in the group, and the ability of the group' members to set aside personal desires in favor of the group's desires are both strengths that help the organization perform at a higher level (Huang, Wang, & Lin, 2011). Such actions need to be recognized so that others may learn and apply these same principles and concepts.

Team commitment also has been defined as the relative strength of the individual's identification and involvement in a particular team (Bishop, Scott, & Burroughs, 2000). This is another element that is important to the overall operation of an EOC. While it may be the sole responsibility of one individual to make a decision, it is

often done with input from other team members. It has also been shown to facilitate overall team effectiveness (Bishop, Scott, & Burroughs, 2000; Bishop, Scott, & Casino, 1997). Strengths in areas such as these should be identified since they play such an important role in the effective operation an EOC.

## Discussion of Variables

Descriptive statistics have been applied to address the research questions developed for this study. Six hypotheses were identified and tested using the Frequency Table analysis methodology. The usage of the frequency table allowed for the examination of the occurrence of multiple variables in a statistical fashion to provide a comprehensive perspective of the data in the areas of categories, themes, and sub-themes against the dependent variable of EOC operations. The impact of the variables on EOC operations will serve as the basis for the creation of all frequency tables created to perform testing.

To document additional information captured from each of the AARs. Details regarding the actual number of items listed from each jurisdiction in each of the three categories are provided in Appendix A for Challenges, Appendix B for Strengths, and Appendix C for Recommendations. Within each appendix, main themes are divided into sub-themes and the number of items submitted per jurisdiction is provided.

For this study, the first question was addressed using Hypothesis 4. The second question was addressed using Hypothesis 6. The third question was addressed through Hypotheses 1-5. Question 4 was addressed using Hypothesis 6 and Question 5 was addressed through the frequency analysis of the Recommendation section of the study (Table 4.7). The main emphasis of this study is to identify the challenges associated with

EOC activations, thus, the hypotheses and research questions were primarily designed and developed to examine this particular area in detail.

Table 4.7 *Relationship of Research Question to Hypotheses*

| Research Question (RQ) | Hypotheses (H) |
|---|---|
| RQ 1 | H4 |
| RQ 2 | H6 |
| RQ 3 | H 1-5 |
| RQ 4 | H6 |
| RQ 5 | Recommendations Category |

However, to provide a more comprehensive view, both strengths and recommendations have been included as part of this study. Developing future training programs should be based upon empirical evidence that should be emphasized, and should include data from both real-world and as well as simulated incidents. Effective training needs to be purposeful and relevant (Wilson, 2000), and should recognize both areas needing improvement as well as strengths. Unfortunately, today's training programs have been found to be organizationally independent, and developed in an ad hoc manner. Unfortunately, not taking advantage of relevant literature and ideas currently available (Sinclair et al., 2012).

## Independent Variable Analysis

### Category: Challenges

The first category, Challenges, was the main emphasis of the study. It was created so that a systematic process could be implemented to empirically explore what the most common challenges that EOCs faced during an activation. The goal is to enhance current and future EOC training programs based upon research.

## Communications

One of the most basic functions within any EOC is communications. Communication in itself can be accomplished through a variety of means and be crafted to accomplish a limitless number of goals. Additionally, communications is a multi-dimensional process. It involves the crafting of a message, the transmittal of the message, and the reception of the message (Comfort, 2007). Thus, successful communication is a necessity for effective EOC operations. In reviewing the eleven AARs submitted for this study, 100% (Table 4.2) reported some issue regarding the communication process. In conducting the content analysis of the AARs, the issues identified fell into two primary categories. One issue was centered in the area of challenges with communications equipment, or the lack of having the communication equipment necessary. Equipment in this sub-theme included both hardware and software.

The second area within this sub-theme focused on communication procedures. For the purpose of this sub-theme, procedures were inclusive of those used to communicate with internal personnel as well as communicating with the public. Procedures also are inclusive of the steps necessary to monitor third party messages such as social media. As demonstrated in research, social media is particularly used and serves as a vital link among younger members of the community (Hunt, Smith, Hamerton, & Sargisson, 2014).

Of the AARs analyzed, over 90% indicated they had issues with communication equipment while just under 83% shared that they had difficulties in the area of procedures (Table 4.8). The examination of this category addresses question 3.

Table 4.8 *Descriptive Statistics Identifying Communications Issues Impacting EOC Operations (RQ 3/H2)*

| Communications | n | Responses (N=27, n=11) | Percent of Cases (n=11) |
|---|---|---|---|
| Communications equipment, or lack thereof, had a negative impact on EOC operations | 10 | 100% | 90.9% |
| Lack of communications procedures had a negative impact on the operation of the EOC | 9 | 100% | 82.8% |

Some of the comments regarding issues within the communication theme included items such as being able to integrate information from one system into another. For example, one jurisdiction experienced a compatibility issue between two different systems. They could not figure out a way to transmit data from their situational awareness software into the GIS system to show the gathered data on a map. Another issue regarding equipment highlighted the need to investigate how to get text messages or emergency alerts that can be read on mobile devices.

In regards to procedural challenges, one of the localities indicated that they needed to develop a more systematic process to identify those areas that required support personnel to address the needs of vulnerable populations. Additionally, they needed to track teams that may be working in various areas after a disaster. Another locale indicated that once the jurisdiction had activated its emergency operation center, a procedure was needed that indicated that updating the media with information and posting relevant information to social media would need to be released through the EOC. It is critical that the EOC know what information is being released and to whom specific information is being provided. Regardless of whether it was equipment or procedural

issues, the communications component impacted each of the jurisdictions that participated in this study.

## Organization

The organization of the EOC helps to keep the overall operation, and functions being conducted, performing in an orderly and deliberate manner. Organization itself is composed of several different areas. For this study, the main theme of organization also was broken down into multiple sub-themes, much in the same manner that was conducted in the communications theme. Another similarity with communications is that all of the eleven jurisdiction who participated in the study reported issues related to the organization of the EOC.

Under the main theme of organization, the following sub-themes were identified: coordination, facility, policies, and procedures. Coordination examined how agencies, outside organizations, department, and other groups worked together to accomplish tasks. Because no one entity can handle all of the aspects that need to be addressed during a disaster response, individuals and groups must work together effectively for a successful conclusion of the event.

The sub-theme of facility is applicable when the actual space that the EOC is located can accommodate the needs of personnel who report to site. The facility also plays a role when the equipment used to conduct operations is non-functional or not present. The equipment noted in this sub-theme is different from the equipment identified in the communications sub-theme. This equipment include items such as lighting, shredders, office supplies, etc. Another issue deals with the adequate ventilation and overall physical environment in which personnel are expected to perform their roles.

Policies are those documents that provide the parameters under which an EOC is operated within a jurisdiction. They are not step-by-step procedures used to actually carry out functions in the EOC. Policies provide the framework under which procedures are developed. They are the strategic concepts while procedures serve as the tactical implementation of aforesaid policies.

Since EOCs are not activated on a regular basis, procedures are necessary to assist activated personnel. Procedures are created to make sure that essential elements of a process are completed correctly and in a timely manner. They help to ensure that the actions carried out by personnel have a purpose and are useful to the overall operation of the EOC itself. Jurisdictions cannot expect personnel who report to the EOC to remember exactly what they are responsible for during the disaster response and recovery. Procedures that are developed for the EOC help these personnel meet the expectations of leadership, as well as the community.

In examining the issues identified by jurisdiction as they relate to the organization of the EOC, several observations were noted. Of the eleven jurisdictions participating in the study, 100% reported that they had issues regarding organization within the EOC that impacted operations (Table 4.2). Within the main theme of organizations, issues were noted in sub-themes and documented as follows:

- 100% (Table 4.9) of the AARs indicated issues in the area of coordination;
- Over 63% (Table 4.9) reported that they experienced challenges in the area of facility capabilities;
- 72.7% (Table 4.9) reported difficulties related to the lack of, or poorly-developed policies;

- 81.8% (Table 4.9) of the jurisdictions indicated that procedures was an area of difficulty for them.

Table 4.9 *Descriptive Statistics Identifying Organizational Issues Impacting EOC Operations (RQ #3/H#3)*

| EOC Organization (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Poor coordination had a negative impact on the operation of the EOC | 11 | 100% | 100% |
| The facility had a negative impact on the operation of the EOC | 7 | 100% | 63.6% |
| Lack of, or poorly-developed, policies had a negative impact on the operation of the EOC | 8 | 100% | 72.7% |
| Lack of, or poorly-developed, procedures had a negative impact on the operation of the EOC | 9 | 100% | 81.8% |

a. Dichotomy group tabulated at value 1

A variety of comments were contained within the after actions reports that described some of the issues that jurisdictions had in the area of organization. Regarding coordination, challenges were found in differing areas of responsibility. Issues documented included a lack of coordination in the area of donation management, coordinating activities between the incident scene and the EOC, and working with other agencies to get messages out to the public. The issues identifying challenges in the area of coordination are not surprising. Past research has shown that coordination is a major

challenge among individuals, groups, and agencies during a disaster (Techakesari, 2014; Faraj & Xiao, 2006; McEntire, 2002; Carter, 1979; Tierney, 1985; Auf der Heide, 1989).

In the sub-theme of facility, issues such as seating arrangements, having agencies not centrally located, and a lack of space were some of the items discussed. Within both policies and procedures, many of the comments addressed the lack of clear direction within the documents themselves. Another issue was simply the lack of any policy or procedures, which had a negative impact on the overall organization of the EOC itself.

**Resources**

Resources are a necessity for any organization to carry out its function. Within an EOC, resources come in a variety of forms including, but not limited to equipment, personnel, and supplies. For this study, this main theme was inclusive of all types of resources and thus no sub-themes were created. A more detailed breakdown of resources is identified in the Recommendations section of this study and is inclusive of equipment and non-equipment types of resources. The challenge of having the right amount and type of resource in the EOC is difficult because each disaster is different. Thus, each requires differing resources in order to address the impact from the event.

One of the most basic realizations in dealing with disasters is the fact that no one jurisdiction has all of the resources they need to meet the demands that arise. While many jurisdictions go through a process of conducting vulnerability studies and going step-by-step to identify resource shortfall, they are not able to have all of the resources necessary to meet every demand that a disaster may bring to their community. The challenge facing EOCs is determining the necessary essential resources, and where they can be obtained.

Under the theme of resources, over 63% (Table 4.10) of the jurisdictions that took

part in the study reported issues in the area of resources. Some of the comments within the AARs indicated that issues arose with not only the lack their ability to access local resources, but a general inability to obtain needed resources from nearby localities or through vendors. Others noted that staffing in the EOC was a significant factor in their ability to conduct activities. In other cases, while meeting the needs of the community was an essential item, meeting the needs of first responders also was a matter that caused some difficulty for the EOC. Not in just getting the resources they needed, but making sure it was the right resource for the right task.

Table 4.10 *Descriptive Statistics Identifying Resource Shortage Issues Impacting EOC Operations (RQ #3/H#5)*

| | | Responses (N=27, *n*=11) | Percent of Cases |
|---|---|---|---|
| Resources | *n* | Percent | (*n*=11) |
| Resource shortage issues had a negative impact on the operation of the EOC | 7 | 100% | 63.6% |

**Situational Awareness**

Being able to maintain what is termed situational awareness in the EOC is a key component in determining whether an event is brought to a successful conclusion. A variety of aspects to situational awareness need to be considered when looking at the concept from a holistic perspective. Kowalski and Vaught, (n.d.), stated that different situations will demand different forms of cognitive activity. Some will call for an increase in an individual's analytical cognition, while other situations will require personnel to rely on intuition. Regardless of the event, situational awareness and the way in which individuals react to situations are key when it comes to making decisions

(Kowalski & Vaught, n.d).

Nowhere was this more evident than with the response to Hurricane Katrina. Waugh and Streib (2006) state that "a large part of the problem with the command and control system was the lack of situational awareness — that is, poor communication among officials in the disaster area and decision makers in Baton Rouge, Jackson, and Washington (p. 136). The EOC is a dynamic environment and the ability to keep abreast of the ever-changing conditions that disaster entails is a constant challenge, but one that must be performed well.

In the main theme of situational awareness, just over half, 54.5% (Table 4.11) of the jurisdictions reported some type of issue with situational awareness. Of the comments documented in the AARs, jurisdictions indicated that maintaining situational awareness was hindered by processes such as keeping up-to-date with the communication flow so that all individuals in the EOC were up to speed with the current status of the disaster. Another jurisdiction reported that they had difficulty due to a lack of equipment that would provide them with the information they needed to make timely decisions. Yet, others shared that it was hard to maintain constant awareness due to the separation of agencies. In fact, some organizations that needed to be kept up to date were not even able to be located in the same room where the situational updates were being provided to other members of the EOC staff.

Table 4.11 *Descriptive statistics identifying Situational Awareness Issues Impacting EOC Operations (RQ #3/H#1)*

| Situational Awareness | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Situational Awareness had a negative impact on the operation of the EOC | 6 | 100% | 54.5% |

**Training**

Training for personnel that staff the many positions in an EOC is an ongoing process for those who are in charge of EOC operations during a disaster. The curriculum of training that needs to be created to provide sufficient knowledge to those who will be performing diverse roles during an activation is broad in nature. Topics need to include how to make good decisions, how to work specialized equipment, how and when to create reports and what information is required in each, and understanding where they fit in as part of the EOC organization. All of these are necessary due to the fact that turnover in the EOC is a constant hurdle that must be overcome (Stern, 1997).

Yet, training as a whole for those who operate in the EOC has been somewhat disappointing. Multiple articles have been written about how the lack of training has impacted the EOC (Kweit & Kweit, 2006; Harrald, 2006b; von Lubitz, Beakley, & Patricelli1, 2008; Somers & Svara, 2009). While attempts have been made at the local level in terms of providing personnel with the training needed, these programs are mostly ad hoc and serve only those jurisdictions that conduct them (Sinclair et al., 2012). EOCs are for the most part activated only occasionally in most localities, and the personnel who report do not have any relevant experience in EOC operations (Canton, 2007; Militello, Patterson, Bowman, & Wears, 2007). Thus, the training developed should help multiple

jurisdictions address the most common of issues.

Of the eleven jurisdictions who are a part of this study, 63.6% (7) (Table 4.12) reported concerns related to training. Much like other concerns that were documented in the AARs, training concerns did not necessarily center on any one particular area. While one jurisdiction may have reported difficulties related to the lack of training on equipment, another locality identified mistakes occurring due to the lack of training on procedural items. However, while not mentioned in all of the AARs where training was indicated as an issue, one area that was noted in a couple of reports was that of understanding roles and responsibilities. This portion of the study analysis addresses question 1.

Table 4.12 *Descriptive statistics identifying Training Issues Impacting EOC Operations (RQ #1/H#4)*

| Training | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Training had a negative impact on the operation of the EOC | 7 | 100% | 63.6% |

**Experience**

The lack of experience in emergency management is an attribute that virtually every level of government must contend with at some point.

> In 1997, James Lee Witt was widely credited with revitalizing FEMA following its less than stellar performance during such disasters as Hurricane Andrew in 1992. In the aftermath of 9/11, FEMA was folded into the DHS. The focus of the vast new department was terrorism. In 2005, disaster management experts complained that FEMA had lost many experienced employees. Some argued the exodus was a result of downgrading the importance of preparation for and response to natural disasters in the new department. Others believed that the cause was the appointment of agency leaders with no

> background in emergency management. (Kweit and Kweit 2006, 378-79)

As organizations change to meet the needs of the community, so do staff. Personnel take positions in other departments, some leave to pursue other careers, while others are promoted into new roles and responsibilities. Additionally, in EOC operations, while personnel who report may be well experienced in their own discipline, they will probably have little knowledge or experience regarding the administrative and/or command skills necessary during an activation in response to a disaster (Revere, 2000).

