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A Comparison of Regional Health Care Structures for Emergency Preparedness

Leslie Porth
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Walden University

College of Social and Behavioral Sciences

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Leslie Porth

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Walden University
2015

Abstract

A Comparison of Regional Health Care Structures for Emergency Preparedness

by

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MPH, Saint Louis University, 1997

BSN, University of Missouri - Columbia, 1984

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Policy and Administration

Walden University

March 2015

Abstract

Since 2001, increased policy attention and federal funding mechanisms have required more effective disaster response by government actors and private sector organizations, including the health care system. However, there is limited scholarly evidence documenting which structural elements have been associated with efficacious regional coalitions. This study addressed the gap by examining whether the number of different participating disciplines (a proxy for coalition roles), community setting, and prior weather-related disaster declaration influenced the number of activities (a proxy for coalition responsibilities) conducted by the health care coalition. Social network theory was the theoretical lens with which the study results were used to examine the relational structures within coalitions. The quantitative study was based on archival data from a survey in 2011 of 375 acute care hospitals in the United States. A general linear model analysis was conducted, and results suggest a statistically significant relationship between the number of disciplines and the number of conducted activities. As the number of different disciplines increases in a coalition, so do the different types of conducted activities. Based on the analysis, community setting—urban versus nonurban—and the occurrence of a federally declared, weather-related disaster did not influence the number of coalition activities. This study provides evidence that establishing network structures for health care coalitions will advance the field of health care emergency preparedness and disaster response. The findings from this research may promote social change by guiding future policy development and research necessary to develop resilient and efficacious disaster response systems, resulting in reduced loss of life and injury.

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Dedication

This dissertation is dedicated to my husband, John, who has provided unwavering support of my pursuit of this lifelong goal. To my family, including my children, Mackenzie, Tyler, and Erika, as well as my parents, Stan and Jan, thank you for accepting my neglect without complaint. I love each of you, very much.

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Chapter 1: Introduction to the Study

Introduction

The terrorist attacks of September 11, 2001 (9/11) served as a catalyst for punctuated expansion of emergency preparedness and disaster response practice in the public, nonprofit, and private sectors. The 9/11 attacks resulted in 2,973 fatalities (U.S. Commission on the Terrorist Attacks Upon the United States, 2004, p. 311) and revealed gaps in planning, equipping, training, and testing systems of disaster response among agents and responders (Kapucu & Van Wart, 2008; U.S. Commission on the Terrorist Attacks Upon the United States, 2004; Waugh & Streib, 2006). The focus of inquiry following 9/11 largely was on public safety and first responders—the disciplines most involved in the response—and thus, their deficiencies were prominent and highlighted (Kapucu & Van Wart, 2008; Waugh & Streib, 2006). It was evident that there was a lack of coordination among public agencies and private organizations required by statute or mission to respond to disasters.

Following 9/11, there was an immediate call-to-action to improve national resilience and systems of response, including authorization for a new federal agency, the U.S. Department of Homeland Security (DHS). Since 2001, there have been substantive increases in resource allocation and prioritized focus on emergency preparedness and disaster response among local, state, and federal government jurisdictions, first responders, and nonprofit and private sectors (Carrier, Yee, Cross, & Samuel, 2012; Caruson & MacManus, 2008; Kapucu, 2006; Kapucu, Arslan, & Collins, 2010; Militello, Patterson, Wears, & Ritter, 2005; Stoto, 2008). Initially after 9/11, funding and program

priorities addressed terrorism or intentional incidents despite historical evidence of catastrophic weather-related disasters in the United States (Kapucu & Van Wart, 2008; Waugh & Streib, 2006). The shift in resources and priorities toward terrorism reflected a reactionary response from policy makers, government agents, and the general public.

The hurricane season of 2005 illuminated the preparedness and response deficiencies of coordination and communication during response at all levels of government, as well as deficiencies within the health care system (Blair, 2011; Boin, ‘T Hart, McConnell, & Preston, 2010; Brinkley, 2006; Fink, 2013; Government Accountability Office, 2006; Kapucu & Van Wart, 2008; Sylves, 2006; Townsend, 2006; U.S. House of Representatives, 2006; U.S. Senate, 2006, Waugh & Streib, 2006). In contrast to 9/11, there was advanced knowledge about the impending threat, providing opportunity for protective measures and coordinated response prior to landfall. However, by May 2006, 1,577 fatalities were confirmed (U.S. Senate, 2006, p. 37) as a result of Hurricane Katrina, demonstrating substantial gaps in the coordination of disaster response among actors and responders (Government Accountability Office, 2006; Townsend, 2006; U.S. House of Representatives, 2006; U.S. Senate, 2006). Specifically, the health care system response to Hurricane Katrina contributed to 195 documented fatalities in Louisiana hospitals (Brunkard, Namulanda, & Ratard, 2008, p. 4). Following this catastrophic disaster, the national spotlight centered on the lack of regional coordination not only among government actors, but also in the health care system (Grieb & Clark, 2008; Kapucu & Van Wart, 2008; McHugh, 2004; Rambhia, Waldhorn, Selck, Mehta, Franco & Toner, 2012; Waugh & Streib, 2006). Hospitals and other provider

organizations demonstrated vulnerability and the inability to coordinate medical surge and evacuation.

In a manner similar to the determination of funding and policy priorities following 9/11, Hurricane Katrina prompted federal funding to increase preparedness and resiliency through formula-based grants with specific requirements for coordination among public and private actors, including the health care system. Federal funds provided for health care system emergency preparedness have been awarded by the Centers for Disease Control and Prevention (CDC) to public health agencies and by the U.S. Department of Health and Human Services (HHS), Assistant Secretary of Preparedness and Response (ASPR) for hospitals. The ASPR department funds the Hospital Preparedness Program (HPP) and requires that health care coalitions be established as the structure for coordination of regional health care system emergency preparedness and disaster response (HHS, 2009; HHS-ASPR, 2012a, 2012b, 2013). Coalitions were presumed to be the structure for which the health care system could effectively preplan and coordinate local and regional strategies to manage the medical surge and existing patient population during any disaster, regardless of setting, severity, or duration.

Effective disaster response connotes government leadership and a coordinated response among citizens, organizations, communities, and local, state, and federal government agents. With new funding and focus, real-world disasters have been subjected to increased public and media scrutiny, as well as scholarly evaluation of risks, capacity, capability, and established systems of preparedness and response. The

operational assumption among federal health officials is that systems of preparedness and response are becoming more refined and resilient.

In this study, the prevailing structure in 2011 for regional coordination of emergency preparedness and disaster response among varied health care organizations was examined. Specifically, organic coalition structures of 2011 were studied and used as a lens from which the regional health care coalition concept and measures currently required through formal guidance within the HPP grant deliverables could be compared (HHS-ASPR, 2013, p. 43). Health care coalitions were evaluated as networks to compare differences in the relational structures between urban and nonurban communities. Further, this study was conducted to examine whether there was a relationship between responding to real-world, weather-related, federally declared major disasters within the county of the hospital coalition member and the coalition relational structure. The coalition network nodal structure of actors or entities within a network was measured by the number of disciplines represented, serving as a proxy for the roles accepted within the coalitions.

The research results contribute to the literature and provide data to influence policy, including the current federal requirements for health care coalitions as the structure for emergency preparedness and disaster response communication and coordination. Positive social change may result from efficacious public policy that strengthens systems of coordinated health care preparedness in both urban and nonurban settings. A well-coordinated system of health care emergency preparedness among

hospitals and other diverse health care provider organizations likely will reduce the loss of life and injury during a disaster response; this is the pinnacle of positive social change.

The first chapter frames the rationale, background, and research questions that identify the current gap in literature and need for additional study to effect social change. The chapter is outlined in the following sequential sections, with appropriate subsections: introduction, purpose of the study, the nature of the study, significance, and summary.

Background

The attacks of 9/11 served to punctuate growth in the broad field of emergency management, specifically around public safety and first responders. The response to Hurricane Katrina served to punctuate growth specifically in the field of health care emergency preparedness and the responsibility during disasters of organizations to serve as first receivers treating victims immediately following a mass casualty incident before systems of response coordination have been established. Both 9/11 and Hurricane Katrina have been catalysts of epistemology, resulting in a shift of paradigm and thus an expansion of actors required for emergency preparedness and disaster response. This paradigm shift has resulted in increased publication of practice-based experience, scholarly inquiry, and an emergence of research. Often, the studies of the early 2000s focused on either government actors or first responders, whereas post-Katrina literature began to study first receivers and the health care system. Many of the studies conducted have focused on individual organizational or jurisdictional response roles, required competence, and the processes and technology needed to communicate and coordinate response during an incident. *Communication* connotes an exchange of information and

requires identified need, intent, and ability to exchange information (Jankowski & Nyerges, 2001, p. 49.) *Coordination* connotes establishing mutually agreed-upon ideas on which to base planning and response decisions (Jankowski & Nyerges, 2001, p. 49). Communication and coordination are understood to be the two most basic levels of connection among actors and serve as ontological constructs for emergency preparedness planning and disaster response evaluation (Caruson & MacManus, 2008, p. 294; Haddow et al, 2011 p. 19; Jankowski & Nyerges, 2001, p. 49; Kapucu, 2006; Kapucu, Arslan, & Collins, 2010; U.S. Bipartisan Committee, 109th Congress, 2006, p. 7; DHS, 2008c, pp. 7-8; U. S. National Commission on Terrorism Attacks Upon the United States, 2004, p. 357; U.S. Senate, 109th Congress, 2006, p. 2). Literature throughout the 2000s initially focused on the two core constructs—communication and coordination—from an individual, jurisdictional, and agency perspective and did not include studies of regional coordination and collaboration of multiple actors working on the same task to achieve a shared goal (Jankowski & Nyerges, 2001). Further, most studies focused on government and public safety actors and did not include health care as an element of inquiry.

Current scholarly literature focused on regional coordination for emergency preparedness and disaster response, especially literature that includes a health care lens, is limited in number and scope. Most publications are descriptive accounts of practice-based approaches or isolated qualitative case studies. Two descriptive articles focus on regional public health emergency preparedness planning in Massachusetts (Grieb & Clark, 2008; Stoto, 2008), including a comparison of Boston to three other regional public health networks in Northern Illinois, Washington, DC, and Nebraska (Stoto,

2008). Stoto (2008) suggested use of social network theory as a frame of reference and is one of just a few researchers to distinguish between urban and nonurban regional networks for health care system preparedness.

There is limited empirical evidence within the entire field of emergency management, and only isolated studies focused on the health care system. The gap in knowledge contributes to a dearth of efficacious models, based on evidence, from which to develop policies and programs for a coordinated system of health care preparedness and response. Among those researchers who have focused on regional emergency management coordination, a few are prominent in the field. MacManus and Caruson conducted a series of survey-based quantitative studies among Florida city and county government officials and emergency managers to study whether disaster vulnerability increased likelihood of regional coordination (Caruson & MacManus, 2008, 2011), and among which actors collaboration was more likely to occur (MacManus & Caruson, 2011). Their study results revealed that county officials and emergency managers, more than city officials, identified common threats to basic infrastructure, including emergency health care (Caruson & MacManus, 2011), and these common threats served as a stronger incentive for regional coordination than financial factors (Caruson & MacManus, 2008). Further, coordination and collaboration were most likely to occur among neighboring jurisdictions, public agencies, and private utility companies (MacManus & Caruson, 2011).

Kapucu (2006, 2010) conducted retrospective content analysis of news reports, government documents, after-action reports, and key informant interviews following 9/11

and Hurricane Katrina to identify network structures as defined by communication during response. The studies revealed the need to expand boundaries beyond organizations and local jurisdictions (Kapucu, 2006) and to identify effective subnetworks measured by high degrees of centrality. The findings led to a recommendation for increased local and regional funding allocations to develop more local and regional networks for coordination as opposed to a federal network of response (Kapucu, 2010).

The one predominant quantitative survey study of health care coalitions was conducted in 2011. Rambhia et al. (2012) surveyed more than 4,000 acute care hospitals in the United States, gathering 477 responses outlining hospital participation in discreet health care coalitions (p. 2). The survey addressed the agency and organization membership, governance models, financial structures, and accepted roles of responsibility within existing health care coalitions, as reported by hospital personnel responsible for emergency preparedness (Rambhia et al., 2012). The findings provided an initial assessment of the coalition characteristics and structure among all reporting coalitions. Although informative, this study generalized the results among all reporting coalitions and did not distinguish characteristics between urban and nonurban coalitions.

Despite available funding and policy initiatives, there is limited scholarly knowledge to guide efficacious models for health care coordination to prepare for and respond to disasters. Caruson and MacManus (2008, 2011) introduced evidence that among Florida emergency managers, increased risk is a motivator for collaboration. However, there is no comparable information for health care coalitions. The omissions of coordination among health care organizations during the Katrina response suggested that

weather-related disasters could serve as a motivator for health care coalitions. However, no such studies have been conducted.

Further, the dearth of information about differences in structure, members and roles between urban and nonurban coalitions increases the likelihood that descriptive, case-study successes will be replicated and generalized without adequate comparison. It is not logical to assume that a health care coalition covering multiple rural counties with one acute care hospital will successfully replicate a coalition structure developed in an urban city governed by a single jurisdiction with multiple large health care systems and trauma services. The federal guidance provides broad preparedness, response, and recovery expectations for health care coalitions without distinction based on geography, risks, population, or available resources. It is the responsibility of local and regional providers to develop an effective health care coalition structure; however, there is no evidence with which to establish effective models.

This study provided a detailed comparison between established discrete health care coalitions, surveyed in 2011, that formed organically and prior to the formal HPP guidance (HHS-ASPR, 2012a, 2012b). The characteristics of coalitions based on urban or nonurban status were assessed to determine whether there were unique differences in structure, membership, roles, and responsibilities. An examination of the structure, membership, participating disciplines, and activities of coalitions that either have or have not experienced a U.S. Federal Emergency Management Agency (FEMA) declared weather-related disaster provided insight into the relationship between weather disasters and the formation of a coalition. This retrospective assessment established a baseline

from which additional studies can further study health care coalitions to discern between coalitions that yield positive outcomes and those that may flounder or fail. Currently, the HPP expectations of coalitions for measurable results are increasing concurrent to draconian cuts in funds. If health care coalitions truly are intended to serve as a primary structure for coordination and communication during a disaster, it is imperative the structure be established based on evidence rather than anecdote or assumption.

Problem Statement

Federal funds provided to state health agencies and health care organizations through formula-based grants require that health care coalitions be established as the structure for coordination of regional health care system emergency preparedness and disaster response (HHS-ASPR, 2012a, 2012b, 2013). The requirement for coalitions, as a mechanism for regional health care disaster coordination, is not based on scholarly practice and established studies. Thus, the guidance may be creating a less efficient and less effective system of preparedness and response among acute care hospitals. Although this guidance is intuitively logical, no empirical evidence indicates that formalized health care coalitions have demonstrated significant results in emergency preparedness and disaster response either in an exercise or during a real-world incident.

The scholarly literature available for this field of inquiry is limited to practice-based or case study descriptions of coalitions in large metropolitan statistical areas; the conclusions are generalized statements based on anecdotal experiences (Grieb & Clark, 2008; McHugh, Staiti, & Felland, 2004; Stoto, 2008). Stoto (2008) summarized the need for additional research to examine whether coalitions have a positive public health

impact, are efficacious, and vary in regional structure based on environmental characteristics (p. 449). Six years later, there remains a significant literature gap about health care coalitions, specifically the relational network structure based on urban or nonurban classification and the effect of risks and threats such as extreme weather on specific preparedness and response roles. This research was used to address those gaps by identifying characteristics of structure, membership, roles, and responsibilities in both urban and nonurban settings. Further, the incidence of a real-world, FEMA-declared weather-related disaster in the county of the coalition was examined to determine what, if any, effect the disaster has on the coalition structure, roles, and responsibilities.

Purpose of the Study

In this quantitative study, I examined and compared differences in participation, membership, and responsibilities among established health care coalitions in urban and nonurban communities in 2011 as defined by the American Hospital Association (AHA) classification of urban and nonurban acute care hospitals. This retrospective analysis established a baseline assessment of the coalitions that formed organically and prior to the federal coalition guidance released in 2012. The study also was used to compare the responsibilities of health care coalitions from geographic areas that have had a major, FEMA-declared weather-related disaster since 2001 with those hospitals that have not been directly involved in a FEMA-declared disaster.

In this study, the differences between health care coalitions were examined using the following independent variables: (a) urban versus nonurban communities; (b) federal, weather-related, major emergency declaration between 2001 and August 2011; and (c)

the number of disciplines represented in the health care coalition. The study also included the following control variables: (a) the percent of acute care hospitals within the community setting that participate in the coalition; (b) the time period in which the coalition was formed; (c) types of disciplines serving as coalition members; (d) the formal or informal coalition structure; (e) whether the hospitals and coalitions participate in the HPP grant; (f) whether there is a jurisdictional requirement for the hospital to participate in the coalition; and (g) whether the coalition leader is a hospital or public health representative. The dependent variable was the number of conducted activities, serving as the proxy for the responsibilities accepted by the health care coalition.

Research Questions and Hypotheses

I conducted this study to address the following three main research questions.

Research Question 1

What was the relationship between the number of disciplines, representing roles, in a health care coalition and the number of conducted activities, representing accepted responsibilities, of health care coalitions?

Research Question 2

What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions that are located in counties that have experienced a federally declared weather-related disaster between 2001 and August 2011 as compared to health care coalitions in communities that were not directly affected by a federally declared disaster?

Research Question 3

What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions in nonurban settings as compared to coalitions in urban settings?

Hypothesis 1

Null Hypothesis 1: The number of disciplines represented in a health care coalition did not increase the number of conducted activities within a health care coalition.

Alternative Hypothesis 1: The number of disciplines represented in a health care coalition increased the number of conducted activities within a health care coalition.

Hypothesis 2

Null Hypothesis 2: Prior disaster declarations did not influence the number of represented disciplines, or conduct activities within a health care coalition.

Alternative Hypothesis 2: Prior disaster declarations influenced the number of represented disciplines or conducted activities with a health care coalition.

Hypothesis 3

Null Hypothesis 3: Community size did not influence the number of represented disciplines or conducted activities within a health care coalition.

Alternative Hypothesis 3. Community size influenced the number of represented disciplines or conducted activities within a health care coalition.

Theoretical Framework

Although the literature about regional health care coalitions as a means to prepare for and respond to disasters is limited, there is use of terminology that provides linkage to a theoretical framework. Kapucu (2010) and Stoto (2008) both referred to elements of social network theory and thus established a theoretical lens from which to study regional systems of emergency preparedness. In this study, social network theory involves actors representing different organizations within a defined geographic area voluntarily engaging in activities of mutual benefit to increase health care system emergency preparedness and thereby presuming more effective and efficient disaster response.

Social network theory has roots in public goods theory (Samuelson, 1954, p. 387) and is the culmination of alignment among varied disciplines including economics, mathematics, engineering, political science, anthropology, and sociology (Coleman, 1988, pp. S116-S118; Katz, Lazar, Arrow, & Contractor, 2004, p. 318; Putnam, 1995, p. 66; Scott, 2013, p. 11; Wasserman & Faust, 1994, p. 17). The application of this theory suggests that individuals contribute toward a common goal through collective action to produce universal, shared right to benefit and outcome (Carpenter, Li, & Jiang, 2012, p. 1329; Coleman, 1988, p. S96; Katz et al., 2004, pp. 308, 315; Marwell, Oliver & Pahl, 1988, p. 502; Wasserman & Faust, 1994, p. 10). Social network theory provides the foundation for explaining why health care competitors would allocate resources for altruistic engagement to manage a low-probability risk with potentially highly negative consequences.