In reviewing the AARs submitted, 81.8 % (Table 4.13) reported that the lack of experience on the part of personnel who reported to the EOC had an impact on the performance and impacted the overall operation. Some of the observations documented by jurisdictions included issues such as having a lack of personnel who were familiar with EOC operations because they had not been involved with many, or any, previous activations. Others indicated that some personnel did not understand the importance of their role in the overall operation of the EOC due to inexperience with respect to the interaction of their role with others in the EOC, and thus did not comprehend its importance. Additionally, another jurisdiction noted that some of the plans and procedures that had been put in place to address situations were underutilized because personnel were not familiar with the plans and/or procedures, and had not used them on a regular basis. This portion of the study addresses question 2.

Table 4.13 *Descriptive statistics identifying Experience as an Issue Impacting EOC Operations (RQ #3/H#1-5)*

| Experience | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Experience had a negative impact on the operation of the EOC | 9 | 100% | 81.8% |

## Strengths

Under the category of Strengths, actions that were considered to have a positive impact on EOC operations were recorded. While the primary focus of this study was directed in the area of identifying the most common challenges, bringing forth the strengths that each jurisdiction identified needs to be recognized as well. The examination of this category has been done in the same fashion that was implemented for the study of challenges. Under this category, several main themes were identified and sub-themes were created where necessary to provide more insight into the main theme itself. The following main themes were explored in this section of the study: communications, organization, relationships, exercises, situational awareness, training, and experience. The examination of this category partially addresses question five.

### Category: Strengths

### Communications

When communications work effectively, they can have a positive impact on the overall EOC operation. Within this main theme, two (2) sub-themes, one being communications with the public, and the other focusing on communications with staff, were created. These sub-themes were inclusive of the various components of the

communications process that need to be in place in order for the communication process to be successful. Under the main theme of communications, 72.7% of the eleven jurisdictions reported observing strengths in this area. Within the sub-theme of communications with the public, 62.5% (Table 4.14) of the eleven jurisdictions reported this area as a strength in the EOC. Additionally, another 62.5% (Table 4.14) reported that they observed good practices in the area of communications with personnel. Additionally, some jurisdictions reported strengths in both sub-themes. Some of the comments that were included as part of the AAR included:

- Calls made to the public through their mass notification system went well;
- Press briefings with the PIO were effective;
- Working with the local Chamber of Commerce, a web site that provided a communication tool for the business community was established and was a valuable asset even weeks after the incident had occurred;
- Communication both to and from the local public information office was excellent.

Table 4.14 *Descriptive Statistics Identifying Strength in the Area of Communication*

| Strength in Communication (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=8) |
|---|---|---|---|
| Good Communication with the Public | 5 | 100% | 62.5% |
| Good Communication with Staff | 5 | 100% | 62.5% |

a. Dichotomy group tabulated at value of 1

**Organization**

Emergency management many times finds itself in the middle of a paradox. On one side of the coin, the activities associated with a disaster response requires that

emergency management involves itself with meticulous organization. On the other side of the same coin, the EOC needs to be spontaneous to address the ever-changing needs brought about by a disaster (Waugh Jr. & Streib, 2006). Organization in an EOC has multiple components that need to be considered in order to be effective. Couple this with the fact that an EOC, is at best, a temporary organization, and challenges are bound to be faced. However, while challenges may be more apparent, strengths established through good organizational practices within the EOC must not be overlooked.

The main theme of organization has been divided into sub-themes for further examination. These sub-themes include: collaboration, coordination, resources, and personnel performance. Of the eleven localities taking part in this study, 90.9% found an area of strength as it related to the organization in the EOC. Within the sub-themes, 45.4% (Table 4.15) found strength in the area of collaboration. Another 45.4% (Table 4.15) found strength in the sub-theme of coordination. Within the segment of good use of resources, 72.7% (Table 4.15) found this area to be a strength in their organization of the EOC. Finally, 54.5% (Table 4.15) of the jurisdictions identified that their personnel performed well during the activation.

Much like the sub-themes that make up this main theme, comments from jurisdictions covered a wide range of specific activities that they identified as highlights in their EOC organizational structure. Below are some of the comments noted in the AARs submitted for this study:

- The EOC staff was proactive in planning for future needs and activities;
- Personnel knew and understood their roles, which proved to be a strength in the operation;

- The collaboration between departments was some of the best seen in a number of years;
- Rotating the same personnel in positions during opposite operational periods created consistency and institutional knowledge of the event;
- EOC staff members were knowledgeable about their duties and responsibilities and worked effectively with each other.

Table 4.15 *Descriptive Statistics Identifying Strength in the Area of Organization*

| Strength in Organization (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Good Collaboration in the EOC | 5 | 100% | 45.4% |
| Good Coordination in the EOC | 5 | 100% | 45.4% |
| Good use of Resources and good Resource Support | 8 | 100% | 72.7% |
| Personnel Performed well in the EOC | 6 | 100% | 54.5% |

a. Dichotomy group tabulated at value of 1

**Relationships**

Relationships play an important role in the EOC. They are often one of the most important ingredients in forming strong groups that need to accomplish, sometimes difficult, and time-sensitive tasks. According to Kettl, relationships among the key players is often the most useful tool to have when in the heat of a problem. While networks matter, personal networks matter most of all (Kettl, 2003). Understanding the capabilities and restrictions that organizations bring to the table is one of the benefits of having established relationships.

Relationship building is often done outside of the EOC. It occurs during training, planning, exercises and other associated functions. Yet, the largest benefit comes when

the EOC is activated. From an EOC member perspective, building a relationship before the disaster occurs is much easier than trying to do so in the middle of one. Within this theme, 54.5% (Table 4.16) of the collected AARs identified that established relationships served to be a strength during an EOC activation.

Within this theme, several disciplines within some of the jurisdictions noted how previously-established relationships served to be a strength during the activation. A few of the comments submitted as part of the AARs are listed below:

- It was evident that good working relationships had already been established between all departments and outside agencies;
- Part of the success of the operation is attributed to the establishment of an effective public safety partnership early;
- Long-standing relationships between the jurisdiction and outside entities continues to provide a basis for successful operations;
- Relationships with the community was evident as offers to provide goods and services from multiple private organizations came in.

Table 4.16 *Descriptive Statistics Identifying Strength in the Area of Relationships*

| Strength in Relationships | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Good Relationships | 6 | 100% | 54.5% |

**Exercises**

Exercises can serve more than one purpose as it relates to EOC operations. While it gives those who will report to the EOC an opportunity to go through processes, review procedures, and conduct functions that they do not have an opportunity to do very often,

it can also highlight areas that need to be addressed. Many times the errors that are found during real-world events also can be identified during an exercise (Militello, Patterson, Bowman, & Wears, 2007).

This theme was created to explore if any exercises that had been conducted in the past were mentioned as being a source of improvement in the current EOC operations, or if participants felt their performance in the EOC was strengthened by past exercises in which they had participated. This is an important area because very often exercises serve as a main component of a training program.

In reviewing the AARs provided for the study, 36.4% (Table 4.17) of the eleven participating localities indicated that past exercises had a positive impact on the operation of the EOC. None of the localities reported that past exercises had a negative impact on EOC operations. The "no" response indicates that no mention of exercises was included in the AAR.

Table 4.17 *Descriptive Statistics Identifying Strength in the Area of Past Exercises having a Positive Impact on EOC Operations*

| Strength in Past Exercises | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Past Exercises had a Positive Impact on EOC Operations | 4 | 100% | 36.4% |

Some of the comments recorded in the AARs pertaining to the positive impact of past exercises on the specific EOC operation included:

- The participation in a full-scale exercise one month prior to this event provided for a similar setup and operation for this event;

- Local and state personnel from multiple disciplines knew what to do and how to coordinate their response due to past exercises;
- Past workshops and exercises related to interoperable communications enhanced the capabilities of personnel.

**Situational Awareness**

In the previous section noting challenges, situational awareness was included to indicate that it is sometimes very hard to maintain. It has also been noted in past research as an area of concern (Boin & Hart, 2010). However, some jurisdictions documented that their ability to maintain situational awareness in some capacity was noted as being a strength. Thus, to provide a balance of perspective for this variable, this study identified those jurisdictions who reported this theme as a strength in their EOC.

Of the eleven jurisdictions who submitted AARs for this study, 45.4% (Table 4.18) reported that their ability to maintain situational awareness during their EOC activation was a strength. Some of the comments documented in the AARs included:

- The situational awareness equipment worked well and we need to expand its capabilities;
- Situational reports provided a good summary of what was going on;
- The equipment utilized provided real-time situational awareness of the incident and assisted command staff in decision making;
- The EOC benefitted from real-time situational awareness information.

Table 4.18 *Descriptive Statistics Identifying Strength in the Area of Situational Awareness*

| Strength in Situational Awareness | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Good Situational Awareness | 5 | 100% | 45.4% |

**Training**

As with the sub-theme of situational awareness being identified as being both a strength and a challenge, training also has been previously identified as a challenge. However, training can have a positive impact on EOC operations. Without some sort of training, personnel who perform roles in the EOC would be left with very little guidance in terms of identifying their roles, what they are responsible for in performing their roles, and how they need to serve as the primary support entity for first responders and the community.

This section was created to identify those jurisdictions that have indicated in their AARs that training was a strength and had a positive impact on their EOC operation. As with the exercise theme within this category, the identification of "no" in the table does not indicate that training has had a negative impact on the ability of the EOC to operate effectively, but rather to indicate that those jurisdictions did not indicate in this specific AAR that past training was indicated as a strength in this specific EOC activation.

Within this theme, 36.4% (Table 4.19) of the eleven reporting jurisdictions indicated that past training had a positive impact on their EOC operations. Some of comments noted for this theme included:

- All jurisdictional employees were provided with training on how ICS was utilized in the EOC and this was a strength;

- All political and administrative leaders were NIMS-trained, which helped to understand their role in the EOC and to act accordingly;
- A commitment to previous training allowed for good integration of emergency services.

Table 4.19 *Descriptive Statistics Identifying Strength in the Area of Training*

| Strength in Training | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Past Training had a Positive Impact on EOC Operations | 4 | 100% | 36.4% |

**Experience**

Experience is a trait that cannot be replaced except over time. While the skills needed to perform a task may not change drastically over time, an individual's ability to perform them can improve simply from having done the task numerous times. In terms of an organization's performance, experience is one attribute that can have a significant and positive impact (Madsen, 2009). Although it has been noted that the lack of experience had played a negative role in the operation of an EOC, experience has served to be a positive influence as well.

Within the eleven jurisdictional AARs collected, 45.5% (Table 4.20) recognized that the experience of the personnel who reported to the EOC was a strength in their activation. Of those documenting this particular strength, the following comments were highlighted:

- History of coordinating disciplines was a strength;
- Using a similar set up that personnel had used before enhance capabilities;
- Experience helped to identify where shortages in resources may occur;

- Experience of EOC staff contributed to the successful operation of the EOC.

Table 4.20 *Descriptive Statistics Identifying Strength in the Area of Experience*

| Strength in Experience | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Past Experience had a Positive Impact on EOC Operations | 5 | 100% | 45.5% |

## Recommendations

Under the category of Recommendations, suggestions from jurisdictions on how to improve their EOC operations have been identified. While recommendations may be thought of as suggestions to only improve operations, some jurisdictions recognized the strengths that their EOC had exhibited and made suggestions to continue in the direction. The analysis of this specific category followed the same template as was used previously in both the Challenges and Strengths categories. Under this category, several main themes were identified and sub-themes were created where necessary. The main themes identified include: communications, exercises, resources, training, and organization. The examination of this category partially addresses research question five. This component of the study was done to highlight those areas, as identified by jurisdictions, which locales want to see addressed. Developing future training programs will need to be cognizant of those areas that jurisdictions identify as needing attention so that the programs developed can be viewed as a collaborative endeavor.

**Category: Recommendations**

**Communications**

Recommendations within this theme have been divided into two (2) sub-themes consisting of communications with staff and communications with personnel. Both sub-themes are inclusive of items such as equipment, procedures, training, and other characteristics that can correct or enhance the communications process.

Within this sub-theme, 100% (Table 4.21) of the jurisdictions submitted recommendations in this main theme, 100% (Table 4.21) provided recommendations in the area of improving communications with staff, and 45.5% (Table 4.21) offered recommendations in the area of communication with the public. Some of the recommendations were as follows:

- Need to identify a way so that we can ensure that all personnel have the same information and are operating off the same page;
- The EM Director needs to make sure that all personnel are loaded into the notification system properly and test the system;
- Make sure that regular briefings are held at the start of each operational period

Table 4.21 *Descriptive Statistics Identifying Recommendations in the area of Communications*

| Recommendations for Communications (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Improve Communication with Staff | 11 | 100% | 100% |
| Improve Communication with the Public | 5 | 100% | 45.5% |

a. Dichotomy group tabulated at value of 1

**Exercises**

The theme of exercises can contain several components such as hold more exercises, involve more people in the exercise process, and redesign how exercises are currently conducted. Exercises serve to provide an opportunity for individuals to practice newly acquired, or previously-acquired skill sets, in an environment that is non-threatening. They also serve to test newly-created policies and procedures. They are an integral component of a well-designed and comprehensive training program.

In this theme, 27.3% (Table 4.22) of the eleven jurisdictions offered recommendations in this area. Some of the recommendations suggested included:

- Future drills, exercises and table tops would enhance our current operational team work
- Participants would like to follow up with more exercises to include a functional drill on weather-related incidents
- Conduct exercises on our current checklists and job aids.

Table 4.22 *Descriptive Statistics Identifying Recommendations in the Area of Exercises*

| Recommendations for Exercises | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Recommendations to conduct more Exercises | 3 | 100% | 27.3% |

**Resources**

The area of resources is one that is sometimes hard to define in terms of recommendations, simply because of the limitations that may already be in place. For example, based upon the event, identifying the resources that may be necessary can be difficult. Unfortunately, the type of equipment or personnel being requested may not be available or in limited supply. While it may seem reasonable to identify resources that

may be needed prior to an incident occurring, it may not be a practical expectation. Thus, recommendations in this theme need to be considered with applicability and reality.

This theme was broken down into three (3) sub-themes. Identifying equipment-related resources, identifying non-equipment related resources, and resource tracking. Within the eleven contributing jurisdictions, 100% (Table 4.23) offered recommendation in the area of needing to identify equipment related resources earlier. In the sub-theme of non-equipment-related resources, 54.5% (Table 4.23) of the responding localities had recommendations in this area. Finally, 27.3% (Table 4.23) of the jurisdictions had some recommendations in the area of, the need to, or how to better perform, in the area of resource tracking.

Within the recommendation sub-theme, some of the comments offered by jurisdictions were as follows:

- Additional disaster resource-tracking options should be explored including the use of current technology;
- The EOC should keep a running list of equipment and personnel expenses for future reimbursement;
- While the resources in terms of staffing for this event was sufficient, longer events will require the identification of additional personnel to maintain a 24-hour operation;
- Need to conduct a complete inventory of current resources so that we know what we have

Table 4.23 *Descriptive Statistics Identifying Recommendations in the Area of Resources*

| Recommendations for Resources (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Recommendation to Identify Needed Equipment Resources | 11 | 100% | 100% |
| Recommendation to Identify Needed Non-Equipment Resources | 6 | 100% | 54.5% |
| Recommendation to Improve Resource Tracking | 3 | 100% | 27.3% |

a. Dichotomy group tabulated at value of 1

**Training**

Along with exercises, training is key to helping personnel understand their roles and responsibilities when reporting to the EOC. Personnel are already at a disadvantage because an activation of the EOC does not occur often enough for them to maintain a high level of proficiency when completing tasks in an effective and timely manner. This is what makes the training component such an important aspect in the performance of the EOC (Sinclair et al., 2012).

In the training sub-theme, 63.6% (Table 4.24) of the participating localities had recommendations noted in their AARs to hold more training activities. Some of the comments included:

- Multiple disciplines should create a calendar with mutual training opportunities that need to be held throughout the year;
- Need to get more people trained to perform this specific function;
- Need to conduct cross-training for personnel;
- Provide further training to EOC staff on the interface process with the Incident Command Post.

Table 4.24 *Descriptive Statistics Identifying Recommendations in the Area of Training*

| Recommendations for Training | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Recommendations to conduct more Training | 7 | 100% | 63.6% |

**Organization**

Organization of the EOC is helps it to function in a seamless and effective manner, or be in a constant state of chaos. Unfortunately, there is not currently a standard manner in which to establish an organization in the EOC when responding to, or recovering from, a disaster. Often, those who are not members of the emergency management department do not always understand the premise for how an EOC is organized (Perry, 1995). Thus, recommendations concerning the organization of the EOC can address many variables.

For the purpose of this theme, several sub-themes were developed to capture the recommendations in a structured manner. These sub-themes were coordination, facility, procedures, and policies. Of the eleven jurisdictions participating in this study, 100% (Table 4.25) had recommendations in the area of EOC organization. Of those recommendations, 27.3% (Table 4.25) were in the area of coordination. Another 36.4% (Table 4.25) had ideas regarding the facility in which the EOC operated. In the area of both policies and procedures, 81.8% (Table 4.25) had recommendation to offer. Within the various sub-themes, some of the recommendations included:

- Continued emphasis on the coordination and partnership of the jurisdiction, schools, and volunteer agencies involved in the disaster response and recovery;
- The jurisdiction needs to plan for a backup EOC facility that can be used when the primary becomes too full;
- Procedures for alerting staff when the EOC has been activated need to be developed;
- The jurisdiction needs to review its policies regarding donations during a disaster.

Table 4.25 *Descriptive Statistics Identifying Recommendations in the Area of Organization*

| Recommendations for Organization (a) | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Recommendation to Improve Coordination | 3 | 100% | 27.3% |
| Recommendation to Improve the Facility | 4 | 100% | 36.4% |
| Recommendation to Create or Improve Policies | 9 | 100% | 81.8% |
| Recommendation to Create or Improve Procedures | 9 | 100% | 81.8% |

a. Dichotomy group tabulated at value of 1

## Results of Hypothesis Testing

**H1: When EOCs are activated for actual real-world or simulated natural, man-made, or technological incidents, situational awareness will be identified as a challenge/deficiency in a majority of after action reports.**

The first hypothesis explores the relationship between situational awareness and the impact it had on EOC operations. For this hypothesis, the dependent variable is EOC operations, which is coded as 0 on a scale of 0-1. 1 is the indication that the EOC was activated. Situational awareness is coded as 1 on a scale of 1-2 to indicate that the lack of situational awareness was noted in the AAR as being a challenge and thus, had a negative impact on EOC operations. The number 2 was assigned to demonstrate that the jurisdiction did not note in their AAR that situational awareness had a negative impact on their EOC.

Based upon the frequency analysis, it was noted that 54.5% (Table 4.26) of AARs indicated that the lack of situational awareness did have a negative impact on EOC operation while 45.5% (Table 4.26) did not note any impact to the EOC based upon a lack of situational awareness. After creating a frequency table, there is evidence to support the argument that the lack of situational awareness did have a negative impact on EOC operations in a majority of the AARs submitted (Table 4.26). This finding is in alignment with the thoughts from Harrald (2006b) regarding situational awareness during the response to Katrina. In his article, he shares that "A detailed and credible common operating picture may not be achievable for 24 to 48 hours (or longer)" (p. 258)**.** While the hypothesis is confirmed and in alignment with other observations, it is noted that this represents a small sample of the population and needs to be taken into consideration.

Table 4.26 *Situational Awareness Frequency Table Indicating Negative Impact on EOC*

| Situational Awareness Impact | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Situational Awareness had a Negative Impact on the Operation of the EOC | 6 | 100% | 54.5% |

**H2: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, communications will be identified as a challenge/deficiency in a majority of after action reports (confirmed)**

The second hypothesis examines the relationship between EOC operations and the function of communications. The independent variable is coded a 1, on a scale of 1-2 to show that the after action report did indicate that within the function of communications, there were challenges that had a negative impact on the EOC operations. The 2 on the scale is used to indicate that the AAR did not state that there were any challenges associated with communications that had a negative impact on EOC operations.

The issues within communications that were identified by the various jurisdictions included items associated with equipment or procedures. Within the area of equipment, 90.9% indicated they had issues with the improper operations or lack of equipment which impacted their ability to communicate (Table 4.8). In the area of procedures, 81.8% indicated that there were no procedures or the procedures in place needed to be updated, which had a negative impact on EOC operations (Table 4.8). In total, 100% of the jurisdictions reported that they had issues with communicating, which had a negative impact on their EOC operation (Table 4.27). Based on the data from the Communications Frequency Table, this hypothesis is confirmed.

It is worth noting that these results are similar to those found by Savoia et al, (2012), who conducted an analysis of AARs from public health agencies and hospitals. In their study, they noted that within the area of communications, they identified that "the most frequent issue was related to the agencies ability to process any release new information (50%), which was often reported to be complex and time consuming" (Savoia et al., 2012, p. 2954). Thus, the results of this study are in agreement with the results from previous studies in this area.

Table 4.27 *Communication Frequency Table Indicating Negative Impact on EOC*

| Communication Impact | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Issues with Communication had a Negative Impact on EOC Operations | 11 | 100% | 100% |

**H3: The lack of EOC organization will be identified in multiple EOC after action reports as being the source of errors committed during an EOC activation.**

The third hypothesis examines the relationship between EOC operations and the organization of the EOC itself. For this hypothesis, several areas were included as part of the organization. In reviewing the data, the dependent variable of EOC operations remains a 1 in a range of 1-2 indicating that the EOC was activated. The independent variable of Organization is coded as a 1, on a scale of 1-2 to show that the AAR did indicate that the lack of organization did have a negative impact on EOC operations. A code of 2 would indicate that the AAR did not indicate that the lack of organization had a negative impact on the EOC.

Using the frequency analysis table, 100% (Table 4.28) of the jurisdictions reported that the lack of organization did have a negative impact on EOC operations.

Within the theme of organization, 100% (Table 4.9) indicated they had issues with coordination. In a study conducted by Faraj and Xiao (2006), they noted that the recent effort to base typologies of coordination from an information processing view, may be too formal of a process to allow organizations to "mount an effective response to events characterized by urgency, novelty, surprise, and different interpretations" (p. 1167). Another 63.6% (Table 4.9) reported that the facility itself impacted the organization of the staff, which impacted EOC operations. 72.7% (Table 4.9) documented that the lack of policies related to EOC operations had a negative impact while 81.8% (Table 4.9) reported that the lack of or outdated procedures were a negative influence. Based upon the results of the frequency analysis table, this hypothesis is confirmed. While the sample population does present a limitation for this study, the strength in this table is noted

Table 4.28 *Organization Frequency Table Indicating Negative Impact on EOC*

| Organization Impact | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Issues with Organization had a Negative Impact on EOC Operations | 11 | 100% | 100% |

**H4: When EOCs are activated for actual real world or simulate natural, man-made or technological incident, training will be identified as a challenge/deficiency in a majority of after action reports (Confirmed)**

The fourth hypothesis examines the impact of training on an EOC operation. As stated in Chapter 2, while training is an important aspect for any high-risk profession, it is especially important to those who come to the EOC due mainly to the fact that EOC activations in response to large-scale emergencies or disasters do not occur that often (Sinclair et al., 2012). While it is important for those who may perform the technical

tasks associated with an EOC operation, learning and understanding how to manage those personnel is just as important when it comes to the overall success of the organization (Pidot, 2013; Cigler, 2008).

Training is an ongoing effort that attempts to address many factors, such as providing basic training for those who are new to the EOC; updating current training programs to keep up with technological advancements; providing advanced training for experienced personnel; and providing training for elected officials. Yet, these are only a few of the items that must be addressed in a comprehensive training program. For this hypothesis, the independent variable of training was coded as 1 on a scale of 1-2 indicating that the jurisdiction did identify the lack of training as having a negative impact on their EOC operation.

Using a frequency analysis, 63.6% (Table 4.29) of the jurisdictions reported that the lack of training did have a negative impact on the EOC operation. This figure was interesting and should be viewed as a flag of concern when compared to the findings that Donahue and Tuohy (2006) found when they examined AARs in identifying lessons learned from previous disasters. In their study, they noted that almost every AAR discussed the importance that training plays in building capacity. Yet, over half of the AARs for this study identified how the lack of training impacted their operations. While based upon the frequency analysis data, this hypothesis is confirmed, additional research would be prudent to uncover the reason why this figure is still so high. Again, taking into account that the results of this study are based on a small population sample.

Table 4.29 *Frequency Table Indicating Lack of Training Having Negative Impact on EOC Operations*

| Training Impact | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Training had a Negative Impact on EOC Operations | 7 | 100% | 63.6% |

**H5: When EOCs are activated for actual real-world or simulated natural, man-made, or technological incidents, resources will be identified as a challenge/deficiency in a majority of after action reports (Confirmed)**

The fifth hypothesis takes into account the important of resources to an effective EOC operation. Resources in this context are comprised of equipment, supplies, and personnel. Anticipating the resources that will be needed for any possible incident that a jurisdiction may encounter is a difficult task and requires constant monitoring. In reviewing this variable, resources were coded again on a scale of 1-2, with 1 indicating that the jurisdiction did document in their AAR that the lack of resources had a negative impact on their EOC operation.

Using the frequency analysis table, 63.6% (Table 4.30) of the jurisdictions reported that the lack of resources did have a negative impact on the EOC operation. In comparison to the 75% of AARs on major incidents studied by Donahue and Tuohy (2006) where logistics was identified as an issue, this result can be viewed as similar. Taking into consideration that the results of this study are founded on a much smaller sample of AARs. However, based upon the frequency analysis data, this hypothesis is confirmed.

Table 4.30 *Frequency Table Indicating Lack of Resources had a Negative Impact on EOC Operations*

| Resources Impact | *n* | Responses (N=27, *n*=11) Percent | Percent of Cases (*n*=11) |
|---|---|---|---|
| Lack of Resources had a Negative Impact on EOC Operations | 7 | 100% | 63.6% |

**H6: When EOCs are activated for actual real world or simulated natural, man-made, or technological incidents, several challenges will be identified as being co-existent. (Confirmed)**

This hypothesis examines the co-existence of challenges among the jurisdictions that submitted AARs for this study. This includes looking at the individual jurisdictions for evidence of challenges that they have noted within their own EOC and compare them to other jurisdictions who may have the same challenges identified in their AAR. Several past studies have shown that issues such as planning, communications, coordination, and leadership, among others, have been common in multiple reports spanning from the 1970's through the 1990's (Savoia, Agboola, & Biddinger, 2012; Donahue & Tuohy, 2006; Henstra, 2010; Col, 2007). For this study, the comparison is inclusive of both the main themes and the sub-themes created within them so that a more in-depth examination could be undertaken. In examining the data from Table 4.31, the following similarities were noted:

- Of those jurisdictions that indicated that a lack of training had a negative impact on their operation, 100% of those same jurisdictions reported that a lack experience had a negative impact on their operations. (Table 4.31)

- Of those jurisdictions that indicated that a lack of resources had a negative impact on their operations, 100% also reported that a lack of, or poorly-written procedures also had a negative impact on their operations (Table 4.31).
- Of those jurisdictions that indicated that a lack of situational awareness had a negative impact on their operations, 100% also reported that a lack of, or poorly-written communications procedures, also had a negative impact on their operations (Table 4.31).

While more similarities were noted between jurisdictions at lower percentages, the similarities highlighted above provide evidence to support the hypothesis. Thus, this hypothesis is confirmed. Taking into account the small population size, this table provides useful information for future studies. This also addresses research question four. In examining the data from the case summaries, 100% of the jurisdictions that submitted an AAR had issues regarding poor coordination, which had a negative impact on their EOC operations (Table 4.31).

Table 4.31 *Case summary of all jurisdictions reporting challenges in the EOC*

| Juris. | Communication equipment, or lack thereof, had negative impact on EOC operations | Lack of communication procedures had a negative impact on the EOC operations | Lack of experience had a negative impact on the EOC operations | Poor coordination had a negative impact on EOC operations | The facility had a negative impact on EOC operations | Lack of, or poorly written policies, had a negative impact on EOC operations | Lack of, or poorly written procedures, had a negative impact on EOC operations | Lack of resources had a negative impact on EOC operations | Lack of situational awareness had a negative impact on EOC operations | Lack of training had a negative impact on EOC operations |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| 2 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| 3 | Yes | No | No | Yes | Yes | Yes | Yes | Yes | No | No |
| 4 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | Yes |
| 5 | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes |
| 6 | Yes | Yes | Yes | Yes | No | No | No | No | No | Yes |
| 7 | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| 8 | No | Yes | No | Yes | Yes | No | Yes | No | Yes | No |
| 9 | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | Yes |
| 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 11 | Yes | Yes | Yes | Yes | No | Yes | No | No | No | No |

## Summary

The results of this study have served to establish the foundation from which future training programs focusing on EOC operations can be created and/or be enhanced. This study has examined the reports submitted by various jurisdictions from across the country, and has highlighted some of the most common challenges when EOCs are activated. While the hypotheses established for this study were confirmed, some surprises were discovered in conducting the research for the study. These will be identified along with recommendations for future research initiatives in the next chapter.

# CHAPTER V

## CONCLUSION

One of the most important functions that a jurisdiction performs during a response to a large-scale emergency or a disaster is the activation of its EOC. Yet, this is also one of the least-performed functions that a locality undertakes. Thus, when the EOC is activated, challenges and mistakes will occur. In an effort to reduce their occurrence and impact on the operations of the EOC, localities often look to training to be the solution. Yet, to conduct effective training, the jurisdiction needs to identify those areas that need to be corrected. This study has attempted to start that process.

The purpose of this study has been to investigate some of the most common challenges of an EOC activation so that current training programs can be improved, and future training programs can be developed. While EOCs have been activated nationally for many years, and training programs have been created to enhance their operation in some fashion, this study appears to be the first to actually examine the most common challenges that EOCs encounter and contributes to the current body of knowledge on this topic. This has been done to help identify training needs from an evidence-based perspective. From the findings of this study, several points can be made.

First, while technical skills are important in performing tasks, jurisdictions seem to have the most difficulty in working together. Of the eleven jurisdictions from which AARs were collected, 100% (Table 4.29) cited a challenge in the area of coordination. So

while training in multiple areas is still needed, attention in the area of how people work together to accomplish a task should be the focus. As indicated in Chapter II, individual organizations often do not engage with many outside entities on a regular basis to conduct their normal day-to-day operations. Additionally, only 54% (Table 4.12) of the jurisdictions reported relationships as being a strength in their operation. Perhaps an emphasis is needed to develop training programs that are designed to encourage this type of behavior more often in lieu of programs that focus on individual performance in specific roles. Focusing more on social skills more so than technical may be an asset and should be further researched.