Social network theory is based on two major theoretical propositions, both of which will be more thoroughly described in Chapter 2. First, mutual motive and contribution among the network actors produces collective benefit and outcomes defined as social capital (Carpenter et al., 2012, p. 1330, Coleman, 1988, p. S101; Lin, 1999, p. 30; Putnam, 2000, p. 135). Examples of social capital relevant to this study include intellectual unity and regional plans; increased access to information or resources; collective ability to leverage and influence other agents; and collective credibility and power (Coleman, 1988, pp. S102, S105; Lin, 1999, p. 30; Lin, 2005, p. 5; Putnam, 2000, p. 135). For this study, I accepted the premise that hospitals and other health care agents participating in a health care coalition presume benefit defined as social capital. Social capital research was not a focus of this study.

The second theoretical proposition is that networks have discernable structures, which include nodes, or single units, and ties, or linkages, between and among the nodes (Carpenter et al., 2012, p. 1329; Katz et al., 2004, p. 308; Wasserman & Faust, 1994, p. 18; Wellman & Berkowitz, 1988, p. 87). Network development research is the study of the nodes and their relational ties that bind, bond, and bridge the nodes within and among network structures (Carpenter et al., 2012, p. 1330; Katz et al., 2004, p. 308; Lin, 2005, p. 12). Social network research focuses on formation and structure rather than outcomes.

This study was conducted to examine network development research, specifically characterizing and counting the different disciplines as nodes within both urban and nonurban coalitions. Comparison of the node count and disciplines between coalitions based on prior federally declared weather-related disasters also was conducted to

determine if weather may serve as factor for nodes to engage in a network structure. Finally, the accepted roles served as a proxy for strength of relational ties; the number and type of accepted roles provided insight into the existence of binding, bonding, or belonging ties.

Nature of the Study

Researching the structure of organically formed health care coalitions through the lens of social network theory is best achieved through a quantitative analysis of the coalitions' respective structural components. This approach enables scholars to compare and contrast the coalition structures based on discreet variables and very specific data outcomes. The use of a nonexperimental survey design is appropriate for this emerging field of study to provide an empirical foundation about coalition structures from which additional, more rigorous studies may be conducted.

Secondary data consisting of information from a 2011 survey of emergency preparedness staff from acute care hospitals and publicly available, county-based federal disaster declarations were analyzed for this study. This existing data source was used to establish baseline characteristics and differences in structure between urban and nonurban health care coalitions that formed organically prior to formal federal guidance and increased grant deliverables requiring coalitions.

I conducted the study to examine differences between health care coalitions and included three independent variables and one dependent variable. The first nominal-level independent variable differentiated between the community setting, based on the hospital designation as either urban or nonurban. The second nominal-level independent variable

differentiated between hospitals that are physically located in a county that had a FEMA-documented weather-related major emergency presidential declaration between 2001 and August 2011. The third independent variable, an interval-level variable, was used to measure the number of disciplines represented in the health care coalition as a proxy for social network ties. Covariates were used to control for spurious results and included (a) the percentage of acute care hospitals within the community setting that participate in the coalition; (b) the time period in which the coalition was formed; (c) types of disciplines serving as coalition members; (d) the formal or informal coalition structure; (e) whether the hospitals and coalitions participate in the HPP grant; (f) whether there is a jurisdictional requirement for the hospital to participate in the coalition; and (g) whether the coalition leader is a hospital or public health representative. The dependent, interval-level variable quantified the roles accepted by the health care coalition, which served as a proxy for presumed responsibilities during a disaster response.

Data collected from a 2011 nonexperimental survey were accessed to conduct the secondary analysis. The electronic survey was sent to acute care hospital CEOs from the University of Pittsburgh Medical Center, Center for Biosecurity (UPMC) research team in August 2011 with a request to forward the survey to the “appropriate hospital personnel in charge of disaster preparedness” (Rambhia et al., 2012, p. 2). Responsibility for disaster preparedness in an acute care hospital was established as the eligibility criteria for survey participation. The survey was sent to 4,632 acute care hospitals, and 477 acute care hospital personnel responsible for emergency preparedness from 477 discreet hospitals self-selected and returned the survey (Rambhia et al., 2012). Public

health or other healthcare organization representatives were not included in this survey. Because the HPP guidance places primary responsibility for health care coalition development upon hospital personnel as evident based on the requirements for medical surge management and hospital membership in coalitions, hospital personnel were logical and appropriate survey respondents (HHS-ASPR, 2012a, 2013). No other discipline or organization is a required member for a health care coalition to be recognized; therefore, this was not considered a limitation of the study.

The analysis methodology originally was proposed to be a simple, random-effect, linear regression to determine if a directional relationship existed between the number of disciplines represented and the number of accepted roles within the health care coalition, and if community size and prior disasters influenced the coalition structure. The assumption of normal distribution for the dependent variable was violated, and thus a nonparametric, chi-square statistic was estimated using a general linear model as the statistical analysis to determine significance. Chapter 3 contains a thorough description of the methodology.

Definitions

Health care coalition: The operational definition of health care coalition in this study is adopted from DHSS ASPR as a collaborative network of private and public sector health care and response partners representing organizations and agencies likely to participate in emergency preparedness and disaster response, recovery, and mitigation activities (HHS-ASPR, 2012a, p. 56).

Emergency management: The operational definition of emergency management in this study refers to the profession, broad practice field, and academic discipline of the full spectrum of disaster-related capabilities including preparedness, response, recovery, and mitigation. A simple definition is “a discipline that deals with risk and risk avoidance” (Haddow, Bullock, & Coppola, 2011, p. 2). The term *emergency management* is broader than the scope of this study.

Emergency preparedness: The operational definition of emergency preparedness in this study involves the activities that transpire to coordinate communication and response during a disaster but occur prior to any disaster. A formal definition of *preparedness* within emergency management is “a state of readiness to respond to a disaster, crisis, or any other type of emergency situation” (Haddow, Bullock, & Coppola, 2011, p. 97).

First receivers: The operational definition for first receivers is personnel in organizations that are not located in the incident site but are receiving victims from a mass casualty incident prior to obtaining information and knowledge about the incident, including possible hazardous materials (Koenig, 2003).

Health care organization: The operational definition of health care organization in this study is adopted from DHSS ASPR and includes any public or private organization that has as its core purpose and mission to provide services that support individual or community health (HHS-ASPR, 2012a, p. 56).

Health care system: The operational definition of healthcare system is “a collection of a community’s healthcare organizations” (HHS-ASPR, 2012a, p. 56).

Major disaster declaration: The operational definition for major disaster is derived from the Stafford Act and serves as the basis for federal disaster declarations (FEMA, 2013a, Sec. 102, p. 2).

Mitigation: The term refers to purposeful action to lessen the impact of disasters including loss of life and property, including community-wide risk reduction and hardening critical infrastructure (DHS, 2011, p. 4).

Nonurban hospitals: The operational definition of a nonurban hospital aligns with the AHA operational definition as any hospital located in a county that is not designated by the U.S. Census Bureau as part of a metropolitan statistical area (personal communication, P. Kralovec, Senior Director, Health Care Data Center, Health Forum of the American Hospital Association, April 2, 2014).

Preparedness: The operational definition for preparedness refers to planning, organizing, equipping, training, and practicing intentional actions prior to but required during a disaster response (DHS, 2011, p. 3).

Urban hospitals: The operational definition of an urban hospital aligns with the AHA operational definition as any hospital located in a county that is designated by the U.S. Census Bureau as part of a metropolitan statistical area (personal communication, P. Kralovec, April 2, 2014).

Assumptions

The use of secondary data necessitated several assumptions regarding the original study design, testing, and validation of responses to accurately reflect information about the research questions. These assumptions and limitations must be acknowledged. This

does not negate the value of this study, as the ability to capture data about organically developed coalitions prior to the release of the HPP coalition guidance cannot be replicated at the current time. The information gathered in this study contributed rich data from which comparative studies may be developed to determine whether there are changes in the structure and roles of health care coalitions that developed following the release of the national guidance document.

The assumptions of this study were categorized based on data, either the original data or newly collected data added for this study. The original data were collected as survey responses through an online survey tool using a consistent method and are assumed to have no systematic error. It was assumed that the survey participants accurately understood the survey and provided truthful responses. The data about county-based disaster declarations, added to the original data set for this study, were assumed to have been collected using agreed-upon definitions and criteria and accurately entered without systematic error.

For purposes of this study, each discipline represented a node within the coalition, and the number of disciplines represented in a health care coalition served as a proxy to quantify the network ties as defined in social network theory. The ties or linkages between the nodes within and among coalitions were identified and quantified through a count of individual nodes within each coalition. For example, if there were six different disciplines represented in a coalition, as many as 14 ties might exist among the coalition members. Further, each discrete discipline served as a proxy for accepted roles. For example, if EMS is represented in a coalition, the critical functions of EMS services

during a disaster were assumed roles of the coalition. This concept of disciplines representing network ties and accepted roles was assumed for purposes of this study. Similarly, the conducted activities of each coalition served as a proxy for accepted responsibilities of the coalition.

It is important to explicitly describe the assumptions identified to provide scholars the underlying beliefs inherent in this study. The results of this study provide depth of information about the organic coalitions that formed prior to the HPP coalition guidance and from which knowledge about the structure of coalitions can be ascertained.

Scope

This study centered on hospital personnel perceptions and knowledge about the health care coalitions in which their hospitals were represented. This focus was appropriate for several reasons. First, hospitals are the one required discipline of any coalition as outlined by HPP; other disciplines including public health and emergency management are encouraged but not required. This requirement is based on the role hospitals assume for treatment of the surge of injured victims during and following a disaster. Second, the original survey requested that hospital personnel responsible for emergency preparedness be the individuals to complete the survey to ensure that the most accurate and consistent information was provided among respondents. Third, soliciting input from the one required discipline and not various disciplines provided similar context for each of the respondents, thus ensuring similarity for comparison between and among the coalitions.

The recommended use of this research is to better understand the relational ties and structures of those coalitions that formed prior to the HPP coalition guidance. This study may not be generalized broadly to describe current coalitions but serves as a foundation on which current coalitions may evaluate their structure and from which policy may direct refinement of coalition guidance. Understanding the perspective of hospital emergency personnel as critical nodes within a coalition provides that foundation.

Limitations and Delimitations

It is prudent to acknowledge the limitations of the study based on identified threats to internal and external validity. Extraneous variables that had the potential to affect the participants and overall results were identified as threats to internal validity (Campbell & Stanley, 1963, p. 5). There were three acknowledged threats to the internal validity for this survey. The first, *observer effect* (or the Hawthorne Effect), was understood to be participants' awareness that their answers were part of a study and thus the potential that participants would alter their answers to convey a different reality. The second, *instrument threat*, arose from the omission of reliability and validity testing, including construct validity, of the survey instrument; thus, the instrument itself might have been flawed and not correctly captured the information sought. The third, *selection bias*, involved participants' self-selection through voluntary participation for this survey; thus, participants were not a random representation of hospital emergency preparedness personnel. The three internal threats limit the generalizability of this study, or external

validity. Specifically, the interaction effect of selection bias and testing limits the ability to generalize the results (Campbell & Stanley, 1963, p. 6).

The populations and boundaries of this study also placed limits on the generalizability of the study. First, the participants were from hospital settings only and were not a representative sample of all coalition disciplines. Second, the study was limited in scope to the knowledge of the participants at the point in time when the survey was completed. Third, although the study power is sufficient, the response rate among U.S. hospitals of 10.3% was considered low. Fourth, the study was conducted in the United States and thus cannot be applied to international inquiry, as countries have very different health care and disaster response systems. This study, while a unique contribution to scholarly literature, cannot be assumed to reflect every hospital and health care coalition structure and roles in 2011. These limitations are important when considering the policy implications.

Another consideration of this study was my potential bias as a researcher. As I am a state hospital association executive responsible for overseeing the administration of approximately 50% of the HPP grant funds for Missouri, my work aligns with the focus of this study. As a professional responsible for HPP implementation for the Missouri health care system since 2006, I have been engaged in facilitating coalition development. Further, I have served on two national subject matter expert (SME) panels related to coalition guidance development and coalition evaluation metrics. Throughout this process, I have intuitively accepted the notion of social capital as a benefit of health care coalitions. However, the lack of research to support the proposed structures and roles was

an identified gap in the literature and prompted the exploration of this topic leading to this research study. The use of blinded, secondary data prevents any ethical issues, preserving the integrity of the study. Although the data set includes the state in which the hospital is located, urban or nonurban classification, and prior disaster declarations, this information is not enough to identify specific hospitals or specific coalitions. Thus, personal knowledge about any particular coalition cannot be associated with the data available for this study. Finally, generally accepted statistical tests were the basis of the quantitative analysis and thus further eliminated bias from the study. Despite the biases and limitations of this study, the value of a retrospective evaluation of organically developed health care coalitions provides context for future studies and inquiry.

Significance

This research contributed to an emerging field of study about health care coalitions as the architecture for regional coordination for emergency preparedness and disaster response. Defining the characteristics of health care coalitions that organically formed during the initial punctuation of emergency preparedness following 9/11 and Hurricane Katrina provided deeper understanding for future policy and practice considerations.

Establishing a theoretical lens from which to study coalitions is essential. Social network theory likely will provide one lens from which an ontological framework for coalition structures may be studied. Kapucu and various colleagues have introduced network analysis in this field in two studies of public and private networks and communication patterns during both 9/11 (Kapucu, 2006) and Hurricane Katrina (Kapucu

et al., 2010). These studies provide rationale for continued study of social network theory as a lens for emergency preparedness and disaster response.

Currently, there is a significant gap in scholarly literature focused on regional health care emergency preparedness coordination and collaboration. Initial studies of emergency preparedness have centered on government actors. Survey studies by Caruson and MacManus were conducted among Florida county and city officials to determine if perceived vulnerabilities contributed to interjurisdictional organization and cooperation (Caruson & MacManus, 2008) and the identified responsibilities for collaboration (Caruson & MacManus, 2011). Their work provides a base from which additional studies about regional coordination can emerge.

Studies centered on regional health care coordination and collaboration through coalitions or other methods have been limited and primarily practice-based applications. Two practice studies depict established regional public health networks for preparedness of public health duties during a pandemic influenza outbreak, including vaccine dispersion, in Massachusetts (Grieb & Clark, 2008; Stoto, 2008) and other regional geographies including Northern Illinois, Washington, DC, and Nebraska (Stoto, 2008, p. 444). Stoto (2008) used terms aligned with social network theory and posed questions about regionalization for preparedness, which were addressed in this study; specifically, was there a positive net impact; were some structures more effective than others; and did geography and disciplines affect the outcome (pp. 448-449).

Only one research study specifically has focused on multidisciplinary health care coalitions. The Rambhia et al. (2012) survey of health care coalitions from the

perspective of hospital emergency preparedness personnel is the original study on which this research was based. The findings aggregate the characteristics and differences in health care coalitions from all respondents and establish a research foundation as an introduction to health care coalitions including membership, roles, and year of origin (Rambhia et al., 2012). Although this study captured urban versus nonurban setting, it did not distinguish between the two in the analysis and findings (Rambhia et al., 2012). The researchers entrusted the data from the original study for this study to expand the knowledge available from the data they collected.

To date, there is no literature clearly distinguishing between urban and nonurban settings for regional health care coordination. Further, there is no literature that demonstrates what, if any, role prior real-world disasters have in influencing health care systems to engage in regional coordination and collaboration for emergency preparedness and disaster response. This research inquiry used the data from the Rambhia et al. study and additional secondary data about county-based disaster declarations, thus contributing to a very scarce foundation of literature providing initial information about nonurban coalitions, as well as limited articles about urban coalitions.

These data and findings provided information for social change, which will be used to guide policy development about coalition development in both urban and nonurban settings for emergency preparedness. The scholarly understanding of the similarities and differences between urban and nonurban coalitions in 2011 as well as the influence of weather-related disasters on coalition development will help differentiate and refine response systems. Guidance for coalition development required further study to

establish coalition structures and assigned roles based on community size and risk of real-world disasters.

The knowledge generated from this study will help promote social change and establishes a scholarly foundation for the epistemology of regional health care emergency preparedness and disaster response. The boundaries of this study suggest that additional research, both qualitative and quantitative, should be conducted to better understand effective network structures and outcomes. In addition, the recent trend of developing specific regional coalitions to coordinate health and medical preparedness and response plans requires additional study to determine efficacy based on structure, size, community setting, and specific preparedness and response roles. Positive social change will result from this research establishing empirical baseline information on which future policy development and research will be based. Policy and practice changes leading to development of a resilient and efficacious health care disaster response system that results in reduced loss of life and injury during disaster response were the research goals.

Summary

Adopting a scholarly approach to studying and implementing social change involves deliberate thought and process. This study contributes to an emerging field of study about health care coalitions as the architecture for regional coordination for emergency preparedness and disaster response. It also differentiates among communities based on size and prior direct involvement in a FEMA-declared disaster. This study also contributes to a body of scholarly knowledge, based on classical sociological theories, and contributes to development of a new conceptual framework from which health care

policy for emergency preparedness and disaster response may be derived. This study interjects information needed to refine current and establish future policy directives as well as practice application.

The following literature review provides the theoretical context, historical progression, and current understanding of regional coordination and communication for emergency preparedness and disaster response. The emergency practice trend of establishing networks among government, nonprofit, and public sector organizations that most likely will be involved in disaster response is used to establish a practice basis for regional health care coalitions.

Chapter 2: Literature Review

Introduction

The current era of prioritized actions and funding for emergency preparedness and disaster response is based on reaction to several recent catastrophic incidents. Most notably, the 9/11 attacks served as a national catalyst for funding and action to strengthen systems of prevention, mitigation, response, and recovery (DHS, 2002, 2003a). This call to action was directed at all public and governmental agencies, nonprofit organizations, and private industries that have an assumed or assigned role in disaster response. Following 9/11, the primary focus was strengthening the local and regional response communication and coordination between different public safety and first responder actors and agencies. Four years later, the hurricane season of 2005 highlighted the disaster response vulnerabilities within the health care industry and illustrated the continued gaps in local and regional response communication and coordination.

The lessons of the 2005 hurricane season reframed the federal expectations for health care preparedness goals as defined by grant funding deliverables. The funding and deliverables shifted from organization-level systems of communication and response to regional systems for communication and coordination. During the next several years, funding directives were expanded to include regional plans for preparedness. Federal funds currently provided to state health agencies and health care organizations through formula-based grants now require health care coalitions to be established as the structure for coordination of regional health care system emergency preparedness and disaster response (HHS-ASPR, 2012a, 2012b). The requirement for coalitions as a mechanism for

regional health care disaster coordination is not based on scholarly practice and established studies, but rather has been introduced following the failed regional coordination of the 2005 hurricane season, most notably the New Orleans health care system response to Hurricane Katrina (HHS, 2009).

To date, no empirical evidence has indicated that formalized healthcare coalitions have demonstrated significant results in emergency preparedness and disaster response either in an exercise or real-world incident. With only a few exceptions, the scholarly literature available for this field of inquiry is limited to practice-based or case studies and primarily focus on coalitions in large metropolitan statistical areas, with generalized statements and conclusions (Carrier, Yee, Cross, & Samuel, 2012; Fillmore et al., 2010; Grieb & Clark, 2008; McHugh, Staiti, & Felland, 2004; Rambhia et al., 2012; Robinson, Berrett, & Stone, 2006; Stoto, 2008).

The published literature include retrospective, descriptive accounts of the processes implemented to share information and facilitate preplanning of resource and response coordination or a cursory assessment of alignment between funding and activities. Only two articles include limited information about health care regional planning or response in nonurban areas, demonstrating the absence of information about a substantial demographic sector (Fillmore et al., 2010; Stoto, 2008). A few studies describe real-world incidents and retrospective assessment of communication, coordination, and collaboration, thus providing context for the presumed purpose of health care coalitions (Fillmore et al., 2010; Robinson et al, 2006). Two publications focus on regional coordination among local public health agencies in Massachusetts,

describing the outcomes and challenges experienced while embarking on regional planning (Grieb & Clark, 2008; Stoto, 2008). Most specific searches focused on health care coalitions produce very limited literature results.

The absence of scholarly literature demonstrating alignment of a theoretical basis and implemented strategies to coordinate regional preparedness and response among various health care organizations supported the need for this study. Stoto (2008) effectively recognized the current scholarly deficit with a recommendation for further research to determine (a) whether regionalization results in positive outcomes; (b) what models of regionalization are more effective; and (c) how the environment or setting affects regionalization (p. 449). The gap in the literature about health care coalitions is notable, specifically concerning differences and efficacy based on urban or nonurban classification, weather-related risks, and defined preparedness and response roles. This lack of scholarly evidence for an effective approach may be resulting in negative outcomes: The requirement to expend resources to develop a regional health care preparedness and response system that is not based on research may be creating a less efficient and less effective system of preparedness and response among acute care hospitals.

This review of literature for this inquiry includes the theoretical framework, historical context, current public policy, leadership, regional coordination, and health and medical coordination as each relates to regional approaches to emergency preparedness and disaster response.

Literature Search Strategy

Literature specifically about health care coalitions is so new that limited scholarly sources are available. Therefore, the literature search strategy was expanded to include regional coordination or coalition development for emergency management within government jurisdictions and intergovernmental jurisdictions including county or parish officials, public safety, and first responders. This search yielded many scholarly practice articles and several studies that align with the concept and purpose of health care coalitions for emergency preparedness and disaster response. Therefore, the literature included in this review expands from health care coalitions to broader regional coordination and coalition development for emergency preparedness and disaster response.

Numerous and varied library databases and search engines including Academic Search Complete, Business Source Complete, Google Scholar, Homeland Security Digital Library, Military and Government Collection, Political Science Complete with the Sage full-text collection, and ProQuest Central were used to collect an exhaustive list of scholarly resources. The field of emergency preparedness literature published prior to 2001 is derived primarily from government documents, select articles, and books focused on government structures and systems. These sources provide the historical context for the evolution of emergency preparedness in this country. Despite this evolution through the 1900s, scholarly literature was sparse until the early 2000s, and many of the published articles were and continue to be practice focused versus research focused.

The theoretical literature was gathered from business, political science, and social science databases and search engines including Business Source Complete, Google Scholar, and Political Science Complete with the Sage full-text collection. The key words used for this search included *social+network+theory* and *community, health, disaster, or emergency*. *Disaster* and *emergency* did not reveal any scholarly articles. Also, after reading several articles, I identified specific authors; textbooks from these scholars were obtained to broaden and deepen knowledge about social network theory. Searches for the historical context of emergency management and emergency management public policy were obtained from federal websites and search engines including Academic Search Complete, Google Scholar, Homeland Security Digital Library, and Political Science Complete with the Sage full-text collection. The key search words, including *disaster+policy* and *federal or government* and *fires, floods, hurricanes, or earthquakes*, were selected based on knowledge of disasters in the 1900s that precipitated policy development. The searches required careful selection of years to ensure appropriate focus. For historical context, all searches eliminated any publications after 2000; for policy searches, dates were segmented to evaluate policies pre- and post-9/11. Two introductory collegiate-level textbooks also were read for background and historical context.

Searches directly focused on health care coalitions included topics about communication and coordination in real-world incidents, regional emergency management, and health care coalitions. The results pertaining to communication and coordination following real-world incidents were daunting. There are numerous scholarly

articles that dissect federal, state, and local jurisdictional communication and coordination following the 9/11 and Katrina disasters. It was necessary to read through official reports and literature to seek the context and premise for regional health care coalitions as a mechanism for communication and coordination during response. In addition, it was necessary to review leadership and management articles describing various leadership styles that revealed effective communication and coordination strategies for emergency management. Searches for the emergency management examples in leadership, communication, and coordination were obtained from federal websites and the Academic Search Complete, Business Complete, Google Scholar, and Political Science Complete with the Sage full-text collection search engines. Key search words including *disaster+leadership; disaster+communication, disaster+coordination; and Katrina, hurricanes, 9/11, communities, jurisdictions, or emergencies* were selected. Searches for regional coordination in emergency management and health care coalitions for emergency preparedness and disaster response required careful selection of engines and key words, as the scholarly work is more limited as compared to the other broader topics. Searches for regional emergency management and health care coalitions were conducted in the Academic Search Complete, Google Scholar, Homeland Security Digital Library, Military and Government Collection, Political Science Complete with the Sage full-text collection, and ProQuest Central search engines. Because of the new, emerging focus on regional, interjurisdictional coordination and the development of health care coalitions, publications began in approximately 2005 but rapidly became more prevalent; therefore, it was important to seek recent dissertations using ProQuest

Central. The key search words included *disaster* or *emergency+coordination* and *regional, health, medical, public health, coalition, jurisdiction*; it was not effective to include *health+emergency*, as this combination resulted in volumes of care delivery protocols and clinical studies centered on the emergency department of a hospital.

Theoretical Foundation

This study was conducted to examine the roles and responsibilities accepted among organizations in health care coalitions in both urban and nonurban settings and dependent on other factors including prior disasters. It was essential to understand the theoretical basis for organizations voluntarily aligning with other entities that likely have different missions and priorities and perhaps are competitors. The voluntary nature of health care coalitions presumes both an altruistic and safety premise for an incident that may not occur; therefore, it was important to understand the theory-based motive for engagement. Social network theory provided an appropriate foundation.

Social network theory indicates that a set of actors representing themselves, an organization, or a homophilic community develops interdependent structures and relations for mutually beneficial and/or collective good broadly categorized as efficiency, effectiveness, influence, and information (Carpenter et al., 2012, p. 1329; Coleman, 1988, p. S96; Katz et al., 2004, p. 308; Marwell et al., 1988, p. 502; Wasserman & Faust, 1994, p. 10). The interdependency for benefit aligns with the axioms of inputs and outputs and reflects a presumption that actors want to minimize input and maximize output (Samuelson, 1954, p. 387). Social network theory has roots in public goods theory and includes two key constructs: the ability to leverage and mobilize collective action and the

universal right to benefit, regardless of individual contribution (Katz et al., 2004, p. 315). In addition to public goods theory, social network theory derives from the culmination of varied disciplines including economics, mathematics, engineering, political science, anthropology, and sociology (Coleman, 1988, pp. S116-S118; Katz et al., 2004, p. 318; Putnam, 1995, p. 66; Scott, 2013, p. 11; Wasserman & Faust, 1994, p. 17). The alignment among these disciplines results in a theoretical foundation of connectivity among actors: the motivation, structure, mechanics, costs, and benefits of group alignment for collective good. It is a precise theoretical and analytical method of studying social relationships.

The actors are referred to as nodes to illustrate a single unit in the network and are connected, or linked to one another, by ties that vary in purpose, strength, and direction (Carpenter et al., 2012, p. 1329; Katz et al., 2004, p. 308; Wasserman & Faust, 1994, p. 18; Wellman & Berkowitz, 1988, p. 87). In early theoretical application, a node was most likely an individual in a family or work-related group. However, organizations as nodes are emerging as another layer of social network theory application. Such application currently is being studied in similar fields such as humanitarian partnerships (Zhao, Yen, Ngamassi, Maitland, & Tapia, 2011). The concept of a network approach among organizational nodes depicts health care coalitions as a network. The most basic nodal tie studied is the dyadic tie, a linkage between two nodes; triads are linkages among three nodes (Carpenter et al., 2012, pp. 1336-1340; Wasserman & Faust, 1994, pp. 18-19). The various configurations among the dyadic and triadic ties form various subgroups,

clusters, and cliques within the network, all affecting the social relationships within, among, and between nodes and networks.

In this current era, studies of social network theory have been further refined to explore whether networks are a cause or a consequence and to study various units of analysis including interpersonal versus interorganizational versus intergroup ties as well as internal versus external ties, thus supporting application for health care coalitions (Carpenter et al., 2012, p. 1329). Dyadic ties have further been examined to determine directional patterns and the underlying basis for the tie including communication; formality or relationships; resource and work flow; proximity; and knowledge (Katz et al., 2004, p. 308). The mechanisms of dyadic ties are relevant to the study of health care coalition structure and communication patterns. There currently are two common classifications for social network theory: *Social capital research* examines the outcomes and consequences of networks, and *network development research* focuses on the formation and structural changes of networks (Carpenter et al., 2012, p. 1330). Both areas of focus are dependent on embedded nodes, connectivity, and purpose, and both social capital and network development research are relevant for health care coalitions.

The network paradigm was adopted by social sciences and revitalized in the 1990s with a broader focus on social capital as a motive and benefit for social networks. The construct of social capital as a motive was modeled after other theories and paradigms including self-interest, social exchange or dependency, mutual or collective interest, cognitive, and homophily (Coleman, 1988, pp. S96, S116; Katz et al., 2004, pp. 312-319; Marwell et al., 1988, p. 504; Marwell & Oliver, as cited by Katz et al., 2004;

Putnam, 1995, p. 67). Social capital indicates mutual interest and potential benefit from coordination and cooperation and establishes a premise that the investment of social connectivity will provide a valuable and expected return or outcome; intellectual unity is an example of the principle of generalized reciprocity (Coleman, 1988, p. S101; Lin, 1999, p. 30; Putnam, 2000, p. 135). It is important to note that social capital in a network conveys the notion of “doing with” rather than “doing for,” which is a different act connoting altruism (Putnam, 2000, p. 117). Social capital provides the rationale for nodes to engage in social networks; specifically, (a) embeddedness within the network, (b) the relationships between nodes, (c) the interdependence of nodes, (d) the flow of information and resources between and among nodes, and (e) the vague boundaries between and among nodes (Katz et al., 2004, pp. 311-312; Wellman & Berkowitz, 1988, pp. 99-117). The return from investment, or outcome, is based on trust and obligation and is classified into three categories: (a) access to information or resources, (b) ability to influence other agents, and (c) credibility or depth of resources through association, or power (Coleman, 1988, p. S102; Lin, 1999, p. 30; Lin, 2005, p. 5). Social capital creates capacity and thus reinforces the notion of collective wisdom and collective good and demonstrates the utility of social network application for health care coalitions.

Social network research focuses on the formation and structure of the network rather than the outcomes (Carpenter et al., 2012, p. 1330). *Dyadic ties* vary in strength among nodes in a network structure. *Binding ties* are strong, intimate dyadic ties characterized by high levels of trust; *bonding ties* are respectful and based on mutual reciprocity; and *belonging ties* denote shared membership and identity (Lin, 2005, p. 12).

The varied strength of ties among nodes produces different outcomes for the network. Binding ties help maintain and protect current capacity of resources and information within an established network and may involve nodes with strong local centrality or a large number of contacts within the immediate network environment (Lin, 2005, p. 12; Scott, 2013, p. 83). However, weaker belonging ties have the ability to serve as bridges to other social networks that provide access to additional capacity of information and resources and may provide strong global significance within the overall network and connectivity to other networks (Granovetter, 1983, p. 202; Scott, 2013, p. 83). Strong, dense dyadic ties are considered effective to preserve and maintain ties and resources, while weaker ties serve as bridges that extend information and resources beyond the intimate network to establish intergroup connectivity, serving as a vehicle for cooperation among various organizations and other group-based networks (Granovetter, 1983, p. 224). It is critical that social networks maintain varied dyadic ties to maintain internal trust and capacity as well as seeking new capacity. Evaluation of the number and type of dyadic ties in health care coalitions in various settings that have demonstrated positive outcomes, either in planning or real-world response, would provide useful information about the structure and roles of health care coalitions.

During the past fifteen years, social network theory has emerged as a conceptual framework for regional emergency preparedness as noted in several practice articles and studies. One researcher, Kapucu and colleagues, has studied network centered approaches to jurisdictional emergency management. The research led by Kapucu (2006, 2010) included retrospective, in-depth content analysis studies of formal and informal

communication among public and private responders during the immediate response and recovery for the 9/11 and Katrina disasters tracing network centered approaches and boundaries among agencies. These two studies provided a foundation for additional research in four metropolitan Florida counties that analyzed relational data about jurisdictional emergency management social networks (Kapucu & Garayev, 2012). The groundbreaking work of Kapucu (2006, 2010, 2012) was focused primarily on governmental nodes providing a foundation on which research was conducted about health care coalitions as emergency planning and disaster responding entities. The concepts and constructs of social network theory intuitively aligned with those of health care coalitions. In this study, I further examined the application of social network theory as the architecture for health care coalitions.

The research questions directed the focus of this study predominantly on network development research rather than social capital. However, a premise that agents presume social capital produces beneficial outcomes in a social network was an assumption of this study. Specifically, established trust and reciprocity facilitated access to information and resources that resulted in increased efficiency and effectiveness in preparedness and response and thus provided agents motivation for network participation (Carpenter et al., 2012, p. 1332; Coleman, 1988, pp. S97-S101; Katz, 2004, p. 311; Lin, 1999, p. 30; Lin, 2005, p. 4; Putnam, 1995, p. 67; Wellman & Berkowitz, 1988, p. 153). The study did not include analysis of the attributional or ideational data, which would further examine social capital including attitudes, opinions, or motives for nodes to engage in coalition

development (Scott, 2013, p. 3). Therefore, although network development research was the focus of my study, the assumed attributes of social capital provided context.

The data collected through this study were the basis for quantitative analysis of the relational ties including contacts, roles, and network formalization (Scott, 2013, p. 3). The relational ties were examined based on (a) the number of nodes within each network and the number of roles and responsibilities accepted within the network; (b) whether previous real-world, weather-related disasters affected the number of roles within a network; and, (c) the difference in roles between urban and nonurban networks. The premise of this study was that health care coalitions resembled social networks comprised of interorganizational nodes with external dyadic ties between organizations, within subgroups, and within the whole network which derive from a need to share intellect and resources through formal and informal structures (Carpenter et al., 2012, p. 1330; Katz et al., 2004, pp. 320-321). Putnam's definition of *social capital* describes an assumption promoted through the funders and policy makers requiring the formation of regional health care coalitions, "social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (1995, p. 67). The findings from this study introduced empirical knowledge quantifying relational data within health care coalitions based on the constructs of social network theory.

Literature Review: Health Care Coalitions

The literature review for this study was organized by chronology and area of focus. It was imperative to establish the historical context of emergency management and disaster response policy to understand the evolutionary development of health care

coalitions. Equally important was the review of real-world incidents and how the successes and failures of those disaster responses have shaped policy. A thorough review of current policy guidance provided the context for the development and expansion of regionalized approaches to emergency management, including a new focus on regional health care coordination. The sections in this literature review include, in order: historical context; communication and coordination; current public policy; and regional approaches to emergency management.

Historical Context

The responsibility to ensure the safety and health of the public are assigned to state government actors as noted in the Tenth Amendment of the U.S. Constitution (as cited by Haddow, Bullock, & Coppola, 2011, p. 30; U.S. Const. amend. X). Despite this charter the roles, responsibility, and strategic approach to protecting people and infrastructure have been ambiguous and have evolved throughout U.S. history. The leadership of emergency management has shifted gradually from a traditional, bureaucratic top-down approach, to a dynamic and flexible structure with leadership originating at the individual and local level (Waugh & Streib, 2006, p. 131). Throughout this evolution the central tenet of coordination was evident among local, state and federal actors representing public and private entities.

Although emergency management may be considered a relatively new field of study and practice historical review reveals that federal government first intervened in 1804 through congressional action to provide financial support to the jurisdiction of Portsmouth, New Hampshire following a fire which destroyed 132 buildings (Canton,

2007, p. 19). Disasters including the 1906 San Francisco earthquake; the 1918 influenza pandemic; droughts; and flooding during the 1930s resulted in federally legislated acts, federal recovery funding, and federal stimulus funding for flood control during the Depression (Canton, 2007, p. 19; Haddow et al., 2011, p. 2). This era was followed by the 1950 passage of two bills: (1) the Federal Disaster Act formally defined the federal government's role in domestic disaster relief, and (2) the Civil Defense Act formally defined the role of local government in preparing for disasters (Canton, 2007, pp 20-21; Morris, 2006, p. 285).

Weather patterns during the 1960s triggered several severe, prolonged, and widespread floods, which prompted the establishment of the National Flood Insurance Program (NFIP) to ensure financial protection and relief for victims of a flood-related disaster (Haddow et al., 2011). The flooding was followed by several seasons of severe wildfires during the early 1970s. The severity and short time span of the floods in the late 1960s and wildfires in the 1970s prompted national attention on emergency management and the need to coordinate and communicate response among various responders and actors at the local and regional levels (Haddow et al., 2011, pp. 5, 175, Waugh & Streib, 2006, p. 132). Specifically, the inability to organize, communicate and coordinate response among firefighters from different U.S. jurisdictions during the southern California wildfires was identified as a risk to responder safety and a hindrance to effective response. The recognition that there was not a method of coordination prompted the U.S. Fire Marshalls to develop the incident command system (ICS) to standardized response objectives and actions among discrete responders (Haddow et al., 2011, p. 175).

As defined by the U.S. Constitution, the responsibility for public safety and health was a state-level responsibility (United States of America, 1787); however, the fragmentation among states in large-scale response was evident following the floods and fires. The “fragmentation of operations, the lack of connection to state policy, and the lack of an integrated national policy or strategy” (Canton, 2007, p. 23) prompted a report and call-to-action from the National Governors Association (NGA) to align emergency management within one federal government agency (Haddow et al., 2011, p. 7). The pressure from the NGA and identification of gaps in coordination prompted policy changes and the 1978 formation of the FEMA under President Carter’s administration (Canton, 2007, p. 22; Executive Order 12127, 44 FR 19367, 3 CFR; Comp, 1979, p. 376 as cited by Haddow et al., 2011, p. 7; Morris, 2006, p. 285). The goal of this singular emergency management agency was delineated in the reorganization plan to “consolidate emergency preparedness, mitigation, and response activities” and for the director to be accountable directly to the president (Haddow et al., 2011, p. 6). This began a new era for emergency management.

During the next decade the singular federal agency administrative responsibility for emergency preparedness and response developed slowly. The agency received legislative support for alignment in 1988, with an amendment to the Stafford Act merging civil defense duties with disaster relief, thereby creating an opportunity for alignment of purpose and mission (Canton, 2007, p. 22).

In 1992, the Federal Response Plan (FRP) was created to advance emergency management and coordinate the response of federal agencies and the American Red

Cross; this was the first effort to coordinate federal agencies among themselves and with state and local agencies (Haddow et al., 2011, p. 182). Twelve Emergency Support Function (ESF) annexes, including public health, were deemed critical operational sectors for effective response to any intentional or unintentional incident and were included within the FRP.

The historical review demonstrates that the federal government assumed leadership for disaster management despite constitutional direction for state level authority. Federal guidance documents were developed to establish the architecture for a national strategy that was based on local and regional coordination yet was dominated by federal roles. Examination of the federal guidance as a network structure revealed the application of a relational network as a construct of social network theory provided confirmation of the complexity of the expected structure proposed in the national planning documents (Kapucu, 2009). The national framework was designed to coordinate planning, response, recovery, and mitigation among private, public, nongovernmental, and government agencies at the local, state, and federal levels.