Second, one of the most interesting discoveries in this study was the fact that only 36% (Table 4.17) of the jurisdictions indicated that past training served as a strength in the EOC operation. While broad, overarching conclusions cannot be made stating that current training programs are not having a positive impact on EOC operations, this finding should not be totally dismissed. Perhaps other reasons explain this low percentage. However, the fact remains that those who report to the EOC are possibly not being adequately trained. It is noted that 63% (Table 4.22) of the jurisdictions indicated they would like to have more training in their recommendations.

Finally, one interesting finding came in the area of facilities, in which 63% (Table 4.5) of the respondents indicated that the facility itself had a negative impact on their EOC operations. This came in the form of different entities being located in different areas, lack of equipment, and not enough space. While this study was initiated to identify challenges that could be addressed through better training, this item demonstrated that localities need to be more aware of how and where they set up their EOCs. One of the

attributes of the EOC is to have a central location in which leaders can come together to gather the accurate and real-time information that they need to make good decisions. To accomplish this, the facility needs to be adequate and capable of providing this capability.

Savoia et al, (2012) utilized AARs to examine lessons learned from responses to real-world incidents within the public health domain. One of the areas that they explored was public health/hospital EOC operations. In their study, they noted that the most common themes identified as challenges were found in the areas of role and responsibility confusion of those working in the EOC, lack of ICS knowledge and training, and difficulty in the area of situation reports (Savoia, Agboola, & Biddinger, 2012). While this study indicated that 60% (Table 4.11) of the localities indicated that their personnel did perform their roles well, 54% (Table 4.7) did document issues related to situational awareness. These findings are similar to the findings of the previous study as well. Additionally, all jurisdictions in this study reported challenges related to organization (Table 4.1), much like those that the Savoia et al. study highlighted.

Although this study was small in terms of numbers of AARs reviewed, eleven in total, the information garnered from the reports is valuable. The AARs themselves were a good source for capturing the strengths and challenges that EOCs faced during their activation. They served as a solid resource upon which improvements to future operations can be made and enhancements to training programs can be initiated. By incorporating data such as this into the design of future training, progress can be tracked and adjustments made that are based on evidence and not just perspectives.

## Limitations

Very little research has been conducted in the area of the most common challenges that are faced by EOCs during an activation. Thus, this study has contributed to the broad area of knowledge so that jurisdictions, private contracting companies, and individuals can engage in developing training programs that are based on empirical findings. In addition, this study has created a platform from which future studies can and should be undertaken to advance the goal of improving EOC operations.

However, limitations are associated with this study that need to be highlighted. First, the number of jurisdictions involved in this study was small. Only eleven AARs were reviewed. While the reports did reflect a valid sample of the population identified to be included in the project, a larger sample from a larger population group would bring added value to this type of research. Additionally, if the response rate from the population identified would have been in the 50%-60% range, more data could have been calculated into the study for a stronger validation of the results.

As shared by Faith et al, (2011), an increasing number of local public safety organizations are capturing the successes and failures of their operations in AARs (Faith, Jackson, & Willis, 2011). Yet, going through an AAR to gather the reliable information that is needed for research purposes does come with its own set of challenges. AARs are not necessarily designed or constructed for this type of analysis (Hallbert, et al., 2004). AARs from different jurisdictions employ different formats and writing styles. In addition, while some programs recommend a standard AAR format for response organizations, even a casual review of several reports demonstrates that the level of detail in reports prepared by different organizations varies greatly (Faith, Jackson, & Willis,

2011).

The AARs collected for this study validate this perspective. The reports analyzed were not all created in the same manner and had multiple authors. As indicated by Faith et al., (2011), at this time, there is no standard manner in which AARs must be created following a real-world incident although guidelines are in place for AARs created from exercises. Thus, the reports collected for this study were not consistent in how they presented their information. While some were very organized and detailed, others were not and required extensive review to uncover the information needed for the study. Additionally, independent contractors, who were not part of the EOC activation, wrote some reports. For their research, they relied on information gathered from interviews and other sources.

Despite these limitations, AARs do contain a wealth of information that is useful for multiple purposes. Furthermore, as a data source that is already generated in many jurisdictions, using AARs as a source of data places little extra burden on local response organizations. However, as indicated earlier, there is a need to develop and demonstrate a standardized approach for encoding the information contained within (Faith, Jackson, & Willis, 2011).

Finally, using only AARs eliminates the use of other sources of documentation that may prove to be beneficial. However, focusing only on AARs keeps the scope of the project narrow and manageable. AARs are now widely used by public and private organizations, businesses, and public health agencies as tools for gathering documenting, and evaluating processes and functions performed in both real-world incidents and simulated exercises (Savoia et al., 2012). The use of only AARs for this study allows the

researcher to focus on the specific aspects of EOC operations that were identified as needing correction.

## Future Research

Future research is needed to expand the database for these types of studies. While this study serves its purpose, more data from larger population centers should be gathered so that a more robust study can be undertaken to not only identify common challenges, but also to conduct comparisons between more communities, seeking to uncover if challenges are similar or different across population sizes. This would make a study of this type more general and thus more useful to more EOCs.

Second, a more in-depth study of the data is warranted. While many challenges and strengths were recognized and documented, this study did not undertake the examination of how, or if, a correlation between a noted strength and challenge in the same general area existed. For example, how can a jurisdiction note a challenge and strength in the area of communication during the same activation? While actions are taken to correct issues, it would be prudent to understand that there may be solutions already identified within the report itself. However, if the focus remains centrally fixated on the problem itself without looking at the EOC environment from a holistic perspective, the answer to that problem may not be recognized.

While the purpose of this study was to identify challenges in areas such as communications and organization, the topics themselves require further investigation. Although improving training programs will help with correcting errors, it may take more than just this one approach. As identified in the study, 100% (Table 4.1) of the localities that participated indicated that the organization of EOC was a challenge. Thus, this is an

area that may need more than just improvements to a training program. As identified in other articles, there are multiple ways in which EOCs are organized in order to meet a jurisdiction's needs (Shouldis, 2010). However, since the primary purpose of an EOC (to address the situations and problems created by a disaster) does not change, the utilization of a singular organizational structure may be a solution worth considering. Implementing such a structure in all EOCs may help them perform their core functions in a manner that is consistent, efficient and effective. All the while assisting in the streamlining of training curriculums.

Several articles have indicated that while the actions of personnel are important, the manner in which they are managed carries just as much significance (Pidot, 2013; Roberts, 2009; Cigler, 2008). Thus, more attention needs to be applied to understanding how management impacts EOC operations. Further study needs to be conducted to better understand how organizations that are not brought together often can operate effectively. One shibboleth often continued to be held onto is to draw upon public service entities such as fire and rescue, law enforcement, and the military to help organize and manage EOC operations.

While managers from these disciplines may be excellent within their own field, the EOC environment is unique. The make-up of the personnel who report to an EOC come from diverse backgrounds outside of public safety, and may not normally operate within an environment that focuses on high-risk crisis possibilities. Hereinto, they may not be familiar with how public safety agencies operate during a crisis and may feel somewhat at a loss as to where they fit in. For this, they look to leadership to provide them with direction. This may be a role that public safety leaders may not themselves be

comfortable in assuming. Directing incident scene personnel is different from managing those who report to the EOC

Thus, whether jurisdictions are bringing the right type of leadership into the EOC may warrant future investigation. There are many potential areas of research open to understand and improve EOC operations. Yet, no in-depth studies have been conducted up to this point to examine how to best accomplish this goal. While formal steps have been taken to improve incident management and personnel performance on incident scenes, no such effort has been put forth to improve the performance of the organization that is activated to serve as their primary source of support.

What has been confirmed through this study is fact that local governments have been responding and recovering from disasters for a long period of time. Yet, there are areas that still require substantial improvements (Donahue & Tuohy, 2006; Savoia, Agboola, & Biddinger, 2012; Wolensky & Wolensky, 1990). This is true not only for those operations that occur in the field, but is inclusive of those operations that take place within an EOC. In a positive step to address deficiencies in the EOC, training programs have been created. However, many of these have been done in an ad hoc manner (Sinclair et al., 2012). While this may serve the individual jurisdiction, the benefits stop there. If the foundation for why the programs were developed, or modified, is not shared beyond the jurisdictional boundaries that created them, very few EOC operations will improve.

Developing training programs that are designed to address known shortcomings identified through multiple, local level AARs, is one way to approach improving this process in a systematic, comprehensive, and prudent manner. Unlike responses in the field, there is no national standard for managing emergency incidents in an EOC. Thus,

these types of studies need to be done more often, and in greater detail, so that that activities taken in the EOC are based upon sound principles and have training programs that enforce this practice. In times of crisis, communities depend upon their local governments to take charge. However, when the EOC environment itself faces challenges, then response and recovery to those that need help the most may be subject to the impact from unfortunate and preventable delays.

## REFERENCES


Alexander, D. (2003). Towards the Development of Standards in Emergency Management Training and Education. Disaster Prevention and Management, 12(2), 113-123.

Auf der Heide, E. (1989). Disaster Response: Principles of Preparation and Coordination. Toronto: C.V. Mosby Company.

Babbie, E. (2004). The Practice of Social Research (10th ed.). Thomson Learning Inc.

Baum, J. A., & Dahlin, K. B. (2007). Aspiration Performance and Railroads' Patterns of Learning from Train Wrecks and Crashes. Organization Science, 18(3), 368-385.

Bazeley, P., & Richards, L. (2000). The NVIVO Qualitative Project Book. Thousand Oaks, CA: Sage Publications.

Berelson, B. (1952). Content Analysis in Communication Research. New York: Free Press.

Bergeron, C. D., & Cooren, F. (2012). The Collective Framing of Crisis Management: A Ventriloqual Analysis of Emergency Operations Centres. Journal of Contingencies and Crisis Management, 20(3), 120-137. doi:10.1111/j.1468-5973.2012.00671.

Biddinger, P. D., Cadigan, R. O., Auerbach, B. S., Burstein, J. L., Savoia, E., Stoto, M. A., & Koh, H. K. (1974). Using Exercises to Identify Systems-Level Preparedness Challenges. Public Health Reports, 96-101.

Bigley, G. A., & Roberts, K. H. (2001, December). The Incident Command System: High-Reliability Organizing for Complex and Volatile Task Environments. The Academy of Management Journal, 44(6), 1281-1299.

Birkinshaw, J., Nobel, R., & Ridderstrale, J. (2002). Knowledge as a Contingency Variable: Do the Characteristics of Knowledge Predict Organizational Structure. Organization Science (13), 274-289.

Birkland, T. (2009). Disasters, Catastrophes, and Policy Failure in the Homeland Security Era. Review of Policy Research, 26(4), 324-438.

Bishop, J., Scott, K., & Burroughs, S. (2000). Support, Commitment, and Employee Outcomes in a Team Environment. Journal of Management, 26, 1113-1132.

Bishop, J., Scott, K., & Casino, L. (1997). The Differential Effects of Team Commitment and Organizational Commitment on Job Performance and Intention to Quit. Annual Meeting of the Academy of Management. Boston.

Bogdan, R. C., & Biklen, S. K. (2003). Qualitative Research for Education: An Introduction to Theories and Methods (4th ed.). Boston: Allyn and Bacon.

Boin , A., & Hart, P. T. (2010). Organising for Effective Emergency Management: Lessons from Research. The Australian Journal of Public Administration, 69(4), 357-371. doi:10.1111/j.1467-8500.2010.00694.x

Borodzcicz, E., & van Heperen, K. (2002). Individual and Group Learning in Crisis Simulation. *Journal of Contingencies and Crisis Management, 10*(3), 139-147.

Bourque, L. B., Siegel, J. M., Megumi, K., & Wood, M. M. (2006). Weathering the Storm: The Impact of Hurricanes on Physical and Mental Health. The Annals of the American Academy of Political and Social Science, 64, 129-151.

Brewer, J., & Hunter, A. (1989). Multimethod Research: A Synthesis of Styles. Newbury Park, CA: Sage.

Brouillette, J., & Quarantelli, E. L. (1971, Winter). Types of Patterned Variation in Bureaucratic Adaptations to Organizational Stress. Sociological Inquiry, 41(1), 39-45.

Brown, J. (2015, January 19). Director of Emergency Management. Arlington, VA.

Bryan, P. (2011). Automating the Emergency Operations Centers. Fire Engineering, 164(5), 69-73.

Burstein, J. (2006). The Myths of Disaster Education. *Disaster Medicine*, 50-51.

Busby, J. S. (2001). Error and Distributed Cognition in Design. *Design Study, 22*(3), 223-254.

Camp, S. N. (2007, 5 17). An Explanatory Mixed Methods Content Analysis of Two State Level Correctional Institutions' Pre-Release Handbook Curriculum Designs, Looking Through the Lenses of Two Philosophical Orientations of Education. The Florida State University DigiNole Commons. Florida, USA: Florida State University. Retrieved January 15, 2015, from https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CEwQ

Canton, L. (2007). Emergency Management: Concepts and Strategies for Effective Programs. Hoboken, New Jersey: John Wiley & Sons, Inc.

Carley, K. (1997). Extracting Team Mental Models Through Textual Analysis. Journal of Organizational Behavior, 18, 533–558.

Carroll, J. S. (1998). Organizational Learning Activities in High-Hazard Industries: The Logics Underlying Self-Analysis. Journal of Management Studies, 35, 699-717.

Carter, T. (1979). Role of Coordination Among Emergency Service Agencies in Community Preparedness. Minneapolis: University of Minnesota.

Carwile, W. L. (2005). Unified Command and the State-Federal Response to Hurricane Katrina in Mississippi. Homeland Security Affairs, 1(2), 1-14.

Cavanaugh, J. C., Gelles, M. G., Reyes, G., Civiello, C. L., & Zahner, M. (2008). Effectively Planning for and Managing Major Disasters. The Psychologist-Manager Journal, 11, 221-239. doi: 10.1080/10887150802371740

Cave, M. (2008). Through Hell and High Water: New Orleans, August 29-September 15, 2005. The Oral History Review, 35(1), 1-10.

Caymaza, E., Akyonb, F. V., & Ereneic, F. (2013). A Model Proposal for Efficient Disaster Management: The Turkish Sample. Social and Behavioral Sciences, 609 – 618.

Cheng, A. S., Fleischmann, K. R., Wang, P., & Oard, D. W. (N.D.). Advancing Social Science Research by Applying Computational Linguistics. National Science Foundation.

Cigler, B. A. (2008). Emergency Management and the New Administration. Public Manager, 37(4), 61-65.

Clark, A., Hooper, B., & Gibbs, J. (2011). Emergency Operation Center or Hardened Command Post: When, Where, and How? Journal of Chemical Health & Safety, 18(3), 10-14.

Col, J. M. (2007, December). Managing Disasters: The Role of Local Government. Public Administration Review, 67(Special Issue on Administrative Failure in the Wake of Hurricane Katrina, 114-124. Retrieved from http://www.jstor.org/stable/4624689.

Comfort, L. K. (1985). Integrating Organizational Action in Emergency Management; Strategies for Change. Public Administration Review, 45 (Special Issue: Emergency Management: A Challenge for Public Administration), 155-164.

Comfort, L. K. (2007). Crisis Management in Hindsight: Cognition, Communication, Coordination, and Control. Public Administration Review, 67 Special Issue on Administrative Failure in the Wake of Hurricane Katrina, 189-197.

Covello, V. T., Peters, R. G., Wojtecki, J. G., & Hyde, R. C. (2001). Risk Communication, The West Nile Virus Epidemic and Bioterrorism; Responding to the Communication Challenges Posed by the Intentional or Unintentional Release of a Pathogen in an Urban Setting. Journal of Urban Health: Bulletin of the New York Academy of Medicine, 78(2), 382-391.