Communication and Coordination

Connection among actors may be described at four levels, often presumed to have increasing dependence from the most basic to the most complex level of connection. The four levels are identified as communication, cooperation, coordination, and collaboration (Jankowski & Nyerges, 2001, p. 49). At the most fundamental level people communicate to exchange information (Jankowski & Nyerges, 2001, p. 49). Cooperation requires establishing a set of ideas (Jankowski & Nyerges, 2001, p. 49). Coordination begins to

describe social capital as it establishes among two or more actors a sequence of coordinated activities for “mutual, synergistic gain” (Jankowski & Nyerges, 2001, p. 49). Finally, collaboration suggests different actors working on the same task concurrently (Jankowski & Nyerges, 2001, p. 49). The gaps identified in real-world disaster response typically are labeled and accurately depict the levels of communication and coordination.

Among those that respond to or evaluate disaster response, failure of communication is universally the most common problem identified. Failures in communication often are the cause attributed to failures in response coordination. Retrospective review of perceived communication and coordination failures among public and private actors during catastrophic disasters often is focused primarily on response of government actors at the local, regional, state, and federal levels (U.S. Bipartisan Committee, 109th Congress, 2006; U.S. Government Accountability Office, 2006a, 2006b; U.S. National Commission on Terrorism Attacks Upon the United States, 2004; U.S. Senate, 109th Congress, 2006; Waugh & Streib, 2006). Many criticisms about a lack of effective and efficient disaster response were based on a lack of communication and coordination during the response among the responsible government agencies and nonprofit and private organizations. These criticisms likely provided the rationale for increased requirements for regional coordination among responsible entities including the health care industry.

The 9/11 Commission Report is widely disseminated government document that described the political environment, and evidence of existing and escalating threats that foretold that specific attack, as well as, a thorough assessment of the response including

well intended response actions and clear omissions of communication and coordination (U.S. National Commission on Terrorism Attacks Upon the United States, 2004). The Commission attributed the 9/11 attacks with identifying four failures in emergency preparedness and response including imagination, policy, capabilities, and management (United States, National Commission on Terrorism Attacks upon the United States, 2004, p. 339). The gaps in communication and coordination were summarized in a recommendation to aggregate information for use in assigning responsibilities and planning for joint operational response involving disparate organizations that included all federal agencies with some role in protecting U.S. citizens at home and abroad (U.S. National Commission on Terrorism Attacks Upon the United States, 2004, p. 357). Among the 40 recommendations included in the report, most were focused on U.S. strategies to confront terrorism on the global stage. However, several domestic recommendations also were focused on command, control, and communication including the recommendation for national adoption of ICS (U.S. National Commission on Terrorism Attacks Upon the United States, 2004, p. 397). The recommendations for coordinated communication at the local, state, and federal regions and including nongovernmental entities established the expectation for regional communication and coordination in all phases of emergency management including preparedness, response, recovery, and mitigation.

Four years after 9/11 and the global focus on terrorism a weather-related disaster illustrated our domestic vulnerability. An omission of communication and coordination at the local, regional, state, and federal levels and among government, public, and private

entities attributed to as many as 1,800 deaths during the 2005 hurricane season, specifically during the Hurricane Katrina (Katrina) response (Haddow et al., 2011 p. 19; U.S. Bipartisan Committee, 109th Congress, 2006, p. 7; U.S. Senate, 109th Congress, 2006, p. 2). Official assessments of the Katrina response centered on the critical need for more effective integration of nongovernmental organizations into the local, state, and federal response system to ensure a coordinated national response (Townsend, 2006; Townsend, as cited by Waugh & Streib, 2006, p. 138; U.S. Senate, 109th Congress, 2006, p. 2). This assessment included the lack of planning, systems, and processes for communication and ineffective coordination among health and medical facilities with response teams that resulted in increased trauma and loss of life (U.S. Bipartisan Committee, 109th Congress, 2006, p. 4). Regional coordination among public and private entities was a central theme in the failures and subsequent recommendations following the 2005 hurricane season; it was the catalyst for health care coalitions. It was from this disaster that the national dialogue for coalitions began to emerge. Very specific recommendations to strengthen the regional health care system for care of vulnerable populations and emergency preparedness and response were suggested as means to increase resiliency for the entire health care system (the Health and Social Services Committee of the New Orleans Commission as cited by Rodriguez & Aquirre, 2006, p. 21). Questions were raised about how to strengthen local and regional response; specifically, the Government Accountability Office (GAO) posed the question “to what extent and how should the federal government encourage and foster a role for regional or

multistate entities in emergency planning and response” (GAO, 2006, p. 5). The need for regional coordination was evident; however, the approach and structure were not.

Highlighting aspects of leadership failure during these two recent catastrophic disasters provided context for review of theoretical models and historical incidents that were conducted to outline principles of coordination for emergency preparedness and disaster response that included networking, political, and leadership competencies (Kapucu & Van Wart, 2008, p. 714). Specific leadership characteristics and skills including decisiveness, flexibility, communication, problem solving, planning, organizing personnel, and managing teams directly aligned with emergency preparedness and disaster response (Kapucu & Van Wart, 2008, pp. 715-716). Leadership also required organizational capacity including the ability to scan the environment, plan strategically, network, partner, and make decisions; these competencies were associated with skills required for effective emergency preparedness and disaster response (Kapucu & Van Wart, 2008, pp. 715-716). The focus on leadership failures and competencies directly related to the identified need of increased communication and coordination among various actors during planning and response. However, a paradox exists. Waugh and Streib (2006) explored the transformation of management from tactical and operational command to a field that also now included strategic leadership and presented the paradox of a field of practice that requires “meticulous organization and planning, but on the other hand, it is spontaneous” (p. 132). The establishment of rigid systems that allow for flexible, scalable adaption for unknown variables during a time of crisis and chaos has challenged even highly effective leaders. This paradox highlights the complexity of

communication and coordination requirements of disparate entities and thus reiterates the notion that policy makers perpetuate coalitions as the solution.

Current Public Policy

After 9/11, a score of presidential and policy declarations were issued authorizing new systems of preparedness and response be developed and implemented among all responding government, public and private entities, and citizens. This new focus on national security and emergency preparedness has resulted in development and revision of numerous guidance documents. Homeland Security President Directive 5 (HSPD-5) was signed in early 2003 and served as the directive to revise the FRP and replace it with a broader National Response Plan (NRP) and develop the National Incident Management System (NIMS) building on the system established with ICS (DHS, 2003; Haddow, 2012, p. 183). The newly formed DHS, authorized through Homeland Security Presidential Directive 3 (HSPD-3), was indoctrinated as the lead agency for the NRP and overall emergency management (DHS, 2002; Haddow, 2012, p. 183). The NRP had as its primary focus the coordination of federal government agency response during disasters. Following the 2005 hurricane season, the NRP was replaced in 2008 with the National Response Framework (NRF) to reflect coordination with state, local, tribal, and territory actors and private organizations to develop a national system of disaster response (DHS, 2008b; Haddow, 2012, p. 183). In May 2013, the NRF was revised and reorganized into a broader set of National Planning Frameworks that maintained much of the same content but formalized the 15 Emergency Support Functions (ESFs) and incorporated the whole community as a tenet of the national plan (FEMA, 2013b). The frequent revisions of the

overarching national plan between 2003 and 2013 reflect the evolution of thought and policy based on information obtained through real-world incidents.

The NIMS was revised and updated 11 months after the NRF to expand the ICS. The NIMS, also directed by the HSPD-5, provided the template for a flexible, scalable, and standardized approach to preparedness; communications and information management; resource management; command and management; and ongoing management and maintenance of preparedness and response systems (DHS, 2008c, pp. 7-8). NIMS was developed to ensure that any incident regardless of complexity or cause will be managed based on a standardized command structure allowing responders that have not previously planned together the ability to coordinate an effective response. This system became a requirement of all federal agencies likely to prepare for and respond to disasters, including public health agencies. In addition, adoption of NIMS was a requirement for any organization receiving federal grant funds. Public and private health care organizations were included in this new requirement.

The NIMS continues to provide very specific structure for managing a scalable response including incident command, coordination among multiple agencies, and dissemination of information to the public (DHS, 2008c, pp. 7-8). The concepts for incident command were based on established operational principles such as managing by objectives during defined operational periods and maintaining a focused span of control of three to seven personnel whom reported to only one leader to ensure unity of command (DHS, 2008c, pp. 47-48). The role and responsibilities developed under the ICS structure are very specific and include designated command staff including officers

responsible for public information, safety, and serving as liaison with other response entities (DHS, 2008c, p. 53). In addition to a single incident commander and command staff, general staff are divided among the functions of operations, planning, logistics, and finance (DHS, 2008c, p. 53). The NIMS also provides the structure to coordinate response and public information among multiple entities. For example, multiple local jurisdictions are able to use ICS and multiagency coordination systems to respond to a weather-related incident involving multiple counties.

Also in 2003, the eighth Homeland Security Presidential Directive (HSPD-8) was signed as a companion to HSPD-5 and required development of an all-hazards, national preparedness goal intended to outline federal preparedness objectives and coordinate federal response with state and local government officials (DHS, 2003). This directive resulted in an interim goal, released in 2005, followed by the National Preparedness Guidelines in 2007 (DHS, 2003).

Following Katrina, in 2007, Homeland Security Presidential Directive–21 (HSPD-21) was signed; this directive authorized development of a national strategy for public health and medical preparedness (DHS, 2007). Among the five key principles of the directive two specifically were focused on regional coordination for health system preparedness requiring engagement of the private sector as well as the contribution of academia to increase scholarly contributions to this field (DHS, 2007, p. 2). The National Health Security Strategy (NHSS) was released in 2009 and identified a lack of coordination among government, communities, public health, and the public and private medical systems as a critical area of improvement (HHS, 2009). The NHSS included two

goals: community resilience and a strengthened health and emergency response system that could be sustained through adoption of an all-hazards, systems-based approach to preparedness and response (HHS, 2009, p. 4). To achieve these goals, ten strategic objectives were developed including the requirement to develop tiered, integrated, and flexible health care delivery systems that scale response as needed for incremental or sudden onset incidents (HHS, 2009, p. 10). Inherent in the NHSS was the expectation for increased coordination among public and private entities responsible for health care system preparedness and response.

Description of current public policy also provided context for the development of health care coalitions in this field. The Presidential Policy Directive – 8 (PPD-8), signed in 2011, outlined the federal plan to enhance national resilience through development of a capability-based systematic approach and cycle for preparedness, response, recovery, and mitigation focused on all-hazards (DHS, 2011). PPD-8 also emphasizes the need for coordination among multilevel jurisdictional government agencies, citizens, and private and nonprofit sectors to strengthen whole community preparedness, response, recovery, and resilience.

The various national planning frameworks and strategy documents provided the architecture but not the operational guidance necessary to standardize the approach for local plan development. Two guidance documents, the Comprehensive Preparedness Guide 101 (CPG-101), version 2.0 and the Comprehensive Preparedness Guide 201 were issued to provide a template and sequenced tasks for preparedness planning. The CPG-101 was released in 2010 and introduced the construct of whole community planning for

individuals and public and private organizations introduced in PPD-8 (DHS, 2011b). The CPG-101 was followed in 2012 by the Threat and Hazard Identification and Risk Assessment Guide: Comprehensive Preparedness Guide 201 (CPG-201), which provided a systematic and coordinated approach for identifying threats and assessing risks for any community, regardless of size, location, or characteristics (DHS, 2012).

These ever-changing federal documents have provided the architecture for a coordinated national response among public and private entities, including the health care system. These documents were intended to serve as complimentary, not, stand-alone guides for emergency preparedness planning and response. The requirement to coordinate preparedness and response efforts among disparate entities in all communities for all hazards necessitates interorganizational alignment of roles and responsibilities as well as the ability to communicate strategically, operationally, and tactically during disaster response. The requirement for a complex interconnected system connotes the rationale for adoption of social networks; health care coalitions may provide the structure appropriate to align all health care actors.

Regional Coordination

As previously described, scholarly literature and research addressing regional coordination of emergency preparedness and disaster response were sparse. Therefore, it was important to review the descriptive and case studies that have been shared among professionals and peers to gain understanding about existing practices to discern the need for additional research. Further, it is difficult to conduct empirical research during a real-

world disaster because of ethical and practical challenges. Consequently, simulation is an effective method of assessing communication, coordination and response.

Simulated disasters conducted as exercises among responders have served as a proxy for practice-based evaluation of preparedness plans. For example, a simulated tornado-response was conducted among representatives from 21 different agencies including county government, fire, police, hospital, public health, the American Red Cross, utility companies, and transportation services likely to be involved in a real-world disaster (Militello, Patterson, Wears, & Ritter, 2005, p. 534). Data were collected from observers, participant surveys, and a debriefing session following the exercise (Militello et al., 2005, p. 536.). Three themes were identified as potential barriers to effective communication and coordination among the actors: (a) asymmetrical flow of information and incomplete information flow; (b) work groups segmented along natural relationships and industries; and, (c) ambiguous roles and functions (Militello et al., 2005, pp. 537-538). This exercise reiterated common themes of inadequate communication and coordination among response entities that also were reported following most real-world incidents and supported the premise for federal requirements for health care coalitions.

Throughout the review of literature about government and public-private emergency management coordination a few studies have utilized content analysis to dissect interagency communication patterns during real-world incidents. A mixed methods study analyzed information from the days following 9/11 from: the *New York Times* (NYT) from September 12 through October 18, 2001; situation reports from FEMA from September 13 through October 4, 2001; and situation reports from the HHS from

September 13 and October 4, 2001 (Kapucu, 2006). A total of 1,607 organizations including 77 international, 1,176 nonprofit domestic, 149 private domestic, and 73 federal agencies were involved in the 9/11 response (Kapucu, 2006, p. 213). The content analysis revealed there was inadequate flow of critical and accurate information during the response (Kapucu, 2006, p. 221). The conclusions of the analysis focused on the need to expand boundaries of networks beyond organizational and jurisdictional emergency preparedness planning prior to disaster response (Kapucu, 2006, p. 221).

Kapucu followed the 9/11 study with a similar methodology to evaluate the network centered approach during Hurricanes Katrina and Rita (Kapucu et al., 2010). A content analysis of news reports from June 1, 2005 through February 28, 2006, official government documents, and after action reports was conducted to determine: (a) how intergovernmental and interorganizational networks functioned during response; (b) the effectiveness of the networks; (c) if the networks may be utilized for coordination during disasters; and, (d) what lessons can be learned (Kapucu et al., 2010, pp. 224-225, 230). The complex hurricane response involved 580 organizations of which 79 were nonprofit, 92 were private, and 409 were government entities (Kapucu et al., 2010, p. 232). Analysis included measures of centrality and clustering among subnetworks to determine critical and effective communication networks and revealed the agency with the highest degree of centrality was the Florida State Emergency Response Team and the lowest degree of centrality was the State of Louisiana (Kapucu et al., 2010, pp. 232-235). The conclusion noted additional resources and emphasis should be provided to support local and regional coordination as it was deemed more efficient and effective than the federal coordination

of response during Hurricanes Katrina and Rita (Kapucu et al., 2010, pp. 222, 240).

Kapucu's research to examine network centered approaches does not specifically identify social network theory as the study lens but aligns with the theoretical constructs of relational ties thus supporting the use of social network theory in my study.

Following this emerging theme of intergovernmental and public-private regional coordination, two researchers conducted a series of studies examining jurisdictional coordination in Florida. A survey study of local governments and first responders was conducted in 2005 to examine the "degree to which perceived vulnerabilities (risks), regional emergency management organizational structures, and intergovernmental cooperation and disaster preparedness are intertwined at the local level (first responder level)" (Caruson & MacManus, 2008, p. 287). The topics for examination included local budgetary pressures of emergency management; local fiscal needs; federal and state grant funding; intergovernmental emergency management structure; and regional emergency preparedness coordination (Caruson & MacManus, 2008, p. 294). Four hundred, seventy-four surveys were sent to county and city government officials for a return rate of 46% (224 surveys) from city officials and 57% (38 surveys) from county officials (Caruson & MacManus, 2008, p. 294). The study confirmed a direct relationship between the magnitudes of disaster vulnerability within a geographic area and government officials' involving regional emergency preparedness (Caruson & MacManus, 2008, p. 299).

The researchers followed a similar survey of Florida city and county officials in spring 2007 to determine functional responsibility for emergency preparedness and collaboration within local government and with private-sector organizations (MacManus

& Caruson, 2011, pp. 283, 286). Among those that identified as first responders, the response rate was 44% for county officials and 37% for city officials (MacManus & Caruson, 2011, p. 283). Among those that did not identify themselves as first responders, the response rate was 21% for county officials and 16% for city officials (MacManus & Caruson, 2011, p. 283). The analysis of 460 surveys provided evidence that there were established networks for collaboration among Florida county and city officials including neighboring jurisdictions (92% for municipalities, 83% for counties) and private-sector partnerships with utility companies (92% for electric power companies, 90% for telephone providers) when the study was conducted (MacManus & Caruson, 2011, pp. 286-288). Health care facilities also were referenced as partners and included nursing homes and assisted living facilities (70%) and hospitals (63%) as health related entities (MacManus & Caruson, 2011, p. 288). The evidence presented by MacManus and Caruson demonstrated regional social networks occurred in Florida although the alignment to theory or real-world benefit of these relations was not quantifiable (MacManus & Caruson, 2011).

The literature focused on jurisdictional and public-private collaboration and networks established a foundation from which more limited research specifically focused on health care coalitions for emergency preparedness and disaster response may be reviewed. Two scholarly practice articles focused on the structure, variation, and experience of public health networks for public health preparedness (Grieb & Clark, 2008; Stoto, 2008). Although funding, governance, and provision of services are segmented into the smallest local jurisdictions, public health officials began establishing

networks for public health preparedness shortly after 9/11 (Stoto, 2008, p. 444). The results, as highlighted for the large metropolitan Boston region, included completion of an all-hazards plan; development of a regional emergency operations plan; established formal mutual aid; development of an inventory of regional resources; a dispensing plan for life-saving vaccines and medications; establishment of a regional Medical Reserve Corps to support response; and execution of a regional tabletop exercise to test specific plans during a pandemic flu outbreak (Grieb & Clark, 2008, pp. 457-458). Stoto then compared the initiatives in Massachusetts with three other established regional public health networks in Northern Illinois, Washington, DC, and Nebraska (2008, p. 444). The comparison with other regional networks aligned with the initiatives established in Massachusetts; there was rationale and intent to formalize regional preparedness structures through both formal governance and informal relationships and align the structures with geopolitical jurisdictions (Stoto, 2008, pp. 445-447). The conclusion from these articles was summarized by Stoto (2008) as a statement for effectiveness among these case studies but also a need for additional empirical studies to determine: (a) “does regionalization have a positive net impact on preparedness...; (b) are some versions of regionalization more effective than others for preparedness; and, (c) are some versions more effective ... (than others based on) different health department types, geographical areas, or settings” (Stoto, 2008, pp. 448-449). The studies conducted in Massachusetts established the foundation for further social network research about the constructs of social capital outcomes and social network structure for emergency preparedness and disaster response in health care systems.

The national increase in regionalization, as a method of effective emergency preparedness and disaster response, was supported by the HHS grant program for hospitals and health care system preparedness (Rambhia et al., 2012, p. 1). The Hospital Preparedness Program (HPP) began to establish health care coalitions as the foundation for health care system disaster readiness. General models were promoted although it was unclear what level of regional structures existed. A survey study of hospital personnel in charge of disaster preparedness was conducted by Rambhia et al. (2012, p. 2). The survey included a representative sample of all U.S. hospitals based on demographic data from the American Hospital Association; however, the survey response rate only was 10.3% (Rambhia et al., 2012, p. 2). The survey provided an assessment of current membership, governance, financial structures, and roles of established health care coalitions. The study analyzed the differences in characteristics between health care coalitions that identified roles in response as well as preparedness; no health care coalition identified a role in response without a role in preparedness (Rambhia et al., 2012, pp. 5-7). This study although limited by response rate did provide an initial assessment of the current movement to develop health care coalitions and was used in this study to examine the relational network ties of the identified health care coalitions.