Cutter, S. L., Emrich, C. T., Mitchell, J. T., Boruff, B. J., Gall, M., Schmidtleine, M. C., Melton, G. (2006). The Long Road Home: Race, Class, and Recovery from Hurricane Katrina. Environment: Science and Policy for Sustainable Development, 48(2), 8–20.

Daft, R. (2012). Organization Theory and Design. United States: South-Western Cengage Learning.

Davidoff, F. (2002). Shame: The Elephant in the Room. British Medical Journal, 623.

Dean, A. L. (1981). General Propositions of Organizational Design. In P. Szanton, Federal Reorganization: What Have We Learned? (pp. 131-154). Chatham, NJ: Chatham House Publishers.

Desjardins, F. J. (2010, July 19). Theoretical Framework. Retrieved October 1, 2015, from You Tube: https://www.youtube.com/watch?v=EcnufgQzMjc

Deverell, E. (2009). Crises as Learning Triggers: Exploring a Conceptual Framework of Crisis-Induced Learning. Journal of Contingencies and Crisis Management, 17(3), 179-188.

Deverell, E. (2012). Investigating the Roots of Crisis Management Studies and Outlining Future Trajectories for the Field. Journal of Homeland Security and Emergency Management, 9(1).

Deverell, E., & Hansen, D. (2009, September). Learning from Crises and Major Accidents: From Post-Crisis Fantasy Documents to Actual Learning in the Heat of Crisis. Journal of Contingencies and Crisis Management, 17(3). doi: 10.1007/s12024-010-9218-1

Donahue, A. K., & Joyce, P. G. (2001, November-December). A Framework for Analyzing Emergency Management with an Application to Federal Budgeting. Public Administration Review, 61(6), 728-740.

Donahue, A. K., & Tuohy, R. (2006, July). Lessons We Don't Learn: A Study of the Lessons of Disasters, Why We Repeat Them, and How We Can Learn Them. Homeland Security Affairs, 2(2). Retrieved from http://www.hsaj.org

Donner, W. R., Rodriguez, H., & Diaz, W. (n.d.). Public Warning Response Following Tornadoes in New Orleans, LA, and Springfield, MO: A Sociological Analysis. Newark: Disaster Research Center, University of Delaware.

Drabek, T. E. (1985). Managing the Emergency Response. Public Administration Review, 45, 85-92.

Drabek, T. E. (1987). The Professional Emergency Manager: Structures and Strategies for Success. Monograph #44. Boulder: University of Colorado Institute of Behavioral Science.

Drabek, T. E. (1997). Social Problems Perspectives, Disaster Research and Emergency Management: Intellectual Contexts, Theoretical Extensions, and Policy Implications. n/a.

Drabek, T. E. (2005). Predicting Disaster Response Effectiveness. International Journal of Mass Emergencies and Disasters, 1, 49-72.

Drabek, T. E., & Hoetmer, G. J. (1991). Emergency Management: Principles and Practices for Local Government. Washington D.C.: International City/County Management Association.

Drach-Zahavy, A., & Freund, A. (2007). Team Effectiveness under Stress: A Structural Contingency Approach. Journal of Organizational Behavior, 28(4), 423-450.

Duriau, V. J., Reger, R. K., & Pfarrer, M. D. (2007). A Content Analysis of the Content Analysis Literature in Organization Studies: Research Themes, Data Sources, and Methodological Refinements. Organizational Research Methods, 10(1), 5-34.

Dynes, R. (1970). Organized Behavior in Disaster. Lexington: Heath Lexington Books.

Dynes, R. R. (1975). The Comparative Study of Disaster: A Social Organizational Approach. Mass Emergencies, 1, 21-31.

Elliot, D. (2009). The Failure of Organizational Learning from Crisis- A Matter of Life and Death. Journal of Contingencies and Crisis Management, 17(3), 157-168.

Emergency Management EDU. (2015). Building Relationships is a Top Priority for Emergency Managers. Retrieved from http://www.emergencymanagementedu.org/2015/01/building- relationships-is-a-top-priority-for-emergency-managers/

Engelmann, H., & Fiedrich, F. (2009). DMT-EOC – A combined system for the Decision Support and Training of EOC Members. Gothenburg. Retrieved March 2015

Evans, M., McIntosh, W., Lin, J., & Cates, C. L. (2007). Recounting the Courts? Applying Automated Content Analysis to Enhance Empirical Legal Research. Journal of Empirical Legal Studies, 4(4), 1007-1039.

Faith, K. S., Jackson, B. A., & Willis, H. (2011). Text Analysis of After Action Reports to Support Improved Emergency Response Planning. Journal of Homeland Security and Emergency Management, 8(1), 1-16.

Faraj, S., & Xiao, Y. (2006). Coordination in Fast-Response Organizations. Management Science, 52(8), 1155-1169

FEMA. (1981). Disaster Operations: A Handbook for Local Government. Washington D.C.: FEMA.

FEMA. (2004). NIMS and the Incident Command System. Washington D.C.: FEMA. Retrieved from http://www.fema.gov/txt/nims/nims_ics_position_paper.txt

FEMA. (2005). Intermediate ICS for Expanding Incidents: Student Manual. Emmitsburg, MD: Federal Emergency Management Agency.

FEMA. (2008a). National Response Framework. Retrieved March 2012, from http://www.fema.gov/pdf/emergency/nrf/nrf-esf-intro.pdf

FEMA. (2008b, January). Retrieved from Emergency Support Function Annexes: Introduction: http://www.fema.gov/media-library-data/20130726-1825-25045-0604/emergency_support_function_annexes_introduction_2008_.pdf

FEMA. (2008c). Special Report: The After-Action Critique: Training Through Lessons Learned. Department of Homeland Security. DHS-Tri-Data. Retrieved November 24, 2014

FEMA. (2013a, May). National Response Framework. 2nd. Washington D.C.: Department of Homeland Security.

FEMA. (2013b, April). The Stafford Act: Robert T. Stafford Disaster Relief and Emergency Assistance Act, as Amended.

FEMA. (2015, October). National Incident Management System. Retrieved from National Incident Management System: http://www.fema.gov/national-incident-management-system

Fischer, H., & Harr, V. (1994). Emergency Operating Centre Response to Media Blame Assignation: A Case Study of an Emergent EOC. Disaster Prevention and Management, 3(3), 7-17.

Franzosi, R. (2008). Content Analysis: Objective, Systematic, and Quantitative Description of Content. Sage Publications.

Frencica, J. (2004). Exclusive Interview with Mayor Harris. Directions Magazine.

Garnett, J. L., & Kouzmin, A. (2007, December). Communicating throughout Katrina: Competing and Complementary Conceptual Lenses on Crisis Communication. Public Administration Review, 67(Special Issue on Administrative Failure in the Wake of Hurricane Katrina), 171-188.

Gibbs, G. R. (2002). Qualitative Data Analysis: Explorations with NVIVO. Philadelphia: Open University Press.

Gibbs, G. R. (2013, February 6). You Tube. Retrieved December 2015, from Coding Multiple Variables and Open- Ended Questions. Part 2 of 3 on Quantitative Coding: https://www.youtube.com/watch?v=rs8L_xzU2_U

Giventer, L. L. (2008). Statistical Analysis for Public Administration (2nd ed.). Sudbury, MA, USA: Jones and Bartlett Publishers.

Grant, N. K., & Hoover, D. H. (2003). The Importance of Cleanup Kits: A Case Study on the Multiple Impacts of Decisions in Disaster Response and Recovery. Public Performance & Management Review, 27(1), 98-100.

Green, H. E. (2014). Use of Theoretical and Conceptual Frameworks in Qualitative Research. Nurse Researcher, 21(6), 34-38.

Green, J. C., & Caracelli, V. J. (1997). Advances in Mixed Methods Evaluation: The Challenges and Benefits of integrating Diverse Paradigms. In A. E. Association (Ed.), New Directions for Evaluation. San Francisco: Jossey-Bass.

Green, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a Conceptual Framework for Mixed-Method Evaluation Designs. Educational Evaluation and Policy Analysis, 11(3), 255–74.

Hallbert, B., Gertman, D., Erasmia, L., Marble, J., Harold, H., & Byers, J. (2004). The use of Empirical Data Sources in HRA. Reliability Engineering & System Safety, 83(2), 139-143.

Hansen, R. R. (2007). Letter to the Editor Regarding Incident Command System (ICS). Journal of Homeland Security and Emergency Management, 3, 1-3.

Harrald, J. (2006a). Testimony for the Senate Homeland Security Government Affairs Committee, Hurricane Katrina: Recommendations for Reform. United States Senate Hearing. Washington D.C.

Harrald, J. R. (2006b). Agility and Discipline: Critical Success Factors for Disaster Response. The Annals of the American Academy of Political and Social Science, 604, 256-272.

Helsloot, I. (2009). Coordination is a Prerequisite for Good Collaboration, Isn't it? Journal of Contingencies and Crisis Management, 16(4).

Henstra, D. (2010, March-April). Evaluating Local Government Emergency Management Programs: What Framework Should Local Emergency Managers Adopt. *Public Administration Review,70*(2), 236-246.

Henstra, D., & McBean, G. (2005). Canadian Disaster Management Policy: Moving Towards a Paradigm Shift? Canadian Public Policy / Analyse de Politiques, 31(5), 303-318.

Hodgson, J. (2001). The Headache of Knowledge Management. Nature Biotechnology, 44-46.

Hodkinson, P. (2005). Learning as Cultural and Relational: Moving Past Some Troubling Dualisms. Cambridge Journal of Education, 35(1), 107-119. doi:10.1080/0305764042000332524

Holcomb, Z. C. (2011). SPSS Basic: Techniques for a First Course in Statistics (3 ed.). Glendale, CA: Pyrczak Publishing.

Hole, G. (n.d.). Research Skills One, version 1.0: Coding data in SPSS:. Retrieved November 2015, from http://users.sussex.ac.uk/~grahamh/RM1web/Week%204%202012/Vampire%20SPSS%20handout.pdf

Hosseini, M., & Izadkhah, Y. O. (2010). Training Emergency Managers for Earthquake Response: Challenges and Opportunities. Disaster Prevention and Management, 19(2), 185-198. doi:10.1108/09653561011037995

Huang, C. F., Wang, J. J., & Lin, T. J. (2011). Resource Sufficiency, Organizational Cohesion, and Organizational Effectiveness of Emergency Response. 58, pp. 221-234. doi:10.1007/a11069-010-9662-y

Hunt, S., Smith, K., Hamerton, H., & Sargisson, R. J. (2014). An Incident Control Centre in Action: Response to the Rena Oil Spill in New Zealand. Journal of Contingencies and Crisis Management, 22(1), 63-66.

Hutchinson, J. F. (2000). Disasters and the International Order: Earthquakes, Humanitarians, and the Ciraolo Project. International History Review, 1(22), 1-36.

Insch, G. S., Moore, J. E., & Murphy, L. D. (1997). Content Analysis in Leadership Research: Examples, Procedures, and Suggestions for Future Use. Leadership Quarterly, 8(1), 1-25.

Jawahar, I., & McLaughlin, G. (2001). Toward a Descriptive Stakeholder Theory: An Organizational Life Cycle Approach. Academy of Management Review (26), 317-414.

Jehn, K. A., & Techakesari, P. (2014). High Reliability Teams: New Directions for Disaster Management and Conflict. International Journal of Conflict Management, 25(4), 407-430.

Joung, W., Hesketh, B., & Neal, A. (2006). Using War Stories to Train for Adaptive Performance: Is it Better to Learn from Error or Success? Applied Psychology: An International Review, 55(2), 282-302. doi:10.1111/j.1464-0597.2006.00244.x

Kamoie, B. (2005). The National Response Plan and Legal Issues in Public Health Emergency Preparedness. Public Health Reports, 120(5), 571-573.

Kapucu, N., Arslan, T., & Collins, M. L. (2010). Examining Intergovernmental and Interorganizational Response to Catastrophic Disasters: Toward a Network-Centered Approach. Administration & Society, 42(2), 222 –247. doi:10.1177/0095399710362517

Kapucu, N., Augustin, M., & Garayev, V. (2009). Interstate Partnerships in Emergency Management: Emergency Management Assistance Compact in Response to Catastrophic Disasters. Public Administration Review, 69(2), 297-313. doi:10.1111/j.1540-6210.2008.01975.x

Kapucu, N., & Van Wart, M. (2003). The Evolving Role of the Public Sector in Managing Catastrophic Disasters: Lessons Learned. *Administration and Society, 38*(3), 279.

Kettl, D. F. (2003). Contingent Coordination: Practical and Theoretical Puzzles for Homeland Security. American Review of Public Administration, 33(3), 253-277.

Kettl, D. F. (2006). Is the Worst Yet to Come? The Annals of the American Academy of Political and Social Science, 604 Shelter from the Storm: Repairing the National Emergency Management System after Hurricane, 273-287.

Kiisel, M., & Vihalemm, T. (2014). Why the Transformation of the Risk Message is a Healthy Sign: a Model of the Reception of the Reception of Warning Messages. Health, Risk & Society, 16(3), 277–294.

Kolbe, R. H., & Burnett, M. S. (1991). Content-Analysis Research: An Examination of Applications with Directives for Improving Research Reliability and Objectivity. Journal of Consumer Research, 18(2), 243-250.

Kowalski, K., & Vaught, C. (n.d). Judgement and Decision Making Under Stress: An Overview for Emergency Managers. Pittsburg: National Institute for Occupational Safety and Health.

Kreps, G. A., & Bosworth, S. L. (1993). Disaster, Organizing, and Role Enactment: A Structural Approach. American Journal of Sociology, 99(2), 428-463.

Krippendorff, K. (1980). Content Analysis: An Introduction to Its Methodology. Beverly Hills, CA: Sage.

Krippendorf, K. (2004). Content Analysis: An Introduction to its Methodology (2nd ed.). Thousand Oaks, CA: Sage.

Kumar, S., & Antonenko, P. (2014). Connecting Practice, Theory and Method: Supporting Professional Doctoral Students in Developing Conceptual Frameworks. Techtrends: Linking Research & Practice to Improve Learning, 58(4), 54-61.

Kweit, M. G., & Kweit, R. W. (2006). A Tale of Two Disasters. Publius, 36(3), 375-392.

Lagadec, P. (1993). Preventing Chaos in Crisis: Strategies for Prevention, Control and Damage Limitation. New York: McGraw-Hill.

Lagadec, P. (1997). Learning Processes for Crisis Management in Complex Organizations. Journal of Contingencies and Crisis Management, 5(1), 24-31.

Lalonde, C. (2011). Managing Crises Through Organizational Development: a Conceptual Framework. Disasters, 35(2), 443-464. doi: IIII/j.0361-3666.2010.01223.x

Lennquist, S. (2004). The Tsunami Disaster - New Lessons Learned and Old Lessons to be Learned Better. *International Journal of Disaster Medicine. 2*, 71-73.

Lester, W., & Krejci, D. (2007). Business "Not" as Usual: The National Incident Management System, Federalism, and Leadership. Public Administration Review, 67, 84-93.

Lettieri, E., Masella, C., & Radaelli, G. (2009). Disaster Management: Findings from a Systematic Review. Disaster Prevention and Management, 18(2), 117-136. doi:10.1108/09653560910953207

Loh, V., Andrews, S., Hesketh, B., & Griffin, B. (2013). The Moderating Effect of Individual Differences in Error-Management Training: Who Learns From Mistakes? Human Factors, 55(2), 435-448.