The studies and literature reviewed provided the rationale and context for my research. The evolution of emergency preparedness has been led by federal policy and regulation often developed following identified gaps in real-world disaster responses. In this current era, 9/11 served as the primary catalyst for increased coordination and communication among government and public safety agents. The health and medical

response during Hurricane Katrina illuminated the lack of coordination among the various health care system actors. Both of these recent catastrophic disasters highlighted deficiencies in coordination among responders at the local, regional, state, and national levels. Practice patterns have changed to develop more regional systems of coordination, and research has been conducted to study the structures and outcomes of established networks as a method of increasing resiliency and improving response. Federal policy disseminated through guidance documents, grant requirements, and reports has promoted models for health care coalitions that were not based in evidence-based research. As a result, public and private resources have been allocated to establish structures that may worsen disaster response coordination efficiency and effectiveness. In addition to federal guidance and grant deliverables as drivers of change, weather-related disasters have been and continue to be the most frequent type of disasters; therefore, previous real-world disaster experience may promote formal coalition structure development among health care providers.

This research inquiry was conducted to examine health care coalitions that were organically formed prior to the release of formal coalition guidance in 2012. The coalitions were studied to compare the number and type of disciplines with the number of accepted roles and responsibilities within all health care coalitions and comparing disciplines and roles between urban and nonurban settings. In addition, one research question compared the accepted roles and disciplines represented based on prior real world weather-related disaster response.

Summary of Literature Review

The comprehensive literature review provided the theoretical foundation, historical context, and current public policy that establish the basis and catalyst for the recent trend in formal structures for regional coordination and communication among public safety and health care actors. The federal recommendations to increase regional coordination among various actors and entities presumed a foundation from which to strengthen effective and efficient response. The scholarly evidence supporting this policy trend is limited but has begun to emerge within government jurisdictions and among actors responsible for emergency preparedness and disaster response. Among those studies, social network theory has been the implied or a stated theoretical lens from which to examine existing regional structures. Recent studies in the field of humanitarian coordination and emergency management have begun to evaluate simulated, retrospective, or self-reported dyadic ties and established networks.

The early studies about emergency management served as a foundation from which to study regional health care coalitions largely responsible for similar coordination and communication objectives. These studies served as models from which this research examined the relational, dyadic ties, and social network structure among 474 hospitals that reported participation in health care coalitions in 2011 (Rambhia et al., 2012). The requirement for regional health care coalitions aligns conceptually with the social network theory constructs and thus warrants further examination.

This study was conducted to exam differences in relational network structures among hospitals from urban and nonurban settings, as well as examine the structural

differences based on response to a federally declared weather-related disaster since 2002. A survey of U.S. acute care hospitals in 2011 provided the data source from which quantitative analysis of health care coalitions using (a) number of disciplines serving as proxy for accepted roles, (b) prior real-world weather declarations, and, (c) community setting as the three independent variables; the number of conducted activities as proxy for responsibilities during disaster response as the dependent variable. Chapter 3 will more fully explain the proposed research methods.

Chapter 3: Research Method

Introduction

The analysis of this study established a baseline assessment of the coalitions that formed organically and prior to the federal coalition guidance released in 2012 by HHS. Also included in the study was a comparison of the accepted responsibilities of health care coalitions from geographic areas that have had a major, FEMA-declared weather-related disaster since 2001 with those hospitals that have not been directly involved in a FEMA-declared disaster. The inquiry was intended to differentiate participation, membership, and responsibilities among established health care coalitions in urban and nonurban communities in 2011. Adopting a pragmatic worldview, I examined the nodes and linkages within organic health care coalitions to better understand the relational network structures. A precise analysis of network structures provided deeper scholarly knowledge about interorganizational relationships formed for the intent of mitigating injury and death caused by a low-probability, high-risk disaster. Analysis of nodes and linkages among network structures was achieved through numerical counts and statistical procedures, and thus a quantitative research study was designed.

This chapter includes the following information used to establish the study design and methodology: the research design and rationale; the comprehensive explanation of the methodology; the threats to validity; and a summation of the research.

Research Design and Rationale

The study was designed to determine the differences between health care coalitions using the following independent variables: (a) urban versus nonurban

communities; (b) federal weather-related major emergency declaration between 2001 and August 2011; and (c) the number of disciplines, as a proxy for roles, represented in the health care coalition. The study also included the following control variables: (a) the percentage of acute care hospitals within the community setting that participate in the coalition; (b) the time period in which the coalition was formed; (c) types of disciplines serving as coalition members; (d) the formal or informal coalition structure; (e) whether the hospitals and coalitions participate in the HPP grant; (f) whether there is a jurisdictional requirement for the hospital to participate in the coalition; and, (g) whether the coalition leader is a hospital or public health representative. The dependent variable was the sum of conducted activities, which served as a proxy for responsibilities accepted by the health care coalition.

The quantitative research design was a secondary data analysis using nonexperimental survey information gathered in 2011 from emergency preparedness staff from acute care hospitals. In addition, the study design included new variable data from publicly available county-based federal disaster declarations of major weather-related disasters between September 2001 and August 2011. Use of this survey established a reliable foundation from a formative period of time for organic coalition development. These rich data contributed to scholarly knowledge from which further information may be studied and used to shape policy and social change.

The selection of a nonexperimental survey design established an understanding about the foundation of organic coalitions formed without direct mandate but instead from an identified need among the health care providers and other actors responsible for

emergency preparedness and disaster response within specific communities or regions. The value of understanding the characteristics and roles of coalitions that formed by choice, rather than by mandate, established context and depth and breadth of knowledge necessary to develop policies to support successful coalition structures. This research design also provided historical analysis of organically formed health care coalitions following 9/11 but preceding formal federal guidance issued in February 2012. The analysis contributed scholarly information and detail about the health care coalitions' characteristics necessary to answer the research questions about the number of accepted roles and responsibilities, differences between urban and nonurban coalitions, and the effect, if any, of real-world weather-related disasters and the formation of coalitions.

If there had been no resource constraints, this retrospective analysis would serve as a foundation on which primary survey research comparing coalition structures established based on the 2012 federal guidance could be conducted. Further, a qualitative component could have been added through focus groups to explore the characteristics, nuances, and perceived benefit of established coalitions. However, the study served as an effective means of establishing a theoretical foundation of coalition relational structures on which further studies may be conducted and policy may be developed. The design choice was appropriate to establish a foundation from which to advance scholarly knowledge.

Methodology

The target population studied was the emergency preparedness- and disaster-related health care coalitions in existence or formed between the attacks of 9/11 and

August 2011. Acute care hospital personnel responsible for emergency preparedness were the selected representatives of coalitions. At the time of the survey, there were 4,632 U.S. acute care hospitals, from which there were 477 unique hospital responses (Rambhia et al., 2012, p. 2). It was not known at the time of the survey how many health care coalitions were in existence. Today, this information is collected annually through the HPP grant reporting requirements, thus defining the target population today (HHS, 2014a). Additional time was required for the original researcher, Rambhia, to provide the county-based weather-related disaster declarations. As the original survey data were provided in a blinded format, it was necessary for Rambhia to enter the additional variable data for the weather-related disasters matching county of the physical hospital location with county declarations. Verbal and written agreement with Rambhia was reached, allowing additional data to be used for a flat fee. He estimated and was able to provide the additional publicly available data without excessive time demands.

Sampling and Sampling Procedures

There was no sampling strategy used in this survey design, as the total population of U.S. acute care hospitals was included in the study request. Rather, the data collected were analyzed and compared to the national data base of acute care hospitals to determine if characteristics including urbanicity, bed size, geographic distribution, and teaching hospital status were representative of the national profile (personal communication, K. Rambhia, April 26, 2014; Rambhia et al., 2012). The survey population represents 10.3% of the acute care hospitals in 2011 (Rambhia et al., 2012). Although this reflects a small

response rate, the descriptive statistics reveal that the sample size closely represents the characteristics of the population (Rambhia et al., 2012).

The analysis of the self-selected respondents suggested that the sample size had sufficient power. G*Power3 software was used prior to the analysis to determine the required sample size necessary to avoid a Type II error while conducting two statistical tests: ANOVA and simple linear regression (Faul, Erdfelder, Lang, & Buchner, 2007). The 477 returned surveys demonstrated sufficient power to conduct a multiple regression using three tested predictors and eight total predictors (independent variable). The G*Power3 software indicated that 119 responses were required to achieve medium effect with an alpha of .05 and 0.80 power. The actual count of 477 respondents resulted in an alpha of .05 with an effect of .15, which would detect smaller, more discrete change and demonstrate a power of .95 (Faul, Erdfelder, Lang, & Buchner, 2007).

Although there was sufficient power to conduct the proposed ANOVA and both a simple and a multiple linear regression, the analysis conducted was a nonparametric, generalized linear model using a final sample size of 375 discrete responses. The generic post-hoc tests for noncentrality with 8 degrees of freedom and an alpha of .05 had a power of .915, indicating sufficient power for conducting analysis and reporting findings.

Archival Data Procedures

Seeking survey participants was a multi-tiered effort involving repetition and encouragement from national organizations to participate. The survey was emailed directly to hospital chief executives, presidents, or other designated executive officers using a current list of hospital executives secured from the AHA for one-time use

(personal communication, K. Rambhia, April 26, 2014). The AHA also advocated for the survey and encouraged participation during two calls with state hospital association subject matter experts, one immediately preceding and one during the survey collection (personal communication, K. Rambhia, April 26, 2014). Leaders of the National Hospital Preparedness Program also emailed state department of health HPP grant awardees and encouraged state contacts to promote the survey with their hospital and hospital association contacts (personal communication, K. Rambhia, April 26, 2014). The survey was released in early August 2011 and was open for participation for 1 month (Rambhia et al., 2012). During this time, a reminder email was sent to the executives, and a support email account was established to answer questions from participants (Rambhia et al., 2012, p. 2).

In 2013, as I was narrowing the broad dissertation topic about health care coalitions, a cursory literature review revealed one published article from Rambhia's survey study. On August 27, 2013, an email was sent to Toner and Rambhia inquiring about possible use of their data set for a secondary analysis. Both were agreeable and willing to share their data for further analysis pending permission from the AHA. Peter Kralovec, AHA executive, authorized transfer of "a hospital level file that has been stricken of all information that could be used to identify a particular hospital," including the name of the health care coalition, to be transmitted to me (personal communication from P. Kralovec to E. S. Toner, copying me and others, September 25, 2013). After I had determined that a blind, hospital-level data set would enable me to conduct meaningful research and contribute new scholarly knowledge, a data use agreement was

developed and executed on January 5, 2014 between myself and Eric S. Toner, MD, senior associate for University Pittsburgh Medical Center, Center for Health Security.

In addition to the data provided from the original study, this research required that the additional data set of county-based weather-related major federal disaster declarations be aligned with the physical addresses of the hospitals represented in the original study. This required one of the original researchers to collect and enter these data into the data set, as the data I received were blinded. Rambhia agreed to assume this responsibility for a flat-fee stipend but required several months to complete this task. The source of data for the disaster declarations consists of publicly available data from FEMA on its website.

Instrumentation

The survey questions for the original study were developed based on previous, recent publications about regional health care response developed for mass casualty incidents (personal communication with K. Rambhia, April 26, 2014; Rambhia et al., 2012, p. 1). The FY2010 and FY2011 HPP grant deliverables also introduced regional partnerships and the concept of coalitions using two new health care system handbooks as the guide (Barbera & Macintyre, 2009; HHS, 2014b). These guidance documents provided intuitive approaches to regional health care system coordination based on national federal emergency management structures but were not grounded with research.

The survey tool used for this study was SurveyMonkey, a fee-based online survey development tool (email communication with Rambhia, April 26, 2014). Once developed, the survey questions were reviewed by three national health care coalition and regional response leaders: Cynthia Dold, Public Health Seattle & King County; John

Hick, Hennepin County Medical Center and the Minnesota Department of Health; and Dan Hanfling, Inova Health System (personal communication with K. Rambhia, April 26, 2014; Rambhia et al., 2012, p. 9). The researchers did not implement a process to measure consistency as a marker of reliability or construct validity to determine whether the test questions accurately captured the intended information.

Operational Definitions

The variables selected for this study were identified based on multiple considerations, including the alignment with foundational health care coalition concepts promoted through national guidance. Variables included such as community setting and prior disaster experience have not been studied yet may have a significant effect on coalition structure and roles. The variables proposed in this study each can be operationalized as follows.

Independent Variables

Community setting. This dummy variable classified each hospital as being physically located in a county that, based on the U.S. Census, was in a metropolitan statistical area and classified as urban, or located in a county without this census designation and thus classified as nonurban. These data were coded with a 0 for nonurban areas and a 1 for urban coalitions.

Disaster declaration. This dummy variable identified whether each hospital physically was located in a county that experienced a weather-related disaster that resulted in a major disaster declaration from FEMA between 9/11 and August 2011.

Counties having no disaster declaration were coded with a 0, and counties with a prior disaster declaration were coded with a 1.

Stakeholder participation. This interval-level, independent variable identified and quantified 14 specific disciplines and one option for other discipline, which were likely to be represented in a health care coalition. These disciplines were counted as a whole integer for each hospital, establishing a value between one discipline and 14 to total 15 disciplines, and served as a proxy for accepted roles within the coalition.

Covariates

Acute care hospital participation. This nominal-level covariant identified three ranges to represent the participation of all acute care hospitals within the community, including less than 25%; 25-75%; and 75% or greater and was coded 0, 1 and 2, respectively, based on the three categories. The literature and formal guidance focus on acute care hospitals as the only organization type critical for effective disaster response management, thus establishing the importance of this covariant.

Coalition membership. This dummy variable delineated between coalitions that only have hospital members and coalitions that include other stakeholder disciplines in the coalition along with hospital membership. Coalitions with only hospitals were coded 0, and coalitions with hospitals and other represented disciplines were coded 1. This variable was included in the descriptive analysis between urban and nonurban hospitals to differentiate coalitions with singular nodal characteristics from those with varied nodal characteristics.

Coalition structure. This dummy variable classified responses as either informal, coded as a 0, or a formal structure such as a memorandum of understanding or contract, coded as a 1. This variable was included in the descriptive analysis comparing urban and nonurban hospitals and possible differences between disaster declaration experiences. Federal guidance reflects an assumption that a formal structure is a requirement to establish effective regional structures of preparedness and response, and thus this covariant studied that assumption.

Hospital Preparedness Program grant participation. This dummy variable classified responses as a bivariate yes-or-no option regarding the hospital-level participation in the HPP grant. Yes was coded as a 1, and no was coded as a 0. This variable was included in the descriptive analysis between urban and nonurban hospitals. The HPP grant has been the one dedicated source of federal funding and guidance promoting health care system preparedness for disasters. It is important to understand the influence of this program on the survey respondents.

Time period of coalition formation. This nominal-level covariant identified three options for the time period in which the coalition entity was started: before 2002—coded as a 0; 2002-2007—coded as a 1; and after 2007—coded as a 2. These time frames, established in the original survey study, align with the key national disasters, 9/11 and Katrina, that prompted increased scrutiny and focus on emergency preparedness.

Coalition participation requirement. This dummy variable identified whether hospital participation in the coalition was voluntary or required by a city, state, county, or

other jurisdictional or regulatory entity. Voluntary participation was coded as a 0; required participation was coded as a 1.

Coalition leader. This dummy variable identified the leading or organizing entity of the coalition. A hospital or group of hospitals identified as the leading or organizing entity was coded a 0 and if public health was identified as the leading or organizing entity, the variable was coded a 1.

Dependent Variable

Responsibilities accepted by health care coalitions. The interval-level, dependent variable was measured based on the sum of activities conducted by the coalition. There were 12 specific activities identified and one option for other activities listed in the survey so the values entered into the database were coded as a range between 0 for no identified activities, and 13 indicated that all activities were identified (see Appendix A). The dependent variable provided the basis for multiple regression analysis based on the above independent variables and covariables.

Data Analysis Plan

The statistical procedures included both descriptive and inferential analyses and were conducted using Statistical Packages for Social Sciences version 21.0 (SPSS 21.0). The data were provided by both a csv and excel file format for entry into SPSS.

There were 6201 cells of data received in this data set derived from 13 different survey questions and 479 unique respondents, although the original study cited 477 respondents (Rambhia et al., 2012). It was necessary to carefully review, clean, and screen the data to ensure there were no systematic or keyed errors in the data set. This

required several steps to prepare the data including a visual inspection of the data fields, and conducting descriptive statistical tests including mean, median, mode, range, skewness, and standard deviation as a method of quickly identifying outliers and errors. The purpose of careful screening and cleaning was conducted to avoid both Type 1 error, rejecting a true null hypothesis, and Type II error, accepting a false null hypothesis (Osborn, 2012). Assessment of effect size and population size also were reviewed to ensure the effect size of the data were not misstated; similarly, the power of the sample size was determined, again to avoid a Type I or Type II error.

Research Questions and Hypotheses

I conducted this study to address the following three main research questions.

Research Question 1

What was the relationship between the number of disciplines, representing roles, in a health care coalition and the number of conducted activities, representing accepted responsibilities, of health care coalitions?

Research Question 2

What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions that are located in counties that have experienced a federally declared weather-related disaster between 2001 and August 2011 as compared to health care coalitions in communities that were not directly affected by a federally-declared disaster?

Research Question 3

What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions in nonurban settings as compared to coalitions in urban settings?

Hypothesis 1

Null Hypothesis 1: The number of disciplines represented in a health care coalition did not increase the number of conducted activities within a health care coalition.

Alternative Hypothesis 1: The number of disciplines represented in a health care coalition increased the number of conducted activities within a health care coalition.

Hypothesis 2

Null Hypothesis 2: Prior disaster declarations did not influence the number of represented disciplines, or conduct activities within a health care coalition.

Alternative Hypothesis 2: Prior disaster declarations influenced the number of represented disciplines or conducted activities with a health care coalition.

Hypothesis 3

Null Hypothesis 3: Community size did not influence the number of represented disciplines or conducted activities within a health care coalition.

Alternative Hypothesis 3. Community size influenced the number of represented disciplines or conducted activities within a health care coalition.

Statistical Analysis Plan

A multiple regression analysis was proposed to be the culminating inferential statistical test applied in this study to determine the answers to each of the three research questions and requisite hypotheses. No specific order or hierarchy was intended be used to sort the independent variables; instead the unordered set of independent variables were to be simultaneously entered through the forced entry method in SPSS.

Assumptions about the statistical test and data were necessary prior to conducting the analysis. The level of measurement and unique entities were confirmed during initial cursory review of the data. However, it was necessary to ensure there was variation in the independent and dependent variable values, no multicollinearity between two independent or covariates, no additional confounding variables, existence of homoscedasticity, and random distribution of residuals along the full model (Field, 2009, p. 220).

To establish confidence in the multiple regression analysis, as the statistical methodology, several additional tests were planned. A method of least squares results in residual values was conducted to determine the best line to fit the data (Field, 2009, p. 201). Residuals, the difference between the data point and the mean are squared, totaled, and summed to calculate an F-statistic to determine goodness of fit between the data and model, and also to analyze the regression line as a better predictor than the mean. An F-statistic larger than 1 provides confidence of goodness of fit (Field, 2009, pp. 201-204).

Each independent or covariant required a specific coefficient test to measure. Therefore, eight different coefficient tests were intended to be conducted with the

analysis. The correlation coefficient, designated as R , quantifies the goodness of fit and the coefficient of determination, designated as R^2 provides an estimate of the impact between the independent and dependent variables (Field, 2009, p. 202). It also was necessary to remove any outlier cases with a standard deviation plus or minus 2 or 3 to avoid skewing the analysis.