Luhmann, N. (1995). Social Systems. Stanford University Press.

Lutz, L. D., & Lindell, M. K. (2008). Incident Command System as a Response Model Within Emergency Operation Centers During Hurricane Rita. Journal of Contingencies & Crisis Management, 16(3), 122-134.

Madsen, P. (2009). These Lives Will Not Be Lost in Vain: Organizational Learning from Disaster in U.S. Coal Mining. Organization Science, 20(5), 861-875.

Mann, S. (2009, April). Lessons Learned? Analysis of Government Preparedness and Responses to Hurricanes Betsy, Katrina & Gustav. MS.

Mann, S. (2011, December). Creating Resilient, Sustainable Local Governments: Merging Human Resource Management and Emergency Management. MS.

Mann, S. (2013). *Survey of Emergency Managers in Mid-Size Cities.* Jacksonville State University, Jacksonville. Retrieved 2015

McEntire, D. A. (2002). Coordinating Multi-Organizational Responses to Disaster: Lessons from the March 28, 2000 Fort Worth Tornado. Disaster Prevention Management, 11(5), 369-379.

McEntire, D. A. (2007). Disaster Response and Recovery: Strategies and Tactics for Resilience. Hoboken, NJ: Wiley Pathways.

McEntire, D., & Myers, A. (2004). Preparing Communities for Disasters: Issues and Processes for Government Readiness. Disaster Prevention Management, 13(2), 140-152.

McKee, A. (2003). Textual Analysis: A Beginner's Guide. London: Sage.

McLoughlin, D. (1985, January). A Framework for Integrated Emergency Management. Public Administration Review, 45, 165-172.

Middaugh, D. J. (2012). The 2-Minute Warning Part V: Conduct a Post-Game Analysis and Press Conference. MEDSURG Nursing, 21(3), 177-178.

Miles, M. B., & Huberman, A. M. (1984). Qualitative Data Analysis: A Sourcebook of New Methods. Beverly Hills: Sage.

Militello, L. G., Patterson, E. S., Bowman, L., & Wears, R. (2007). Information Flow During Crisis Management: Challenges to Coordination in the Emergency Operations Center. Cognition, Technology & Work, 9(1), 25-31.

Moilanen, J. H. (2015). The Wisdom of Tacit Knowing-in-Action and Mission Command. Adult Learning, 26(3), 101-108.

Morris, R. (1994). Computerized Content Analysis in Management Research: A Demonstration of Advantages and Limitations. Journal of Management, 20(4), 903-931.

Moynihan, D. P. (2008). Learning Under Uncertainty: Networks in Crisis Management. Public Administration Review, 68(2), 350–365.

Moynihan, D. (2009, September). From Intercrisis to Intracrisis Learning. Journal of Contingencies and Crisis Management, 17(3).

Nacos, B., Shapiro, R., Fan, D., & Young, J. (1991). Content Analysis of News Reports: Comparing Human Coding and a Computer Assisted Method. Communication, 12(1), 111-128.

Neal, D., & Phillips, B. (1995). Effective Emergency Management: Reconsidering the Bureaucratic Approach. Disasters, 19, 322-337.

Neamy, R., & Nevill, W. M. (2011, August 11). From Firescope to NIMS: How NIMS Developed out of the Earlier FIRESCOPE Program. Retrieved from Firefighter Nation: http://www.firefighternation.com/article/command-and-leadership/firescope-nims

Neuendorf, K. A. (2002). The Content Analysis Guidebook. Thousand Oaks: Sage.

O'Leary, M. (2004). The First 72 Hours: A Community Approach to Disaster Preparedness. New York: Universe.

Palomares, I., & Martınez, L. (2014). Low-Dimensional Visualization of Experts Preferences in Urgent Group Decision Making Under Uncertainty. Procedia Computer Science, 29, 2090-2101.

Paton, D., Flin, R., & Violanti, J. (1999). Incident Response and Recovery Management. In J. Violanti, & D. Paton (Eds.), Police Trauma: Psychological Aftermath of Civilian (pp. 124-138). Springfield, IL: Charles C. Thomas.

Peerbolte, S. L., & Collins, M. L. (2013). Disaster Management and the Critical Thinking Skills of Local Emergency Managers: Correlations with Age, Gender, Education, and Years in Occupation. Disasters, 37(1), 48−60.

Perry, R. (1995). The Structure and Function of Community Emergency Operations Centers. Disaster Prevention and Management, 4(5), 37-41.

Perry, R. W. (2003). Emergency Operations Centers in an Era of Terrorism: Policy and Management Functions. Journal of Contingencies and Crisis Management, 11(4), 151-159.

Perry, R. W., & Lindell, M. K. (2003). Preparedness for Emergency Response: Guidelines for the Emergency Planning Process. Disasters, 27(4), 336-350.

Pidot, J. (2013). Deconstructing Disaster. Brigham Young University Law Review, 213-257.

Popping, R. (2000). Computer-Assisted Text Analysis. Thousand Oaks, CA: Sage.

Princeton University. (n/d). Princeton University Library: Data and Statistical Services. Retrieved December 2015, from How to Use a Code Book: http://dss.princeton.edu/online_help/analysis/codebook.htm

Prizzia, R. (2009). The Role of GIS in Emergency Management. The Public Manager, 63-67.

Pynes, E. J., & Tracy, P. (2007). Flirting with Disaster: A Case Study. Public Performance & Management Review, 31(1), 101-117.

QRS International. (2008). NVIVO 8 Fundamentals. Melbourne: QRS International Pty Lmt.

Quarantelli, E. (1978). Uses and Problems of Local EOCs in Disasters. University of Delaware Disaster Research Center.

Quarantelli, E. L. (1986). Disaster Crisis Management. International Conference on Industrial Crisis Management. New York: Disaster Research Center University of Delaware.

Rahm, E., & Do, H. H. (2000). Data Cleaning: Problems and Current Approaches. University of Leipzig, Bulletin of the IEEE Computer Society Technical Committee on Data Engineering. University of Leipzig, Germany. Retrieved from http://dbs.uni-leipzig.de

Revere, M. (2000). Emergency Operations Center Staff Development for City Administrators: Executive Analysis of Fire Service Operations in Emergency Management. Monterey Park. Retrieved March 2015

Richards, L. (1999). Data Alive!: The Thinking Behind NVivo. Qualitative Health Research, 9(3), 412-428.

Roberts, C. (1997). Semantic Text Analysis: On the Structure of Linguistic Ambiguity in Ordinary Discourse. In C. Roberts, Text Analysis for the Social Sciences: Methods for Drawing Statistical Inferences from Texts and Transcripts (pp. 55-77). Mahwah: Lawrence Erlbaum Associates.

Roberts, P. S. (2009). Building the Disaster State: The Development of US Disaster Policy, 1789-1900. American Political Science Association, (pp. 1-33).

Römer, H., Kersten, J., Kiefl, R., Plattner, S., Mager, A., & Voigt, S. (2014). Airborne Near-Real-Time Monitoring of Assembly and Parking Areas in Case of Large-Scale Public Events and Natural Disasters. International Journal of Geographical Information Science, 28(4), 682–699.

Rose, S., Spinks, N., & Canhoto, A. I. (2015). Management Research: Applying the Principles. Retrieved from http://documents.routledge-interactive.s3.amazonaws.com/9780415628129/Chapter%206%20-%20Quantitative%20content%20analysis%20final_edited.pdf

Rosenthal, U. (1990). "Politics in Administration: Max Weber and the Quest for Democratic Order. In A. Kouzmin, & N. Scott, Dynamics in Australian Public Management: Selected Essays. Melbourne: MacMillian.

Rourke, L., & Anderson, T. (2004). Validity in Quantitative Content Analysis. Educational Technology Research and Development, 52(1), 5-18.

Rutty, G. N., & Rutty, J. E. (2012). Did the Participants of the Mass Fatality Exercise Operation Torch Learn Anything? Forensic Science, Medicine & Pathology, 8, 88-93.

Ryan, G. W., & Bernard, H. R. (2003). Techniques to Identify Themes. *Field Methods, 15*(1), 85-109. doi: 10.1177/1525822X02239569

Sagan, S. (1993). The Limits of Safety: Organizations, Accidents and Nuclear Weapons. Princeton: Princeton University Press.

Sager, B. (2005). Training for the Emergency Operations Center Staff. Fire Engineering, 158(2), 117-121.

Sagun, A., Bouchlaghem, D., & Anumba, C. J. (2009). A Scenario-Based Study on Information Flow and Collaboration Patterns in Disaster Management. Disasters, 33(2), 214-238.

Savoia, E., Agboola, F., & Biddinger, P. D. (2012). Use of After Action Reports (AARs) to Promote Organizational and Systems Learning in Emergency Preparedness. International Journal of Environmental Research and Public Health, 9, 2949-2963. doi:10.3390/ijerph9082949

Sawaiha, I. (2014). Collaboration in Crisis and Emergency Management: Identifying the Gaps in the Case of Storm Alexa. Journal of Business Continuity & Emergency Planning, 7(4), 312-323.

Schneider, S. K. (1992, March-April). Governmental Response to Disasters: The Conflict Between Bureaucratic Procedures and Emergent Norms. Public Administration Review, 52, 135-145.

Shafritz, J., Ott, J., & Yong, J. (2015). Classics of Organizational Theory (Eighth ed.). Cengage Learning.

Shields, P. M., & Tajalli, H. (2006). Intermediate Theory: The Missing Link in Successful Student Scholarship. Journal of Public Affairs Education (12), 313-334.

Shouldis, W. (2010). The Emergency Operations Center: A Vital Preparedness Tool. Fire Engineering, 163(5), 71-76.

Siccama, C. J., & Penna, S. (2008). Enhancing Validity of a Qualitative Dissertation Research Study by Using NVIVO. Qualitative Research Journal, 8(2), 91-103.

Sinclair, H., Doyle, E. E., Johnston, D. M., & Paton, D. (2012). Assessing Emergency Management Training and Exercises. Disaster Prevention and Management, 21(4), 507-521. doi:10.1108/09653561211256198

Somers, S., & Svara, J. H. (2009). Assessing and Managing Environmental Risk: Connecting Local Government Management with Emergency Management. Public Administration Review, 69(2), 181-193.

Spence, P. R., Lachlan, K. A., & Griffin, D. R. (2007). Crisis Communication, Race, and Natural Disasters. Journal of Black Studies, 37(4), 539-554.

Stern, E. (1997). Crisis and Learning: A Conceptual Balance Sheet. Journal of Contingencies and Crisis Management, 5(2), 69-86.

Stewart, M. G. (1993). Structural Reliability and Error Control in Reinforced Concrete Design and Construction. *Structural Safety* (12), 277-292.

Suter, E., Goldman, J., Martimianakis, T., Chatalalsingh, C., Dematteo, D. J., & Reeves, S. (2013). The Use of Systems and Organizational Theories in the Interprofessional Field: Findings From a Scoping Review. Journal of Interprofessional Care, 27(1), 57-64.

Sylves, R. (2008). Disaster Policy and Politics: Emergency Management and Homeland Security. Washington D.C.: CQ Press.

Systems, C. R. (2012). *Creative Research Systems*. Retrieved from The Survey System-Sample Size Calculator: http://www.surveysystem.com/sscalc.htm

Techakesari, K. A. (2014). High Reliability Teams: New Directions for Disaster Management. *International Journal of Conflict Management, 25*(4), 407- 430.

Thierauf, R. J., & Hoctor, X. (2006). Optimal Knowledge Management. Hershey, PA: IGI Idea Group.

Thomas, T. L., Hsu, E. B., Kim, H. K., Colli, S., Arana, G., & Green, G. B. (2004). The Incident Command System in Disasters Evaluation Methods for a Hospital-Based Exercise. *Prehospital and Disaster Medicine, 20*(1), 14-23.

Tierney, K. (1985). Emergency Medical Preparedness and Response in Disasters: The Need for Interorganizational Coordination. Public Administration Review, 45, 77-84.

Trainor, J. E. (2004). Searching for a System: Multi-Organizational Coordination in the September 11th World Trade Center Search and Rescue Response. Delaware: University of Delaware.

Trist, E., & Bamforth, K. (1951). Some Social and Psychological Consequences of the Longwall Method of Coal Getting. Human relations (4), 3-38.

Trochim, W. M. (2006). The Research Methods Knowledge Base (2nd ed.). Retrieved December 2015, from http://www.socialresearchmethods.net/kb/

Uhr, C. (2009). Multi-organizational Emergency Response Management: A Framework for Further Development. Lund, Sweden: Lund University Centre for Risk Assessment and Management. ISBN: 978-91-628-7839-9

United States GAO. (1989). Content Analysis: A Methodology for Structuring and Analyzing Written Material. Washington D.C.

University, C. S. (2015, October). Content Analysis: Disadvantages of Content Analysis. Retrieved from The Writing Center: http://writing. colostate.eud/guides/page.cfm?pageid=1319&guideid=61

von Lubitz, D. K., Beakley, J. E., & Patricelli1, F. (2008). All Hazards Approach to Disaster Management: The Role of Information and Knowledge Management, Boyd's OODA Loop, and Network-Centricity. Disasters, 32(4), 561-585. doi:10.1111/j.0361- 3666.2008.01055.x

Wamsley, G. L., & Schroeder, A. D. (1996). Escalating in a Quagmire: The Changing Dynamics of the Emergency Management Policy Subsystem. Public Administration Review, 56(3), 235-244.

Wantanakorn, D., Mawdesley, M. J., & Askew, W. H. (1999). Management Errors in Construction. Engineering, Construction, Architectural Management, 6(2), 112-120.

Waugh Jr., W. (1991). Coordination or Control: Organizational Design and the Emergency Management Function. UCLA International Conference on the Impact of Natural Disasters: Agenda for Future Action. Los Angeles. Retrieved September 2013

Waugh Jr., W. L. (2007). EMAC, Katrina, and the Governors of Louisiana and Mississippi. Public Administration Review, Vol. 67, Special Issue on Administrative Failure in the Wake of Hurricane Katrina, 107-113.

Waugh Jr., W., & Streib, G. (2006). Collaboration and Leadership for Effective Emergency Management. Public Administration Review, 66(S1), 131-140.

Weitz, D., O'Shea, G., Zook, N., & Needham, W. (2011). Working Memory and Sequence Learning in the Hebb Digits Task: Awareness is Predicted by Individual Differences in Operation Span. The American Journal of Psychology, 124(1), 49-62.

Welsh, E. (2002, May). Dealing with Data: Using NVivo in the Qualitative Data Analysis Process. Forum: Qualitative Social Research, 3(2). Retrieved from http://www.qualitative-research.net/fqs-texte/2-02/2-02welsh-e.htm

Wenger, D., Quarantelli, E. L., & Dynes, R. (1990). Is the Incident Command System a Plan for all Seasons and Emergency Situations? Hazard Monthly, 10, 8-12.

Wheeler, H., & Riding, R. (1994). Occupational Stress in General Nurses and Midwives. British Journal of Nursing, 3, 527-534.

Williams, R. (2011). Collaboration in Emergency Preparedness and Management. Corrections Today, 54-57.

Williams, Y. (2015, December 14). Test-Retest Reliability Coefficient: Examples & Concept. Retrieved from Study.Com: http://study.com/academy/lesson/test-retest-reliability-coefficient-examples-lesson-quiz.html

Wilson, H. C. (2000). Emergency Response Preparedness: Small Group Training. Part I - Training and Learning Styles. Disaster Prevention and Management, 9(2), 105-116. Retrieved from http://search.proquest.com/docview/214376814?accountid=11662

Wilson, P. F., Dell, L. D., & Anderson, G. F. (1993). Root Cause Analysis: A Tool for Total Quality Management. Milwaukee: ASQC Quality Press.