The results of the originally proposed statistical tests would have been interpreted based on three different focuses. The model summary would have been interpreted based on the F statistic and level of significance of the correlation; the regression would have been interpreted based on the F statistic and level of significance of the sum and mean of residual squares; and the coefficient correlations and determination would have been interpreted based on the t score, level of significance, and confidence intervals (Green & Salkind, 2011, p. 294).

Threats to Validity

This study was a retrospective analysis of the relational nodes and ties present in health care coalitions at the time of the survey in 2011. The information will be used to provide historical context and data about organic coalitions developed prior to official HPP coalition guidance in 2012. The nature of this study presented several internal and external threats to validity, which must be clearly communicated to scholarly practitioners using this information for policy development and positive social change (Frankfort-Nachmias & Nachmias, 2008, pp. 96-103).

Internal Threats

There were four internal threats that could have affected the results of this study including instrumentation, testing, history, and selection. Instrumentation was a critical threat to the internal validity of this study because there was no formal or measured testing for reliability and validity. Because of this threat, it cannot be established that the information collected either consistent or accurately reflected the intended question. In addition, the lack of comprehensive instructions about how to complete the survey, prerequisites for respondents, and preferred setting for completion threatened the validity of data. Testing was another threat to validity, defined as the reaction generated by the act of completing a test or survey. It is possible that respondents provided answers based on what the coalition structure should be versus the actual coalition structure.

History also was an internal threat resulting from recent national, state, or local disasters that may have influenced the information provided from respondents. For example, in 2011, the Midwestern U.S. states experienced a significant blizzard and several severe spring tornados including an EF-5 in Joplin, Missouri that destroyed an acute care hospital and killed more than 160 persons (FEMA, 2011). These weather-related incidents, which impacted regional health care services, may have influenced the respondents' answers.

Finally, selection, or the impetus to voluntarily submit this survey, is unknown and thus the factors that provided motivation to either complete or ignore the survey request cannot be characterized and likely influenced the survey results.

External Validity

The generalizability of this study established a historical context and is intended to contribute to domestic policy and social change. The survey was sent to the total population of hospitals and a representative sample was received, thus accurately reflecting the structures and maturity of regional health care coalitions, as reported by hospitals, in 2011. This study examined coalitions through a hospital and theoretical lens from which future studies about health care coalitions may be conducted. The generalizability of this study is limited to hospital settings and may not be transferrable to other health care services such as public health, long-term care, or emergency medical services.

Ethical Procedures

This study, based on a blind analysis of archived data, reduced, but did not eliminate, the risk of ethical harm to participants or the broader community of health care emergency preparedness planners and experts. The original research was conducted with IRB approval and included cooperative agreements with AHA, the UPMC Center for Biosecurity, and Georgetown University. The survey included language that IRB approval had been obtained and that use of this information was intended to characterize current coalition status and would be retained on a not-for-attribution basis. Recruitment of survey participants extended to the entire population of acute care hospitals in 2011; participation was sought through emails and conference calls. There was no direct solicitation of individual hospital employees. As such, respondents were encouraged but

never coerced to complete the survey and the study lasted only for the duration required to complete the survey.

Permissions for use of the data were obtained from the authors of this study. The AHA provided informal email approval verifying that data were to be shared only if hospital identification, including coalition names, were blind. A formal data use agreement was signed by the UMPC senior medical associate involved in the original survey study. The primary author of the original research assumed responsibility for ensuring the transfer of only blind data.

Once the data were made available for research, the transferred data files were stored and filed only on an encrypted laptop and on a CD-ROM for backup in my personal residence. No other person has access to the laptop on which the data are stored. The files will be secured and retained for a minimum of five years after completion of the dissertation study.

Summary

The pragmatic worldview applied to this study enables current policy and practice professionals to garner detailed analysis of the characteristics of organic health care coalitions that existed in 2011, prior to the release of the official HPP coalition guidance in 2012. The design and methodology were based on use of an archival set of data that were collected but not fully analyzed and thus, additional scholarly information was obtained from the rich data source. The original data were collected from a nonexperimental survey study. The methods selected for data analysis originally centered on a multiple regression analysis examining eight independent variables and covariates

against one interval-level dependent variable. The results were intended to illuminate differences in the relational structures between urban and nonurban coalitions, as well as, determine whether the experience of a disaster, resulting in a major disaster declaration, influenced the structure or characteristics of health care coalitions in either urban or nonurban settings. Detailed analysis of the statistical analysis, survey results, and additional data elements are the focus of Chapter 4.

Chapter 4: Results

Introduction

This quantitative study examined and compared the differences between U.S. urban and nonurban health care emergency preparedness coalitions established in August 2011 through descriptive and multivariate inferential data analysis using Statistical Package for the Social Sciences version 21 (SPSS 21.0). Fundamental, essential comparisons between the coalitions included participating disciplines, serving as a proxy for roles, and performed activities, serving as a proxy for accepted responsibilities. The roles and responsibilities in coalitions with counties that experienced a federally declared weather-related disaster between 2001 and August 2011 were examined and compared with those in coalitions that did not have the occurrence of a disaster declaration during this same time period. Other important comparisons between established urban and nonurban coalitions analyzed included the formal or informal coalition structure, time period of formation, acute hospital representation, leadership, Hospital Preparedness Program grant participation, and a requirement for hospitals to participate in the coalition to receive grant funding.

This study was conducted to address the following three main research questions.

Research Question 1: What was the relationship between the number of disciplines, representing roles, in a health care coalition and the number of conducted activities, representing accepted responsibilities, of health care coalitions?

Research Question 2: What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions that are located in

counties that have experienced a federally declared weather-related disaster between 2001 and August 2011 as compared to health care coalitions in communities that were not directly affected by a federally declared disaster?

Research Question 3: What was the difference in the accepted roles and responsibilities among organizations in regional health care coalitions in nonurban settings as compared to coalitions in urban settings?

Hypothesis 1

Null Hypothesis 1: The number of disciplines represented in a health care coalition does not increase the number of conducted activities within a health care coalition.

Alternative Hypothesis 1: The number of disciplines represented in a health care coalition increases the number of conducted activities within a health care coalition.

Hypothesis 2

Null Hypothesis 2: Prior disaster declarations do not influence the number of represented disciplines or conducted activities within a health care coalition.

Alternative Hypothesis 2: Prior disaster declarations will influence the number of represented disciplines or conducted activities with a health care coalition.

Hypothesis 3

Null Hypothesis 3: Community size does not influence the number of represented disciplines or conducted activities within a health care coalition.

Alternative hypothesis 3: Community size will influence the number of represented disciplines or conducted activities within a health care coalition.

This chapter provides a comprehensive analysis of the research conducted in the following sequential sections, with appropriate subsections: introduction, data collection, results including quantitative descriptive and inferential statistics, and summary.

Data Collection

The secondary data for this study were obtained in June 2014 but not accessed until IRB approval was received on August 13, 2014. Following IRB approval, the Excel file was imported into SPSS 21. Although the original study referenced 477 cases, the data file actually included 479 discrete cases from which to begin reviewing and cleaning the data prior to analysis. The original survey design and structure required extensive cleaning prior to analysis. The answers to the survey questions were each limited-set, single-response narrative options. Thus, the data points were narrative options; converting each of the variables from string to numeric was the first step in cleaning the data necessary to conduct the appropriate statistical tests. Another initial step in preparing the data was to assign labels to each of the 67 variables, ensuring that the labels were easily associated with specific variables, as many of the questions had similar key words. Likewise, values for each answer option had to be assigned and coded into the data set, assigning values of 0 and 1 to each of the dummy variable options. The final step in the initial data-cleaning process required all missing values be coded and labeled as missing values with 999. The data use and research design conformed to Walden IRB approval #08-13-14-0275830.

Data Discrepancies

Initial review of the data set identified two minor discrepancies in coding but did not alter the data as collected or for analysis. The first discrepancy involved the classification and data regarding EMS and ambulance providers. The distributed survey included a question that asked for selection of stakeholders that participated in the coalition. Two options were “EMS providers, private or municipal” and “private ambulance providers” (personal communication, K. Rambhia, April 26, 2014). These two categories are very similar and were not differentially defined in the survey, resulting in a lack of clarity. Further, the data set included two categories, with different data, for the one survey question for ambulance providers: “ambulance” and “private ambulance” (personal communication, K. Rambhia, April 26, 2014). This discrepancy was resolved by computing the two variables into a new, combined variable using SPSS 21, coding and labeling 0 for no ambulance provider or 1 for one or more ambulance providers.

The second discrepancy identified is that the research proposal referred to a comparison of urban and nonurban hospitals. However, the data set classified hospitals as either urban or rural. The terms *rural* and *nonurban* have the same operational definition for the AHA, both indicating a hospital that is located in a county that is not included in a metropolitan statistical area designation from the U.S. Census Bureau (personal communication, P. Kralovec, April 2, 2014). The terms used throughout this research remained *urban* and *nonurban*.

Data Treatment and Preliminary Analysis

The survey data included 479 unique hospital responses. In the process of data review and cleaning, it was determined that 39 responses included no identified stakeholders or activities, and six additional responses were largely incomplete. The 45 cases were removed from the data to eliminate skewed results. There were 59 completed surveys that also were removed, as these were hospital-only coalitions, indicating only that hospitals were participating disciplines in the coalitions. The research questions all were based on diverse stakeholders fulfilling different coalition roles. Therefore, hospital-only coalitions were not relevant to the research questions and thus were eliminated from this study. The final survey sample size identified for analysis was 375.

The respondent characteristics of the 375 survey participants indicate health care coalitions with an established structure. As shown in Table 1, the majority of hospitals responding about the coalitions indicated the following: majority of coalition participation is required; includes greater than 75% of acute care hospitals in the community; formed after 2002; formal structure in place; participates in the HPP grant; and located in counties that had a federal weather-related disaster declaration between 9/11 and August 2011. However, it is of interest that leadership of the coalitions is equally divided between hospital and public health leadership.

Table 1

Survey Respondent Characteristics

| Characteristic | Frequency | Percentage |
|--|-----------|------------|
| Participation requirement | | |
| Participation is voluntary | 96 | 25.7 |
| Participation is required | 278 | 74.3 |
| Acute hospitals in community | | |
| Less than 75% | 40 | 10.7 |
| Greater than 75% | 334 | 89.3 |
| Coalition formation | | |
| Before 2002 | 126 | 33.7 |
| After 2002 | 248 | 66.3 |
| Coalition leader—hospital or public health | | |
| Hospital or group of hospitals | 183 | 48.9 |
| Public health or emergency management | 191 | 51.1 |
| Coalition structure | | |
| Informal linkage | 76 | 21.9 |
| MOU, MOA, or contract | 271 | 78.1 |
| HPP participation | | |
| Does not participate | 86 | 23.1 |
| Participates | 286 | 76.1 |
| Disaster declaration | | |
| No disaster declaration | 21 | 5.6 |
| Disaster declaration | 353 | 94.4 |

To facilitate analysis, four variables were recoded or computed. The variable for coalition start date was recoded from three survey-answer options to two categorical options classifying coalition start dates before or after 2002. This was determined appropriate because very few coalitions ($n = 21$) were started after 2007, the third option in the survey, and 2002 was a landmark time designation immediately following 9/11.

Similarly, the categorical variable for the percentage of acute hospitals participating in the coalition from a community was reduced from three survey-answer options to two. Only 40 respondents indicated that less than 75% of hospitals participated; therefore, the two response options for less than 25% and 25%-50% were recoded as a single option. Recoding these two variables resulted in an efficient method of analysis and notable distribution between the two options for each variable.

The interval, independent variable for stakeholder participation by discipline was collected as 14 separate data points, excluding other. These variables were combined into a sum total computed variable providing a range of 0 to 14 to facilitate analysis. The same reason and rationale were used to create a sum total computed variable for the interval dependent variable, coalition activities, excluding other, with a range of 0 to 13.

The unit of analysis, multistakeholder coalitions, was the basis of the aggregate descriptive statistical analysis conducted for each of the categorical covariates to identify characteristics, patterns, and status of the coalitions. The data were organized by community setting classification to provide a descriptive statistical comparison based on the independent, categorical variable community setting of the nonurban ($n = 163$) and urban ($n = 211$) respondent characteristics; one respondent did not specify either

nonurban or urban. As noted in Table 2, urban respondents represented 56.4%, and nonurban respondents represented 43.6% of the 374 cases included in the analysis. This aligns closely with the reported 60.1% urban-based acute hospitals in the 2012 AHA database of 4,632 hospitals (Kunal et al., 2012, p. 3). This alignment demonstrates external validity, thus supporting the use of this study for additional studies and analysis of national health care coalition preparedness work including comparison with other health care coalitions.

Table 2

Community Bivariate Size

| Characteristic | Community size | | Fischer's exact |
|--|------------------|------------------|-----------------|
| | Nonurban | Urban | 2-sided |
| Participation requirement | | | 1.000 |
| Participation is voluntary | 42 _a | 54 _a | |
| Participation is required | 121 _a | 157 _a | |
| Acute hospitals in community | | | .736 |
| Less than 75% | 16 _a | 24 _a | |
| Greater than 75% | 147 _a | 187 _a | |
| Coalition formation | | | .741 |
| Before 2002 | 53 _a | 73 _a | |
| After 2002 | 110 _a | 138 _a | |
| Coalition leader—hospital or public health | | | .211 |
| Hospital or group of hospitals | 86 _a | 97 _a | |
| Public health or emergency management | 77 _a | 114 _a | |
| Coalition structure | | | 1.000 |
| Informal linkage | 33 _a | 43 _a | |
| MOU, MOA, or contract | 118 _a | 153 _a | |
| HPP participation | | | .267 |
| Does not participate | 42 _a | 44 _a | |
| Participates | 120 _a | 166 _a | |
| Disaster declaration | | | .498 |
| No disaster declaration | 11 _a | 10 _a | |
| Disaster declaration | 152 _a | 201 _a | |

Note. Each subscript letter *a* denotes a subset of Community size—urban or rural categories whose column proportions do not differ significantly from each other at the .05 level.

The review of descriptive analysis for each of the covariates—HPP requirement, HPP participation, time period started, acute care hospital participation, coalition structure, coalition requirement, and coalition leadership—all remained relevant covariates for analysis, as noted in Table 2. It is important to note that the distribution of the categorical, independent variable for disaster declaration revealed that the majority of respondents were hospitals participating in coalitions that were located in a county that had received a federal disaster declaration between 2002 and August 2011 ($n = 353$, 94.4%). This disproportionate distribution limits the ability to conduct the analysis needed to answer the second research question comparing the roles and responsibilities between coalitions that have, or have not had, a disaster declaration.

Results

The intended statistical analysis testing described in the proposal was a multivariate regression analysis testing each of the covariates against the dependent variable. To conduct a regression analysis, it was necessary to validate the level of measurement, identify possible outliers, and assess for multicollinearity. The two-way interaction among all variables and covariables did not reveal any statistically significant results, dismissing concern for multicollinearity.

Regression analysis test assumptions were conducted for homoscedasticity; random distribution of residuals between two observations and along the correlation model; and determination of linearity or nonlinearity. As noted in Figures 1 and 2, analysis of the interval, independent, and dependent variable revealed the independent variable—stakeholders served as proxy for roles—was normally distributed ($n = 375$, $\mu =$

7.17, $s = 2.806$), but the dependent variable—activities served as proxy for responsibilities—was not normally distributed ($n = 375$, $\mu = 9.62$, $s = 3.082$).

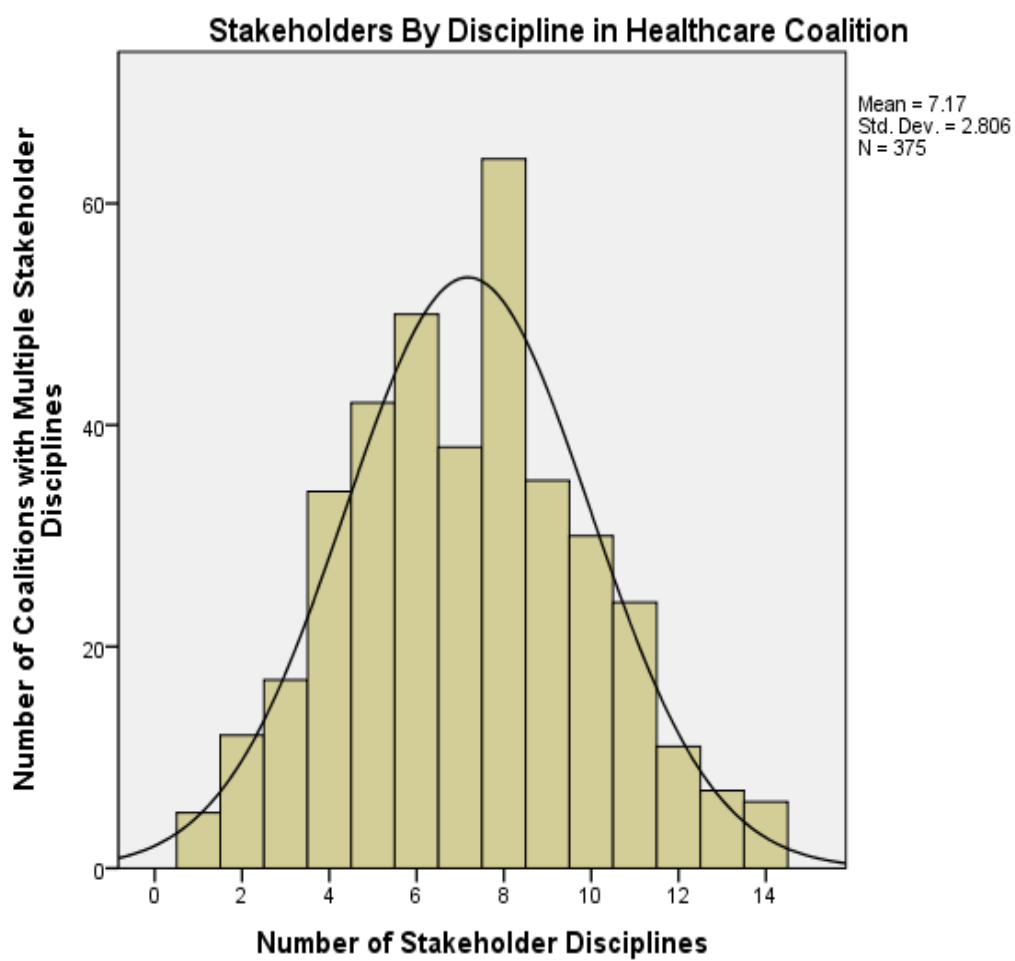


Figure 1. Stakeholder disciplines.