Winchester, S. (2003). Krakatoa: The Day the World Exploded: August 27, 1883. New York: Harper Collins.

Wolensky, K. C., & Wolensky, R. P. (1990, Summer). Local Government's Problem with Disaster Management: A Literature Review and Structural Analysis. Policy Studies Review, 9(4), 703-725.

Woodrum, E. (1984). Mainstreaming Content Analysis in Social Science: Methodological Advantages, Obstacles, and Solutions. Social Science Research, 13, 1-19.

# APPENDIX A

# ANALYSIS OF THE CHALLENGES REPORTED FROM THE AARS

## Jurisdictions Reporting Challenges with Communications

The total number of jurisdictions reporting challenges/errors within the main theme of Communications was 11. This is representative of 100% of the jurisdictions included in the study. The main theme of Communications was broken down into the two (2) sub-themes of Equipment and Procedures. Of the 11 jurisdictions reporting, 81% reported items related to equipment difficulties and another 81% reported issues with procedures. As a whole within the Communications main theme, there were a total of 81 issues identified. Of those, 44% were related to difficulties with equipment, while the remaining 56% of issues highlighted were concerned with procedural difficulties.

Table A.1 *Breakdown of Jurisdictions Reporting Challenges with Communications*

| Jurisdiction | Equipment | Procedures | Total |
|---|---|---|---|
| 1 | 3 | 2 | 5 |
| 2 | 8 | 12 | 20 |
| 3 | 3 | 0 | 3 |
| 4 | 3 | 2 | 5 |
| 5 | 6 | 1 | 7 |
| 6 | 1 | 3 | 4 |
| 7 | 3 | 0 | 3 |
| 8 | 0 | 2 | 2 |
| 9 | 1 | 4 | 5 |
| 10 | 8 | 16 | 24 |
| 11 | 0 | 3 | 3 |
| **Total** | **36** | **45** | **81** |

Jurisdictions Reporting Challenges Associated with Organization

The total number of jurisdictions reporting challenges/errors within the main theme of Organizations was 11. This is representative of 100% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Organizations was broken down into the four (4) sub-themes of Coordination, Facility, Policies, and Procedures. Of the 11 jurisdictions reporting challenges in the area of organization, 100% reported some type of issue with coordination; 63% reported items related to the facility; another 72% highlighted challenges in the area of policies, and 81% had concerns in the area of procedures. Within the Organization main theme, there were a total of 102 issues identified. Of those, 23% of the issues were related to coordination; 26% were in the sub-theme of facility; 18% of the items were in policies and the remaining 31% if issues were related to procedures. Of note, in the area of facility, jurisdiction #1 accounted for over 51% of the issues reported, while in the sub-theme of procedures, jurisdiction #10 reported 34% of the total items recorded.

Table A.2 *Breakdown of Jurisdictions Reporting Challenges with Organization*

| Jurisdiction | Coordination | Facility | Policies | Procedures | Total |
|---|---|---|---|---|---|
| 1 | 1 | 14 | 1 | 3 | 19 |
| 2 | 1 | 1 | 1 | 1 | 4 |
| 3 | 2 | 1 | 5 | 4 | 12 |
| 4 | 6 | 0 | 4 | 4 | 14 |
| 5 | 2 | 3 | 0 | 3 | 8 |
| 6 | 2 | 0 | 0 | 0 | 2 |
| 7 | 3 | 1 | 1 | 3 | 8 |
| 8 | 1 | 5 | 0 | 1 | 7 |
| 9 | 1 | 0 | 4 | 2 | 7 |
| 10 | 3 | 2 | 2 | 11 | 18 |
| 11 | 2 | 0 | 1 | 0 | 3 |
| **Total** | **24** | **27** | **19** | **32** | **102** |

Jurisdictions Reporting Challenges Associated with Resources

The total number of jurisdictions reporting challenges/errors within the main theme of Resources was seven (7). This represents 63% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Resources had no sub-themes created. Within the Resources main theme, there were 26 issues identified. Of those, 23% of the issues reported identified with jurisdiction #7.

Table A.3: *Breakdown of Jurisdictions Reporting Challenges with Resources*

| **Jurisdiction** | **Resources** | **Total** |
|---|---|---|
| 1 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 3 | 3 |
| 5 | 4 | 4 |
| 7 | 6 | 6 |
| 9 | 4 | 4 |
| 10 | 4 | 4 |
| **Total** | **26** | **26** |

Jurisdictions Reporting Challenges Associated with Situational Awareness

The total number of jurisdictions reporting challenges/errors within the main theme of Situational Awareness was six (6). This represents 54% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Situational Awareness had no sub-themes created. Within the Situational Awareness main theme, there were only 11 issues identified. These were relatively dispersed among the reporting jurisdictions.

Table A.4: *Breakdown of Jurisdictions Reporting Challenges with Situational Awareness*

| Jurisdiction | Resources | Total |
|---|---|---|
| 2 | 1 | 1 |
| 4 | 3 | 3 |
| 5 | 2 | 2 |
| 8 | 2 | 2 |
| 9 | 1 | 1 |
| 10 | 2 | 2 |
| **Total** | **11** | **11** |

Jurisdictions Reporting Challenges Associated with Training

The total number of jurisdictions reporting challenges/errors within the main theme of Training was seven (7). This represents 63% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Training had no sub-themes created. Within the Training main theme, there were only 11 issues identified. These were relatively equally dispersed among the reporting jurisdictions.

Table A.5 *Breakdown of Jurisdictions Reporting Challenges with Training*

| Jurisdiction | Training | Total |
|---|---|---|
| 2 | 1 | 1 |
| 4 | 2 | 2 |
| 5 | 2 | 2 |
| 6 | 1 | 1 |
| 7 | 2 | 2 |
| 9 | 1 | 1 |
| 10 | 2 | 2 |
| **Total** | **11** | **11** |

Jurisdictions Reporting Challenges Associated with Experience

The total number of jurisdictions reporting challenges/errors within the main theme of Experience was nine (9). This represents 81% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Experience had no sub-themes created. Within the Experience main theme, there were 18 issues identified. These were relatively dispersed among the reporting jurisdictions with the highest number of 4 issues being reported by jurisdiction #4. This represented 22% of the total number of issues recorded

Table A.6 *Breakdown of Jurisdictions Reporting Challenges with Experience*

| **Jurisdiction** | **Training** | **Total** |
|---|---|---|
| 1 | 3 | 3 |
| 2 | 2 | 2 |
| 4 | 4 | 4 |
| 5 | 3 | 3 |
| 6 | 1 | 1 |
| 7 | 1 | 1 |
| 9 | 1 | 1 |
| 10 | 2 | 2 |
| 11 | 1 | 1 |
| **Total** | **18** | **18** |

## APPENDIX B

## ANALYSIS OF THE STRENGTHS REPORTED IN THE AARS

Jurisdictions Reporting Strengths within the area of Communications

The total number of jurisdictions reporting strengths within the main theme of Communications was eight (8). This is representative of 72% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Communications was broken down into the two (2) sub-themes of communications with personnel and communications with the public. Of the eight jurisdictions reporting strength in the area of communications, 62% reported strength in the area of communications with personnel. In communications with the public, 45% of the reporting jurisdictions documented this area as a strength. In total, 26 items were documented in this sub-theme, each of the two areas had 13 items (50%).

Table B.1 *Breakdown of Jurisdictions Reporting Strengths within the area of Communications*

| Jurisdiction | Comm. with Personnel | Comm. With the Public | Total |
|---|---|---|---|
| 2 | 1 | 0 | 1 |
| 3 | 5 | 0 | 5 |
| 5 | 3 | 0 | 3 |
| 7 | 0 | 2 | 2 |
| 8 | 2 | 5 | 7 |
| 9 | 0 | 1 | 1 |
| 10 | 2 | 2 | 4 |
| 11 | 0 | 3 | 3 |
| **Total** | **13** | **13** | **26** |

Jurisdictions Reporting Strengths within the area of Organization

The total number of jurisdictions reporting strengths within the main theme of Organization was ten (10). This is representative of 90% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Organization was broken down into the four (4) sub-themes of resources, collaboration, coordination and performance. Of the ten jurisdictions reporting strength in the area of organization, 72% reported strength in the area of resources; 55% reported strength in the area of collaboration; 55% reported strength in the area of coordination, and 66% indicated a strength in the area of personnel performance. In total, 47 items were documented in this sub-theme, the most items were found in the category of resources, with 51% of the total number of items. Followed by collaboration with 19%, personnel performance with 17% and coordination with 12%. The most items listed were documented by jurisdiction 8, who had 11 (23%) of the 47 items recorded.

Table B.2 *Breakdown of Jurisdictions Reporting Strengths within the area of Organization*

| **Jurisdiction** | **Resources** | **Collab.** | **Coord.** | **Perf.** | **Total** |
|---|---|---|---|---|---|
| 2 | 1 | 2 | 2 | 0 | 5 |
| 3 | 3 | 1 | 1 | 0 | 5 |
| 4 | 5 | 0 | 0 | 0 | 5 |
| 5 | 0 | 0 | 1 | 1 | 2 |
| 6 | 1 | 1 | 0 | 1 | 3 |
| 7 | 7 | 0 | 0 | 1 | 8 |
| 8 | 4 | 4 | 0 | 3 | 11 |
| 9 | 1 | 0 | 0 | 0 | 1 |
| 10 | 2 | 1 | 1 | 1 | 5 |
| 11 | 0 | 0 | 1 | 1 | 2 |
| **Total** | **24** | **9** | **6** | **8** | **47** |

Jurisdictions Reporting Strengths within the area of Relationships

The total number of jurisdictions reporting strengths within the main theme of Relationships was six (6). This is representative of 54% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Relationships had no sub-themes created. In total, 17 items were documented in this sub-theme. Most of the issues noted (10) came from jurisdiction 8. These represented 58% of the total items recorded.

Table B.3 *Breakdown of Jurisdictions Reporting Strengths within the area of Relationships*

| Jurisdiction | Relationships | Total |
|---|---|---|
| 3 | 2 | 2 |
| 4 | 2 | 2 |
| 6 | 1 | 1 |
| 7 | 1 | 1 |
| 8 | 10 | 10 |
| 10 | 1 | 1 |
| **Total** | **17** | **17** |

Jurisdictions Reporting Strengths within the area of Exercises

The total number of jurisdictions reporting strengths within the main theme of Lessons Learned was four (4). This is representative of 36% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Exercises had no sub-themes created. In total, 10 items were documented in this sub-theme. The largest number of comments recorded was by jurisdiction # 7 with 5, or 50% of the total number of comments recorded in this sub-theme.

Table B.4 *Breakdown of Jurisdictions Reporting Strengths within the area of Exercises*

| **Jurisdiction** | **Exercises** | **Total** |
|---|---|---|
| 3 | 1 | 1 |
| 4 | 1 | 1 |
| 7 | 5 | 5 |
| 8 | 3 | 3 |
| **Total** | **10** | **10** |

Jurisdictions Reporting Strengths within the area of Situational Awareness

The total number of jurisdictions reporting strengths within the main theme of Situational Awareness was five (5). This is representative of 45% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Situational Awareness had no sub-themes created. In total, 15 items were documented in this sub-theme. The largest number of comments recorded was by jurisdiction # 8 with 6, or 40% of the total number of comments recorded in this sub-theme.

Table B.5 *Breakdown of Jurisdictions Reporting Strengths within the area of Situational Awareness*

| **Jurisdiction** | **Situational Awareness** | **Total** |
|---|---|---|
| 1 | 1 | 1 |
| 3 | 2 | 2 |
| 4 | 3 | 3 |
| 8 | 6 | 6 |
| 10 | 3 | 3 |
| **Total** | **15** | **15** |

Jurisdictions Reporting Strengths within the area of Training

The total number of jurisdictions reporting strengths within the main theme of Training was four (4). This is representative of 36% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Training had no sub-themes created. In total, 19 items were documented in this sub-theme. The largest number of comments recorded was by jurisdiction # 8 with 11, or 68% of the total number of comments recorded in this sub-theme.

Table B.6 *Breakdown of Jurisdictions Reporting Strengths within the area of Training*

| **Jurisdiction** | **Training** | **Total** |
|---|---|---|
| 4 | 1 | 1 |
| 6 | 2 | 2 |
| 7 | 4 | 4 |
| 8 | 13 | 13 |
| **Total** | **19** | **19** |

Jurisdictions Reporting Strengths within the area of Experience

The total number of jurisdictions reporting strengths within the main theme of Experience was five (5). This is representative of 45% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Experience had no sub-themes created. In total, 17 items were documented in this sub-theme. The largest number of comments recorded was by jurisdiction # 3 with 10, or 58% of the total number of comments recorded in this sub-theme.

Table B.7 *Breakdown of Jurisdictions Reporting Strengths within the area of Experience*

| Jurisdiction | Experience | Total |
|---|---|---|
| 3 | 10 | 10 |
| 4 | 1 | 1 |
| 7 | 2 | 2 |
| 8 | 3 | 3 |
| 10 | 1 | 1 |
| **Total** | **17** | **17** |

## APPENDIX C

## ANALYSIS OF THE RECOMMENDATIONS REPORTED IN THE AARS

Jurisdictions with Recommendations within the area of Communications

The total number of jurisdictions with recommendations within the main theme of Communications was eight (11). This represents of 100% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Communications was broken down into the two (2) sub-themes of communications with personnel and communications with the public. Of the eleven jurisdictions with recommendations, 100% had comments within the sub-theme of communications with personnel and 45% had comments related to the sub-theme of communications with the public. In total, 35 items were documented in this sub-theme, Communications with personnel having 15, and the remaining 20 being assigned to the area of communications with the public. Jurisdiction #10 had the highest number of recommendations with 9 (4-personnel, 5-public) in total, or just over 25% of all of the recommendations provided.

Table C.1 *Breakdown of Jurisdictions with Recommendations in the area of Communications*

| Jurisdiction | Comm. w/Personnel | Comm. w/the Public | Total |
|---|---|---|---|
| 1 | 1 | 0 | 1 |
| 2 | 2 | 3 | 5 |
| 3 | 1 | 0 | 1 |
| 4 | 1 | 0 | 1 |
| 5 | 3 | 0 | 3 |
| 6 | 2 | 3 | 5 |
| 7 | 3 | 2 | 5 |
| 8 | 1 | 2 | 3 |
| 9 | 1 | 0 | 1 |
| 10 | 4 | 5 | 9 |
| 11 | 1 | 0 | 1 |
| **Total** | **20** | **15** | **35** |

Jurisdictions with Recommendations within the area of Conduct Exercises

The total number of jurisdictions with recommendations within the main theme of Conduct Exercises was three (3). This is representative of 27% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Conduct Exercises had no sub-themes created. In total, six (6) items were documented in this sub-theme. The largest number of comments recorded was by jurisdiction # 7 with 4, or 66% of the total number of comments recorded in this sub-theme.

Table C.2 *Breakdown of Jurisdictions with Recommendations in the area of Conduct Exercises*

| **Jurisdiction** | **Conduct Exercises** | **Total** |
|---|---|---|
| 1 | 1 | 1 |
| 6 | 1 | 1 |
| 7 | 4 | 4 |
| **Total** | **6** | **6** |

Jurisdictions with Recommendations within the area of Resources

The total number of jurisdictions with recommendations within the main theme of Resources was eleven (11). This is representative of 100% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Resources was broken down into the three (3) sub-themes of identify resources needs (equipment), identify resource needs (non-equipment), and resource tracking. Of the eleven jurisdictions with recommendations, 100% had comments within the sub-theme of equipment, 54% had comments in the sub-them of non-equipment, and 27% had recommendation the area of resource tracking. In total, 42 items were documented. 54% in the area of equipment, 38% in the area of non-equipment and 7% in the area of resource tracking. Jurisdiction #3 had the highest number or recommendations, with eight (8); 3 in the area of equipment and 5 in the area of non-equipment. In total, submitting 19% of the total number of recommendations for this category.

Table C.3 *Breakdown of Jurisdictions with Recommendations in the area of Resources*

| **Jurisdiction** | **Equipment** | **Non-Equipment** | **Tracking** | **Total** |
|---|---|---|---|---|
| 1 | 2 | 1 | 0 | 3 |
| 2 | 2 | 3 | 1 | 6 |
| 3 | 3 | 5 | 0 | 8 |
| 4 | 2 | 3 | 0 | 5 |
| 5 | 2 | 2 | 0 | 4 |
| 6 | 1 | 0 | 0 | 1 |
| 7 | 3 | 2 | 1 | 6 |
| 8 | 1 | 0 | 0 | 1 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 5 | 0 | 0 | 5 |
| 11 | 1 | 0 | 1 | 2 |
| **Total** | **23** | **16** | **3** | **42** |

Jurisdictions with Recommendations within the area of Training

The total number of jurisdictions with recommendations within the main theme of Training was seven (7). This is representative of 63% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Training had no sub-themes created. In total, 25 items were documented in this theme. The largest number of comments recorded was by jurisdiction # 7 with 9, or 36% of the total number of comments recorded in this sub-theme.

Table C.4 *Breakdown of Jurisdictions with Recommendations in the area of Training*

| **Jurisdiction** | **Conduct Training** | **Total** |
|---|---|---|
| 1 | 6 | 6 |
| 2 | 1 | 1 |
| 4 | 2 | 2 |
| 5 | 2 | 2 |
| 6 | 4 | 4 |
| 7 | 9 | 9 |
| 10 | 1 | 1 |
| **Total** | **25** | **25** |

Jurisdictions with Recommendations within the area of Exercises

The total number of jurisdictions with recommendations within the main theme of Organization was three (3). This is representative of 27% of the jurisdictions included in the study. As indicated in the methodology section of this study, the main theme of Exercises had no sub-themes created. In total, 6 items were documented in this theme. The largest number of comments recorded was by jurisdiction # 7 with 4, or 66% of the total number of comments recorded in this sub-theme.

Table C.5 *Breakdown of Jurisdictions with Recommendations in the area of Exercises*

| **Jurisdiction** | **Conduct Exercises** | **Total** |
|---|---|---|
| 1 | 1 | 1 |
| 6 | 1 | 1 |
| 7 | 4 | 4 |
| **Total** | **6** | **6** |

Jurisdictions with Recommendations within the area of Organization

The total number of jurisdictions with recommendations within the main theme of Organization was eleven (11). This represents 100% of the jurisdictions included in the study. As indicated in the methodology section, the main theme of Organization was broken down into the four (4) sub-themes of coordination, facility, procedures, and policies. Of the eleven jurisdictions 27% had comments within the sub-theme of coordination, 36% had comments in the sub-theme of facility, 81% had recommendations in the area of procedures and another 81% had recommendations in the area of policies. In total, 58 items were documented. 10% in the area of coordination, 8% in the area of facility, 53% in the sub-theme of procedures and finally, 27% in the area of policies. The jurisdiction with the highest number of recommendations, with nineteen (12), was jurisdiction #4. Jurisdiction #7 also submitted a high number of recommendation within the theme of organization with eight (8).

Table C.6: *Breakdown of Jurisdictions with Recommendations in the area of Organization*

| Jurisdiction | Coordination | Facility | Procedures | Policies | Total |
|---|---|---|---|---|---|
| 1 | 0 | 2 | 4 | 0 | 6 |
| 2 | 0 | 0 | 3 | 3 | 6 |
| 3 | 0 | 1 | 2 | 1 | 4 |
| 4 | 2 | 0 | 9 | 1 | 12 |
| 5 | 2 | 0 | 1 | 3 | 6 |
| 6 | 2 | 0 | 1 | 1 | 4 |
| 7 | 0 | 0 | 7 | 1 | 8 |
| 8 | 0 | 1 | 0 | 0 | 1 |
| 9 | 0 | 0 | 1 | 4 | 5 |
| 10 | 0 | 1 | 3 | 1 | 5 |
| 11 | 0 | 0 | 0 | 1 | 1 |
| **Total** | **6** | **5** | **31** | **16** | **58** |

## APPENDIX D

## CODEBOOK FOR THE ANALYSIS OF AFTER ACTION REPORTS

This codebook has been developed in an association with the study being undertaken to identify the most common challenges that are found within Emergency Operations Centers during activations. Additionally, the study compares the data across multiple jurisdictions to identify any possible relationships between challenges. The data used for this study has been derived from the eleven AARs that were submitted by jurisdictions with a population size of between 300,000 and 499,000. The total number of jurisdictions within this population range located within the United States is twenty-seven. Thus, the number of jurisdictions participating in this study represents 40.7% of the eligible participants.

The codebook is constructed to correspond with the issues identified in the research questions and hypotheses developed for this study (Princeton University, n/d). Each AAR has been coded against the variables (themes and sub-themes) that have been created to address the research questions and hypotheses. Additionally, calculations have been done within some themes to identify frequencies of subthemes to provide a more in depth analysis of the data. Finally, the analysis has identified the most common strengths and recommendations noted in the AARs examined.

The codebook has been divided into 3 distinct sections. The first outlines the questions used to identify those jurisdictions who identified in their AAR that they had issues with the themes and/or sub-themes created under the category of Challenges. The

usage of a number 1 indicates that the jurisdiction did indicate an issue in that specific theme or sub-theme. The coding of the number 2 indicates that they did not document any issues within that theme or sub-theme that had a negative impact on their EOC operation

The second section addresses the area of strengths. In this category, if a jurisdiction indicted that they had a strength in a specific theme or sub-theme, it was coded as a 1. If there was no indication that the jurisdiction had a strength in the specific theme or sub-theme, it was coded as a 2. The coding of a 2 does not imply there were weaknesses in the theme or sub-theme. It only indicates if the jurisdiction documented a strength in the AAR for that specific theme or sub-theme.

The final section indicates if a jurisdiction documented a recommendation in a specific theme or sub-theme. The coding of 1 indicates that there was a recommendation documented within a specific theme or sub-theme. The coding of a 2 indicates that the jurisdiction did not document a recommendation for that specific theme or sub-theme.

## Codebook for the Category of Challenges

| Category | Question | Code |
|---|---|---|
| Challenge | Did the jurisdiction indicate that the communications equipment, or lack thereof, have negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of communications procedures had a negative impact on the EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of experience had a negative impact on the EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that poor coordination had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the facility had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of, or poorly written policies, had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of, or poorly written procedures, had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of resources had a negative impact on EOC operations? | 1=Yes 2=No |

| | | |
|---|---|---|
| Challenge | Did the jurisdiction indicate that the lack of situational awareness had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of training had a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of organization have a negative impact on EOC operations? | 1=Yes 2=No |
| Challenge | Did the jurisdiction indicate that the lack of communications have a negative impact on EOC operations? | 1=Yes 2=No |

## Codebook for the Category of Strength

| Category | Question | Code |
|---|---|---|
| Strength | Did the jurisdiction indicate a strength in the area of communications with the public? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate a strength in the area of communication with staff? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that past exercises had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that experience had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that collaboration had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate coordination had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate the use of resources had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that personnel performed well in the EOC? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that previously established relationships had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that situational awareness had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that past training had a positive impact on EOC operations? | 1=Yes 2=No |

| | | |
|---|---|---|
| Strength | Did the jurisdiction indicate that communications had a positive impact on EOC operations? | 1=Yes 2=No |
| Strength | Did the jurisdiction indicate that organization had a positive impact on EOC operations? | 1=Yes 2=No |

## Codebook for the Category of Recommendations

| Category | Question | Code |
|---|---|---|
| Recommendation | Did the jurisdiction have recommendations in the area of improving communications with staff? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of improving communications with the public? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to conduct more exercises? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of identifying needed equipment resources earlier? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of identifying needed non-equipment resources earlier? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of improving resource tracking? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to conduct more training? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to improve coordination? | 1=Yes 2=No |

| | | |
|---|---|---|
| Recommendation | Did the jurisdiction have recommendations to improve the facility? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of resources? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to create or improve policies? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to create or improve procedures? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations in the area of communications? | 1=Yes 2=No |
| Recommendation | Did the jurisdiction have recommendations to improve the area of organization? | 1=Yes 2=No |

## APPENDIX E

## DICTIONARY

| Term | Definition | Source |
|---|---|---|
| Communication | The act or process of using words, sounds, signs, or behaviors to express or exchange information or to express your ideas, thoughts, feelings, etc., to someone else | Merriam-Webster |
| Collaborate | To cooperate with an agency or instrumentality with which one is not immediately connected | Merriam-Webster |
| Coordinate | To cause (two or more things) to be the same or to go together well : to cause (two or more things) to not conflict with or contradict each other | Merriam-Webster |
| Drill | A drill is a coordinated, supervised activity usually employed to validate a specific operation or function in a single agency or organization. Drills are commonly used to provide training on new equipment, develop or validate new policies or procedures, or practice and maintain current skills. | HSEEP |

| | | |
|---|---|---|
| Exercise | An instrument to train for, assess, practice, and improve performance in prevention, protection, mitigation, response, and recovery capabilities in a risk-free environment. Exercises can be used for testing and validating policies, plans, procedures, training, equipment, and interagency agreements; clarifying and training personnel in roles and responsibilities; improving interagency coordination and communications; improving individual performance; identifying gaps in resources; and identifying opportunities for improvement. Exercise can be conducted in various formats such as drills, seminars, workshops, games, functional exercise, table-top exercise, full-scale exercise | HSEEP |
| Experience | skill or knowledge that you get by doing something | Merriam-Webster |
| Full Scale Exercise | The most complex and resource-intensive type of exercise. They involve multiple agencies, organizations, and jurisdictions and validate many facets of preparedness. FSEs often include many players operating under cooperative systems such as the Incident Command System or Unified Command. | HSEEP |
| Functional Exercise | Exercises are designed to validate and evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of functions. FEs are typically focused on exercising plans, policies, procedures, and staff members involved in management, direction, command, and control functions. In FEs, events are projected through an exercise scenario with event updates that drive activity at the management level. An FE is conducted in a realistic, real-time environment; however, movement of personnel and equipment is usually simulated. | HSEEP |

| | | |
|---|---|---|
| Game | A simulation of operations that often involves two or more teams, usually in a competitive environment, using rules, data, and procedures designed to depict an actual or hypothetic situation. Games explore the consequences of player decisions and actions and are therefore excellent tools to use when validating or reinforcing plans and procedures or evaluating resource requirements. | HSEEP |
| Homeland Security Exercise and Evaluation Program (HSEEP) | HSEEP is a program that provides a set of guiding principles for exercise programs, as well as a common approach to exercise program management, design and development, conduct, evaluation, and improvement planning. | HSEEP |
| Incident Command System (ICS) | Management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. ICS is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, Intelligence & Investigations, finance and administration. It is a fundamental form of management, with the purpose of enabling incident managers to identify the key concerns associated with the incident—often under urgent conditions—without sacrificing attention to any component of the command system. | DHS |

| | | |
|---|---|---|
| National Incident Management System (NIMS) | The NIMS standard was designed to enhance the ability of the United States to manage domestic incidents by establishing a single, comprehensive system for incident management. It is a system mandated by Homeland Security Presidential Directive 5 (HSPD-5) that provides a consistent, nationwide approach for Federal, State, local, tribal, and territorial governments; the private sector; and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. | HSEEP |
| Organization | an administrative and functional structure (as a business or a political party); *also* : the personnel of such a structure | Merriam-Webster |
| Policy | a set of guidelines or rules that determine a course of action | Merriam-Webster |
| Procedure | a series of actions that are done in a certain way or order : an established or accepted way of doing something | Merriam-Webster |
| Plan | a set of actions that have been thought of as a way to do or achieve something | Merriam-Webster |
| Relationship | the way in which two or more people, groups, countries, etc., talk to, behave toward, and deal with each other | Merriam-Webster |
| Resource | a source of supply or support: an available means —usually used in plural | Merriam-Webster |

| | | |
|---|---|---|
| Seminar | Orient participants to, or provide an overview of, authorities, strategies, plans, policies, procedures, protocols, resources, concepts, and ideas. As a discussion-based exercise, seminars can be valuable for entities that are developing or making major changes to existing plans or procedures. Seminars can be similarly helpful when attempting to gain awareness of, or assess, the capabilities of interagency or inter-jurisdictional operations. | HSEEP |
| Situational Awareness | Gaining an understanding of the situation includes gathering, recording, analyzing, and displaying information regarding the scale, scope, complexity, and potential incident impacts | Department of Homeland Security |
| Table Top Exercise | Exercise is typically held in an informal setting intended to generate discussion of various issues regarding a hypothetical, simulated emergency. TTXs can be used to enhance general awareness, validate plans and procedures, rehearse concepts, and/or assess the types of systems needed to guide the prevention of, protection from, mitigation of, response to, and recovery from a defined incident. Generally, TTXs are aimed at facilitating conceptual understanding, identifying strengths and areas for improvement, and/or achieving changes in attitudes. | HSEEP |
| Training | Training can encompass those activities that are designed to improve the knowledge and/or skill of an individual to improve his/her performance. Training activities can include lectures, independent study, hands on skill development, classroom instructor, one- on- one instruction | Merriam-Webster |

| | | |
|---|---|---|
| Workshop | Although similar to seminars, workshops differ in two important aspects: participant interaction is increased, and the focus is placed on achieving or building a product. Effective workshops entail the broadest attendance by relevant stakeholders. Products produced from a workshop can include new standard operating procedures, emergency operations plans, continuity of operations plans, and mutual aid agreements. To be effective, workshops should focus on a specific issue, and the desired objective, product, or goal must be clearly defined. | HSEEP |

## APPENDIX F

## SAMPLE LETTER

**********
**********
**********
**********

Attention: **********

Dear **********:

I would first like to thank you for taking my call on ******** to assist me with my research. As a follow up to our conversation, I would like to request a copy of an After Action Report that is directly related to an activation of your jurisdiction's Emergency Operations Center. As I shared during our conversation, I am a student at Jacksonville State University, in the Emergency Management doctoral program, and I am studying how to improve EOC operations through the use of AARs to help identify the most common challenges that occur during EOC activations. The study will be used to help enhance EOC operations and improve our understanding of what errors are most prevalent so that future educational and training programs can be structured to address them in a holistic and comprehensive manner. This will hopefully provide a foundation from which we will be able to help improve EOC operations regardless of their makeup, size, and/or location. As I explained, the AAR can be based upon either a real world event or an exercise in which your EOC was activated and expected to perform tasks in response to a natural, manmade, or technological incident.

For your assurance, neither your jurisdiction, anybody who participated in the EOC activation nor anybody associated with the AAR submitted will be identified in my dissertation. My contact information is provided below if you should have any questions or concerns. Thank you very much for your assistance in helping me to complete my research project and fulfill my aspiration to improve EOC operations.

Sincerely,

Michael Ryan
Email: jsu0049k@jsu.edu
Phone: 571-447-3231