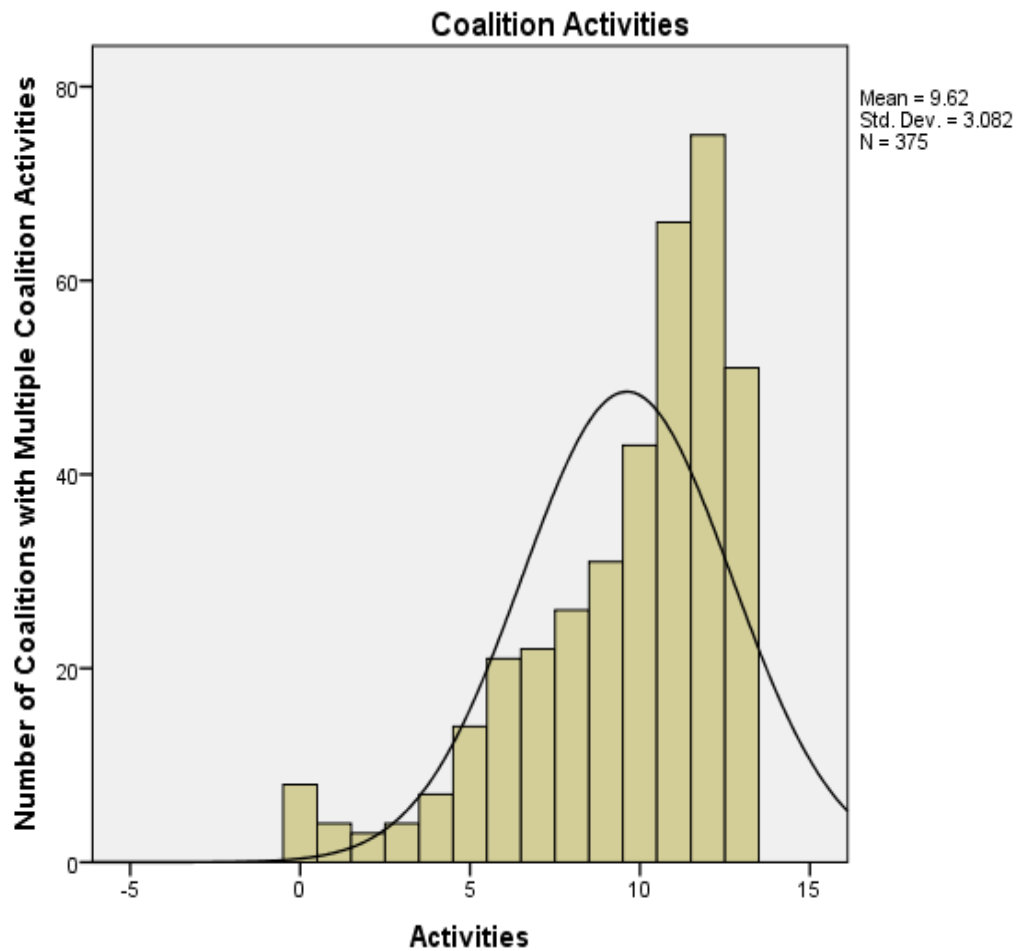


Figure 2. Coalition activities.

The descriptive statistics characterized the normal distribution of the study sample; however, descriptive analysis of the dependent variable revealed a negatively skewed, nonnormal distribution. To determine whether the assumption of homogeneity had been violated, Kolmogorov-Smirnov and Shapiro-Wilks tests were conducted to determine if the distribution, as a whole, deviated from a comparable normal distribution. The results of both tests ($D(375) = 0.000$, $p < .05$), as noted in Table 3, validated

heterogeneity and thus the use of a nonparametric inferential statistical test was required for this study.

Table 3
Normality Table

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|----------------------|---------------------------------|-----|------|--------------|-----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Coalition activities | .185 | 375 | .000 | .873 | 375 | .000 |

^aLilliefors significance correction.

The nonnormal distribution, with negative skewness of the dependent variable, violated the assumptions for homogeneity and random residual distribution along the correlation model. These assumption violations necessitated a different, nonparametric, nonlinear, statistical test for analysis. It was determined the appropriate inferential statistical test for study analysis was the generalized linear model (GLM) with Poisson methodology for counts. Modeling count data into a linear model was achieved with the Poisson calculation resulting in increased symmetry, and approximating a normal distribution as the mean statistic increases in value. The rationale for use of the test was supported by the data collection methodology using counts for both the interval independent and dependent variables.

The assumptions for a nonparametric GLM using ranked, count data include evidence of distribution, independence of individual observations, correct link function selection, goodness of fit, and equal mean and variance (Fox, 2008, pp. 379-381). Specifically, the three essential components of the GLM are: a random component and evidence of distribution with a random variable; a linear predictor of regression; and, use of a link function to transform and produce a linear prediction (Fox, 2008, pp. 379-381).

Evidence of distribution using count data was confirmed in the descriptive analysis frequency histogram for both stakeholders and activities. Independence of individual observations among the 375 discrete respondents was confirmed.

To methodologically transform the data into a linear predictive model, it was necessary to apply a linearizing, invertible, link function. The Log link function was selected in SPSS 21 based on the use of the Poisson count GLM methodology (Fox, 2008, p. 382). Goodness of fit was confirmed with the variance (deviance) and chi-square values greater than $p > .05$. These results were confirmed with a variance (330.905, $df = 1, p = .985$) and chi-square (266.932, $df = 1, p = .794$). The assumption test of mean equals variance or deviance also was confirmed with the deviance ($p = .985$) and ($\mu = 9.82$) for the dependent count variable – activities. These tests validated the use of the GLM, Poisson count methodology as the appropriate inferential statistical test for this study analysis.

Statistical Results

A generalized linear model using Poisson count methodology was conducted to test the three hypotheses, as noted in Table 4. The first research hypothesis: there is relationship between the number of disciplines, representing roles, in a health care coalition and the number of conducted activities, representing responsibilities of health care coalitions. This hypothesis examined the relationship between the interval number of stakeholders, a proxy for roles (independent variable), and the interval number of coalition activities, a proxy for responsibilities (dependent variable). A significant relationship was identified. The statistical values for the relationship between the number

of stakeholders and the number of coalition activities was significant: the Wald $\chi^2 = 26.670$, $B(1, 336) = .032$ (.95 CI = .020 - .045), $p = .000$. The null hypothesis was rejected and the alternative research hypothesis was accepted.

The second research hypothesis stated there is a difference in the accepted roles and responsibilities among organizations in regional health care coalitions that are located in counties that have experienced a federally declared weather-related disaster between 2001 and August 2011, as compared to health care coalitions in communities that were not directly affected by a federally declared disaster. This research hypothesis examined the influence of a disaster declaration as measured by the number of stakeholders (roles) and coalition activities (responsibilities). The results for disaster declarations are not significant, the Wald $\chi^2 = 1.382$, $B(1, 336) = .084$ (.95 CI = -.056 - .224), $p = .240$. The null hypothesis cannot be rejected and the alternative research hypothesis cannot be accepted. It is important to reiterate only 5.6% ($n = 21$) of coalitions were located in counties that did not have a disaster declaration during this time period.

The third research hypothesis stated there is a difference in the accepted roles and responsibilities among organizations in regional health care coalitions in nonurban settings as compared to coalitions in urban settings. The study revealed that community setting, urban or nonurban, did not influence the number of stakeholders (roles) and coalition activities (responsibilities); the results were not significant: the Wald $\chi^2 = .082$, $B(1, 336) = .010$ (.95 CI = -.059 - .079), $p = .775$. The null hypothesis cannot be rejected and the alternative research hypothesis cannot be accepted.

Table 4.
Generalized Linear Model Results

| Parameter | B | Std. Error | 95% Wald confidence interval | | Hypothesis test | | |
|------------------------------|-------|------------|------------------------------|-------|-----------------|----|------|
| | | | Lower | Upper | Wald chi-square | df | Sig. |
| (Intercept) | 1.792 | .1088 | 1.579 | 2.006 | 271.240 | 1 | .000 |
| Community size | .010 | .0350 | -.059 | .079 | .082 | 1 | .775 |
| Disaster declaration | .084 | .0715 | -.056 | .224 | 1.382 | 1 | .240 |
| Acute hospitals in community | .216 | .0653 | .088 | .344 | 10.922 | 1 | .001 |
| Coalition leader | -.010 | .0348 | -.079 | .058 | .090 | 1 | .764 |
| Coalition structure | .032 | .0425 | -.051 | .116 | .577 | 1 | .448 |
| Coalition formation | .005 | .0364 | -.066 | .077 | .020 | 1 | .889 |
| Total stakeholders | .032 | .0062 | .020 | .045 | 26.670 | 1 | .000 |
| Participation requirement | .008 | .0399 | -.070 | .086 | .042 | 1 | .838 |
| HPP participation | .039 | .0431 | -.045 | .124 | .823 | 1 | .364 |

Note. Dependent variable: total coalition activities. Model: (Intercept), comm_setting, Disaster_declared, acute_percent, coal_leader, coal_structure, Started_2002, StakeTotal_2, part, hpp.

The statistical significance of one covariate was noted during the analysis. The results for the percentage of acute care hospitals participating in the community was significant, the Wald $\chi^2 = 10.922$, $B(1, 336) = .216$ (.95 CI = .088 - .344), $p = .001$. This finding suggests that coalitions with more than 75% of acute care hospital participating in the coalition conduct more activities and thus have accepted increased responsibility.

Summary

This study was conducted to examine three foundational research questions about the structure of health care coalitions. First, the study was designed to examine relationship between the number of disciplines, representing stakeholders and serving as a proxy for roles and the number of conducted activities, serving as a proxy for coalition responsibilities. Statistical results support the research hypothesis and suggests there is a statistically significant, direct positive relationship, between the number of disciplines represented in a coalition and the number of conducted activities.

However, statistical support was not found for the two remaining research questions. The second research question explored the influence of prior disasters on coalition roles and responsibilities and the third question examined the difference in the coalition roles and responsibilities in nonurban as compared to urban coalitions. There was not a statistically significant test result for either of these questions, thus the null hypothesis was not rejected, and the alternative research hypothesis was not accepted.

The final chapter will provide a concise summary of the study purpose, methodology, key findings, and limitations, as well as, suggest recommendations for further research, grounded in the theory and results of this study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The epistemology of emergency preparedness following 9/11 and Hurricane Katrina rapidly expanded to include communication and coordination among varied public safety first responders; local, state, and federal government actors; and nonjurisdictional organizations with a mission to protect and provide services to various populations. The identified gaps in preparedness and response communication and coordination following 9/11 and Hurricane Katrina prompted expedited increases in federal funding, identification of critical partners, and increased expectations among government actors and the public. Among those nongovernmental actors engaged in this punctuated era of change, health care organizations are among the partners serving as first receivers in any disaster or incident involving mass casualties and medical surge or providing support during loss of community infrastructure. Today, the health care system is among the new partners invited to participate and account for improved systems of preparedness and response.

The increased federal HPP grant funding was, and continues to be, provided to hospitals and health care systems to strengthen organizational and regional systems of communication and coordination through formation of health care coalition structures. However, there is no research providing evidence of efficacious structures or validated roles or responsibilities of health care coalitions. Federal funding currently is being allocated and expended to form health care coalitions based on broad guidance and

objectives without evidence of effectiveness. Further, the federal guidance does not distinguish between coalitions established in urban and nonurban settings.

This quantitative study examined and compared the differences in membership and relational structure of health care coalitions to better understand the roles and responsibilities of coalitions in both urban and nonurban settings. This study also examined the roles and responsibilities of health care coalitions with hospitals located in counties that experienced a federally declared weather-related disaster between 2001 and August 2011, as compared to coalitions that were in counties that were not directly affected by a federally declared weather-related disaster.

Archival data from a 2011 survey of 477 acute care hospitals in the U.S., representing 10.3% of the U.S. acute care hospitals, were the data analyzed in this study. The independent variables were (a) urban versus nonurban communities; (b) federal weather-related major emergency disaster declaration between 2001 and August 2011; and (c) the number of disciplines, serving as a proxy for roles, in the health care coalition. Other control variables included (a) the percentage of acute care hospitals within the community setting that participate in the coalition; (b) the time period in which the coalition was formed; (c) types of disciplines serving as coalition members; (d) the formal or informal coalition structure; (e) whether the hospitals and coalitions participate in the HPP grant; (f) whether there is a jurisdictional requirement for the hospital to participate in the coalition; and, (g) whether the coalition leader is a hospital or public health representative. The dependent variable was the number of activities accepted by the coalition, serving as a proxy for coalition responsibilities.

Key Findings

The key findings of this study provide information useful for health care coalitions and policy makers. The first research question examined the relationship between the number of disciplines, serving as a proxy for coalition roles, and the number of conducted activities, serving as a proxy for coalition responsibilities. The results suggest a statistically significant relationship between the number of roles and the number of responsibilities. As the number of different disciplines increases in a coalition, so does the number of different types of conducted activities.

The second research question examined the differences in roles and responsibilities between hospitals located in counties that had experienced a federally declared weather-related disaster declaration as compared to those hospitals and coalitions not directly affected by a federally declared disaster. It is important to note that the data revealed that the majority of respondents were hospital personnel participating in coalitions that were located in a county that received a federal disaster declaration between 2002 and August 2011 ($n = 353, 94.4\%$). This disproportionate distribution limited the ability to conduct a thorough analysis, and thus the null hypothesis could not be rejected. The disproportionate distribution of respondents introduces new research questions that should be explored in future studies.

The third research question examined the differences in roles and responsibilities between urban and nonurban coalitions. The study did not reveal statistically significant differences based on community setting, and thus the null hypothesis could not be

rejected. This finding provides very useful information for policy makers and coalition leaders in both urban and nonurban settings.

Interpretation of the Findings

The research findings from this study contribute to and extend the limited field of knowledge about health care coalitions as a network structure for regional emergency preparedness. During the past decade, the evolution of emergency management leadership has demonstrated an intentional progression from operational competence of individuals and organizations to collaboration among organizations and jurisdictions (DHS, 2008c, pp. 7-8; Haddow et al., 2011, p. 182; HHS-ASPR, 2012a, 2012b; Kapucu & Van Wart, 2008, pp. 714-716; Townsend, 2006; U.S. Bipartisan Committee, 109th Congress, 2006, p. 4; U.S. National Commission on Terrorism Attacks upon the United States, 2004, pp. 339, 357; U.S. Senate, 109th Congress, 2006, p. 2; Waugh & Streib, 2006, p. 138). However, policy guidance historically has not provided research- and theory-based strategies for implementation (DHS, 2008c; FEMA, 2013b; HHS-ASPR, 2012a, 2012b). Policy guidance insinuates network development and alludes to social capital without research-based evidence or instruction. This study confirms that structure yields benefit.

The findings of this study suggest that previous literature, which did not identify social network theory as a framework, does conform to the constructs of regional coordination for emergency preparedness and response. Social network theory establishes a theoretical architecture for evaluation of health care coalition structures, identifying disciplines as nodes, with linkages between and among both nodes and coalitions.

Specifically, the constructs of social capital and network structure are implied components of regional efforts to coordinate preparedness and response activities. The social capital construct indicates that investment of social connectivity will yield positive results. Contribution of expertise and resources by individual nodes is intended to result in a collective, efficient gain of information, resources, ability to influence, credibility, and power (Coleman, 1988, p. S102; Lin, 1999, p. 30; Lin, 2005, p. 5). The findings of the study demonstrate that there is a direct relationship between the number of disciplines represented in a coalition and the number of coalition-conducted activities. Although not the central focus of this study, these results suggest that efficiency and increased access to information and resources were achieved, a measure of positive social capital.

Positive capital is gained through an established network structure, the second construct. A network of nodes connected through linkages of dyadic ties established relationships of varying strength. The relationships, interdependencies, flow of information, and level of embeddedness between and among the nodes form the boundaries and structure of regional networks (Caruson & MacManus, 2008; Katz et al., 2004, pp. 311-312; MacManus & Caruson, 2011; Wellman & Berkowitz, 1988, pp. 99-117). Previous literature depicting case studies or qualitative reviews of health care coalitions conform to the constructs of social network theory (Carrier et al., 2012; Grieb & Clark, 2008; McHugh et al., 2004; Stoto, 2008). Social network theory provided the architecture from which varied configurations of emergency preparedness coalitions may be described and compared.

The findings from this study revealed that nodal linkages provide structure and increase the measurable activities of coordinated planning and response among different disciplines. Thus, social network theory should be central to further development of regional, multidisciplinary networks intended to prepare for and respond to disasters that require health care coordination and communication. This study further strengthens the social network analysis foundation established by Kapucu (2006, 2010) and Stoto (2008).

The implications from this study are broad: Health care coalitions established for emergency preparedness and disaster response can be developed using network structure. The engagement of multiple nodal representatives and development of linkages that are binding, bonding, or belonging serve to bridge the resources needed to effectively communicate and coordinate. An increase in the number of disciplines represented in a network-structured coalition statistically increases the number of activities accepted by the coalition and thus increases the likelihood of effective communication and coordination for emergency preparedness and disaster response.

Limitations of the Study

The limitations of this study primarily stem from use of archival, blinded data. The dataset enabled a comprehensive study of relational structures among organic coalitions that were in existence in 2011, establishing a baseline from which further research could be conducted. However, the research questions were limited by the original survey audience, questions, and answers not allowing for additional analysis to be conducted. For example, the study was limited to the perspective of hospital personnel and did not reflect the perspective of all or different coalition members. The use of blind

data also prevented comparison and contrast of nodal responses within the same coalition.

Internal Validity

The nature of this study and use of archival data present four internal threats to the reliability of the findings: instrumentation, testing, history, and selection.

Instrumentation threatened the findings due to a lack of formal or measured instrument testing prior to administration. In addition, the vague instructions, lack of test setting requirements, and prerequisites for participants provided with the survey increased the possibility of unreliable data. It cannot be established that the information were either consistent among similar coalitions or accurately reflected the intended question.

Testing also presented a threat to reliability, as the respondents may have provided answers based on what the coalition structure should be rather than their actual perspective about the coalition structure. It was noted in the dataset that the time required for most respondents to complete the survey was less than 10 minutes. Although the survey design was intended to facilitate an efficient survey process, it is possible that some participants did not have adequate time to reflect on the answers.

Another threat, history, limited the reliability and validity of the data. The data provide evidence that 96% of the respondents had been in counties with weather-related federal disaster declarations between 2001 and the survey. The occurrence of disasters preceding the survey instrument may have biased the respondents based on personal involvement with response or perception of response based on media and other external

sources of information. The blind data set prevented analysis of specific locations and disasters to determine the historical threat to validity.

Selection also presented a threat to the internal validity of the study and reliability of the information. Among the respondents, only 4% were not directly located in a county that had experienced a federally declared weather-related disaster since 2001. This disproportionate representation introduces questions of selection: Did the experience of a federally declared disaster prompt coalition formation?

External Validity

The generalizability of this study establishes a baseline with which other like studies may be compared. The survey was sent to all acute care hospitals and supported by the AHA. The urban respondents represented 56.4% and nonurban respondents represented 43.6% of the 374 cases included in the analysis that provided information about community size. This aligns closely with the reported 60.1% urban-based acute hospitals in the 2012 AHA database of 4,632 hospitals (Kunal et al., 2012, p. 3). The similar distribution demonstrates external validity, thus supporting the use of this study for additional studies and analysis of national health care coalition preparedness work, from the perspective of hospital personnel, including comparison with other health care coalitions.

The study is limited in generalizability based on the study participants: hospital emergency preparedness personnel. The study did not capture perspectives of emergency preparedness personnel from public health, emergency medical services, primary care or

post-acute care settings, or other disciplines likely to be represented in the multidisciplinary health care coalition.

Further, the study is limited in generalizability based on the time period of the survey. This study was conducted in 2011 when health care coalitions were organically formed, based likely on a need identified locally or regionally, rather than directed through the federal HPP guidance, issued in 2012. As a result, this study provides a foundation from which coalitions formed after 2012 could be compared but limits the generalizability of these findings to coalitions formed after 2012.

Recommendations

Following earlier studies by Kapucu (2006, 2010) and Stoto (2008), this study strengthens the theoretical foundation for health care emergency preparedness coalitions based on social network theory. From this foundation, further research should be conducted on network structures and social capital, the two constructs of social network theory.

Deeper analysis of the social network structure in health care coalitions will provide more comprehensive understanding of the efficacy and challenges of coalitions. Identification of the structural relationship between specific disciplines and specific coalition activities will provide understanding about essential coalition roles required to provide specific coalition responsibilities (Carpenter, 2012; Katz, 2004; Lin, 1999, 2005, Wasserman & Faust, 1994). Research questions examining the linkages between and among nodes and different network coalition structures also should be explored. Examination and measurement of the type and strength of the dyadic and triadic ties

within and between various subgroups of the network and between networks would provide rich context for the relational structure of coalition networks (Carrington, Scott & Wasserman, 2005; Granovetter, 1983; Lin, 1999, p. 34; Wasserman & Faust, 1994). Detailed examination and determination of the differences between bonding, belonging, and binding ties, in addition to the bridges established between nodes and structures, would provide meaningful understanding of the relational structure within and among coalitions (Granovetter, 1983). Similarly, examining different coalitions to identify the nodal locus of centrality for decision making may clarify the roles among organizational, local, regional, state, and federal actors during a disaster response (Scott, 2013, pp. 83-85). Hierarchical linear modeling may be an effective methodology to further explore relational structures by nesting nodes within and between coalitions as well as examination of linkages among and between coalitions.

In addition to deeper analysis of network structures in coalitions, new research should be conducted to examine the efficacy of coalition networks as compared to health-system networks for emergency preparedness and disaster response. In this current era of health care system transformation, the expansion of multidisciplinary, integrated health care systems may replace or supplement regional coalition structures for preparedness and response. This possibility introduces many opportunities for further inquiry. For example, would a hospital be a node in both a system-based and regional network structure? Membership of a health care system would not include all disciplines represented in a regional coalition—for example, public health—therefore, would the health system-based network be as effective during response? In this dynamic health care

environment, this area of inquiry is important and should be pursued to evaluate the efficacy of both regional and systems-based networks.

This study was limited to one of two constructs of social network theory: social network analysis, which examined the relational structures of the network. This study did not include exploration or examination of the other construct: social capital. Examination of the relational structures within like discipline nodes within the same network—for example competing hospitals—would provide initial context for social capital research. Numerous research designs would lend themselves to exploring research questions about social capital in health care emergency preparedness coalitions. Elements of social capital research could include examination of coalition participants' attributional and ideational data, such as, their attitudes, benefits, and motivation for participating in the health care coalition for preparedness and comparison against post-disaster evaluation of those same attitudes, benefits, and motivation (Scott, 2013, p. 3). Case studies about specific, established health care coalitions that have responded to weather-related disasters efficiently and effectively, as defined by protection of patients, staff, and community, as well as, minimal loss of life or injury, would provide valuable insight for future policy and model replication.

The use of archival data to conduct this analysis limited the ability to further explore and examine the activities conducted by coalitions. On a scale of 0-13 activities, the mean was 9.62 indicating the dependent variable was negatively skewed and the majority of coalitions conducted the majority of activities provided as survey options. Additional qualitative research to fully explore the type of activities considered for a

coalition and quantitative research to examine the distribution of those expanded activities would provide deeper understanding of presumed or accepted coalition responsibilities.

The findings from this study also introduce a foundation for future research questions centered on the influence of prior disasters on coalition formation, membership, and responsibilities. From this study and data set, it may be possible to determine if there is a relationship between the time period of coalition formation, and the first disaster declaration following 9/11. In addition, understanding what percentage of U.S. counties have had disaster declarations since 2001 would provide basic information important for policy makers and emergency preparedness planners. Exploration about whether a prior county disaster declaration is a motive for increased hospital organizational and regional engagement in emergency preparedness could guide policy decisions. The influence of disaster declarations on jurisdictional models of regional communication and coordination also would provide valuable insight into command and control systems during disaster response.

Implications

The epistemology of emergency preparedness among governmental and nongovernmental actors, responders, and receivers whom have a responsibility to provide systems of safety has undergone tremendous expansion in the era post-9/11 and post-Hurricane Katrina. Yet, there remains a dearth of information about specific sectors that contribute to community resiliency. Health care is among those sectors with limited research from which to base and fund policy. Scholarly literature from which to establish

relational structures of regional coordination for health care emergency preparedness and disaster response are scarce. This study contributes to the theoretical foundation and emerging field of regional health care emergency preparedness and disaster response through the social network lens. Adoption of the social network theory as the architecture for health care coalitions establishes foundational structure and process for any developing health care coalition.

Social Change and Health Care Coalitions

Within the coalition network structure, the findings of this study suggest it is important to establish specific, essential membership representation and responsibilities. Resources should be invested to develop assessment tools that identify, define, and align coalition roles and responsibilities based on discipline. Guidance about representative disciplines, and their expected responsibilities, will further advance regional communication and coordination during preparedness and response. Forming coalitions, using the network structure of social network theory as the architecture, will create positive social change through efficient use of public and private resources and effective coalition roles and responsibilities, thereby, potentially reducing injury and loss of life during disaster response.

The data from this research reveal that the focus on roles and responsibilities is more important than distinguishing between urban and nonurban structures. Somewhat surprisingly, the data do not suggest the need to develop different policies or guidance for urban and nonurban communities; the findings support the current approach of policy

makers to develop and disseminate broad coalition guidance without differentiating between urban and nonurban settings.

The study also supports the research hypothesis that different disciplines contribute different expertise and roles thus increasing the type and number of responsibilities the coalition can accept. As the number of disciplines increase in a coalition, so too does the number of activities increase. This finding suggests that if health care coalitions are to fulfill all responsibilities for communication and coordination, as outlined by the HPP guidance, then a diverse group of disciplines must engage in the coalition. This study also provides a basis from which a coalition could evaluate the membership, activities, and expectations to identify gaps in roles and responsibilities.

This finding provides opportunity for further guidance refinement. Practitioners and policy makers may use this study to develop tools and guidance documents focused on the roles and responsibilities, rather than the community size. For example, development of an assessment tool that evaluates and determines the number and type of disciplines critical to coalition responsibility, rather than separate urban and nonurban tools, would be a research-based solution for advancing coalitions. In an era of decreasing funding for emergency preparedness and disaster response, this information will help guide efficacious policy and yield promising results.

Although the study did not allow for a conclusive statement about the difference in roles and responsibilities among coalitions located in counties that had experienced a federally declared weather-related disaster, as compared to coalitions that had directly

experienced this type of disaster, the study does provide the foundation for new research about this topic. The information revealed provided direction for deeper, refined inquiry about the influence of disasters on regional communication and coordination. In this era of climate-change, there is likelihood of continued increase in the number and magnitude of weather-related disasters. Flooding, wildfires, winter storms, and hurricanes are examples of climate-related disasters that have become more frequent and severe in the past decade. It is critical that health care providers understand the implications of climate change on their community and are prepared to respond. Health care coalitions with network structures that include many health- and disaster-related disciplines should be formalized with clear roles and responsibilities, centered on communication and coordination, to effectively support the health and medical infrastructure. The social network theory and findings from this study provide a framework for community resiliency.

Practice Implications for Social Change

Beyond weather-related disasters, the 2014 Ebola Virus Disease outbreak has demonstrated the critical need for health care coordination during any disaster and beyond any borders. The need to communicate and coordinate systems of care to screen, isolate, and provide initial and extended treatment for confirmed Ebola patients in the United States has proved daunting. Formalized networks among diverse providers including emergency medical services, public health, and hospitals are critical to protecting patients, families, health care workers, and the general community. Further, networks that can efficiently and effectively train, equip, and prepare health care workers

likely would minimize the public and financial risk, as well as, the resource burden of caring for a patient with Ebola. The Ebola outbreak has demonstrated a need for better coordination among these health care actors and this study suggests health care coalitions are an effective structure for such coordination.

The implications for positive social change based on scholarly knowledge will further refine coalition structures creating clearly defined disaster roles and responsibilities, regardless of community size. This research will support efficient allocation of resources toward outcomes that establish regional systems of accurate communication and essential coordination of medical response during a disaster. The result and positive social change may contribute to reduced loss of life and injury.

It also is important to pursue innovation and further explore and study the benefits of community-based networks beyond the scope of disasters. For the health care industry, the implications for positive social change go beyond emergency preparedness. The Patient Protection and Affordable Care Act, enacted in March 2010, has dramatically changed the health care delivery system (Public law 111 – 148, 2010). The current landscape of health care reform demands development of interdependent relationships among providers across the entire continuum of public health and medical care. Population-based approaches require providers to improve health outcomes, such as hospital readmissions, while concurrently addressing and improving community health status. These new demands to improve quality of care and health require network structures to develop efficacious systems to communicate and coordinate care from primary prevention through end-of-life care. The nodes of public health, primary care

providers, community-based clinics, hospitals, pharmacies, and home health are examples of key disciplines, which require linkages that bridge resources and coordinate care of the individual and the community.

Research Implications

The current environment provides an opportunity to develop researched-based network structures to reconfigure the health care system. Regional and community linkages that bridge people, organizations, and jurisdictions likely will produce social capital through efficient use of limited resources to improve safety, quality, and health within any community, regardless of size. Identification of a larger set of activities currently conducted by health care coalitions for emergency preparedness may result in a normally distributed dependent variable, thus supporting more rigorous analysis such as a multivariable regression analysis. The study of many disciplines with the same coalition may lend itself toward a hierarchical linear model to further study disciplines within a coalition.

There are new research questions posed for study. Evaluation of real-world disaster response of coalitions would provide insight into network structures and social capital. Beyond disasters, in-depth qualitative exploration of social capital among varying health care coalitions would provide context for further coalition development and refinement. Quantitative studies focused on additional disciplines and activities also would provide context for more complex coalition structures and for varying missions.

Conclusions

In an era of decreased federal funding for emergency preparedness, health care reform, and increased national and global threats of disease and disruption, it is critical that health care systems have established regional structures and processes to communicate and coordinate response during a disaster. Establishing regional structures founded in social network theory provides the architecture for health care system resiliency during a disaster. Defining the roles and responsibilities of health care coalition actors, responders, and receivers provides clear guidance for regional communication and coordination structures, in any community, of any size. Health care coalitions with clearly defined structure, roles, and responsibilities strengthen regional response during disasters resulting in reduced loss of life and injury.

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Appendix A: Hospital Participation in Healthcare Coalitions for Emergency Preparedness and Response Survey

The following is the original survey used by Rambhia et al. (2012).

Appendix: Complete Survey Questions

Survey Questions on Hospital Participation in Healthcare Coalitions for Emergency Preparedness and Response

| <i>Question</i> | <i>Response Options</i> |
|--|---|
| Hospital name, zip code | <ul style="list-style-type: none"> • Write in |
| Does your hospital participate in a discrete entity, partnership, organization, coalition, planning group, consortium, or other agreement with other hospitals and community partners for emergency planning and response? | <ul style="list-style-type: none"> • Yes/No |
| Select the option that best describes participation in this entity. | <ul style="list-style-type: none"> • Participation is voluntary • Participation is required by city, state, county or other jurisdictional or regulatory entity • Other (please specify) |
| Select the option that best describes membership in this entity. | <ul style="list-style-type: none"> • Greater than 75% of acute care hospitals in the community participate • Between 25% and 75% of acute care hospitals in the community participate • Less than 25% of acute care hospitals in the community participate |
| When was this entity started? | <ul style="list-style-type: none"> • Prior to 2002 • Between 2002 and 2007 • After 2007 |
| Select the option that describes stakeholder participation in this entity. | <ul style="list-style-type: none"> • Includes hospitals only • Includes other stakeholders in addition to hospitals |
| Select all that apply regarding stakeholders' participation in this entity (multiple option). | <ul style="list-style-type: none"> • Public health • EMS providers, private or municipal • Emergency management agency • State or regional hospital association • State medical society • Physicians' practices • Primary care providers • Federally Qualified Health Centers • Private ambulance providers • Long-term care providers • Mental health providers • First responder organizations • Coroner or medical examiner • Home health agency • Other (please specify) |
| Select the option that best describes organization of this entity. | <ul style="list-style-type: none"> • Leading or organizing entity is a hospital or group of hospitals. • Leading or organizing entity is a public health or emergency management agency. • Other (please specify) |
| Select the option that best describes structure of this entity. | <ul style="list-style-type: none"> • Members are linked formally through Memorandum of Understanding (MOU), Memorandum of Agreement (MOA), or contract. • Informal linkage by custom or agreement • I don't know. • Other (please specify) |
| Does your hospital participate in the National Hospital Preparedness Program (HPP) run by the US Department of Health and Human Services? | <ul style="list-style-type: none"> • Yes/No |

(continued)

Appendix. (Continued)

| <i>Question</i> | <i>Response Options</i> |
|---|---|
| Select the option that best describes distribution of HPP funds. | <ul style="list-style-type: none"> • HPP funds go directly to the hospital. • HPP funds go to the coalition or entity for distribution to hospitals for common purchasing. • HPP funds go to both. • I don't know. |
| Select the activities performed by the entity and its partners (multiple option). | <ul style="list-style-type: none"> • Involved in planning activities to prepare for mass casualty events and disasters • Conducts joint threat assessment/hazard vulnerability analysis • Joint purchasing of equipment or supplies, and/or creating regional stockpiles • Formally links group of hospitals, jurisdictional emergency response, and public health entities • Conducts joint training and drills • Involved in joint response to mass casualty events and disasters • Participates in local Emergency Operations Center • Shares bed availability and surge capability information during planning and response • Serves as an information clearinghouse with systems for tracking patient load and available assets • Coordinates alternative care facilities • Convenes regular coalition meetings • Members contribute money or in-kind resources to support the coalition • Other (please specify) |

Curriculum Vitae

LESLIE L. PORTH**EDUCATIONAL BACKGROUND**

- **Walden University** **current**
 - Doctorate in Public Policy and Administration, concentration: Homeland Security Policy and Coordination
 - Dissertation in progress
 - Coursework completed November 2013, GPA: 3.91
 - Relevant courses:
 - Public Policy Implications of Terrorism Legislation and Policies
 - Terrorism: A Systemic Approach for Emergency Preparedness
 - Critical Incident Planning and Leadership
- **Saint Louis University** **1997**
 - Master's in Public Health with Honors, Summa Cum Laude
 - Thesis: Developing Health Care Coalitions to Address Preventive Health Issues
- **University of Missouri – Columbia** **1984**
 - Bachelor's in Science of Nursing

PROFESSIONAL ACCOMPLISHMENTS**Missouri Hospital Association** **1999-current**

Job Summary: Research, analyze, provide strategic direction, develop, lead, facilitate collaboration, implement and evaluate population-based initiatives resulting in improved systems of care.

- Division Vice President of Strategic Quality Initiatives 2014 - current
- Vice President of Health Planning 2005-current
- Vice President of Population Health Improvement 2000-2005
- Director of Community Health Services 1999-2000

Summary of Emergency-Preparedness Initiatives **2005-current**

- Direct and lead the ASPR Hospital Preparedness Program grant (formerly HRSA National Bioterrorism Hospital Preparedness Program) for Missouri hospitals as a subcontract for the Missouri Department of Health and Senior Services for 152 hospitals to date: \$50.5 million
- Develop and refine guidance and provide ongoing technical support for 5 regional health care coalitions for emergency preparedness, response and recovery
- Develop emerging national best practice for emergency preparedness coalition development and sustainability in rural and small metropolitan settings
- Provide all-hazard, competency-based education and exercises based on hazard vulnerability assessments for Missouri health care organizations including hospitals, federally-qualified health care centers, local public health, emergency medical services and others
- Established, refine and maintain multiple regional resources including:
 - mobile mortuary remains cooling systems to provide additional temporary morgue space
 - mobile respiratory supplies and oxygen generation system trailers to provide mobile support for respiratory care

- mobile mass casualty and communication response trailers to provide on-scene supplies and communication
- basic medical and sheltering supplies and equipment for approximately 5,500 people
- Established, refine and maintain redundant communication systems to strengthen interoperability during loss of infrastructure including Hospital Emergency Administration Radio (HEAR), 800MHz radio, Web-based management systems, voice-over-Internet protocol, satellite phone and Internet
- Real-world response leadership and coordination for disasters including:
 - 2011 Joplin EF5 tornado
 - 2011 Missouri blizzard
 - 2009 Southeast Missouri ice storm
 - 2006 St. Louis power outage

Summary of Health Equity Initiatives

2001-current

- Provide information and analysis to health care entities regarding disparate health outcomes related to race and income including detailed analysis of preventable hospitalizations
- Seek opportunities to address the health disparities and discrimination of the lesbian, gay, bi-sexual and transgender patient population through awareness and education from LGBT policy organizations
- Facilitate partnerships and provide information on grant opportunities to improve the literacy levels of patient education materials and consent documents
- Language Access
 - Created and sustain Web site to provide more than 750 translated patient education documents in seven languages to approximately 4,000 unique visitors per month
 - Site of origin for the translated “The All About Diabetes Toolkit: series from the American Diabetes Association into Serb/Croatian, Chinese, Russian, Vietnamese and Arabic
 - Site of origin for the translated The Centers for Disease Control 2009 H1N1 materials into Serb/Croatian, Chinese, Farsi, Russian, Vietnamese and Arabic
 - Developed communication boards for simple commands and patient requests in seven languages
 - Participate in a collaborative project with the Office of Civil Rights and the American Hospital Association to increase knowledge and limited-English proficiency services to Missouri patients

Summary of Healthcare Workforce Initiatives

2000-2014

- Capacity Expansion
 - 2003-current
 - Expansion of 195 seats and 14 faculty in Missouri schools of professional nursing and 24 seats in Missouri clinical lab science through 11 academic-provider grant programs
 - Expansion of professional nursing capacity including 108 individual scholarships to increase nursing faculty and advance education of practicing nurses
 - Pilot program for certified patient-care technician program in partnership with the full-employment council and local community college
 - Fiscal management of more than \$2.0 million for scholarship and grant programs
- Recruitment and Retention
 - 2001-current
 - Recruitment of 340 individuals into Missouri schools of nursing and health professions through development and implementation of a scholarship program
 - Retention program to 311 individuals to further education through employment scholarship program
 - Retention programs to develop mentors and preceptors
 - Grant program for hospital-based programs to develop health care professionals from local communities; applications still being accepted
 - Fiscal management of more than \$8.5 million for scholarship and grant programs
- Advocacy and Awareness
 - 2000-current

- Increased advocacy, awareness and educational offerings to provide safe, timely, effective, equitable and efficient patient care in Missouri's hospitals through data analysis and report development
- Increased awareness of the critical need, shortages and contribution of the health care workforce to the state economy through advocacy for a statewide data center
- Development of printed and Web-based materials for health care professionals, educators and the public (www.mohealthcareers.com)

Summary of Population-Based Health Planning Initiatives **1999-current**

- **Community-Based Health Improvement** 2010-current
 - Develop guidance and provide technical support to tax-exempt hospitals to meet the community health needs assessment and community benefit requirements of the 2010 Patient Protection and Affordable Care Act.
 - Facilitate complex local and regional partnerships based on the socio-ecological model to develop community-based strategies to address priority community health care needs
- **Tobacco-Free Campuses** 2005-current
 - Facilitated regulatory language to require hospitals designate facilities and campuses as tobacco-free
 - Developed resources and provide ongoing technical support to implement and sustain tobacco-free campuses in a state with high tobacco consumption and the lowest tobacco tax
- **Hospital Quality Transparency** 1999-2006
 - Facilitated consensus of Missouri hospitals to voluntarily publish Core Measure data prior to the release of Centers for Medicare and Medicaid Services Hospital Compare
- **Community-Based Health Coalitions** 1999-2005
 - Developed and implemented a grant program providing \$2.4 million to 18 community-based coalitions of hospitals, local public health departments and stakeholders to develop and evaluate locally-lead primary and secondary preventive health initiatives
 - Evaluation of coalitions resulted in strategic shift toward locally-based versus state-based leadership and development of more sustainable models

Lake Regional Hospital (formerly Lake of the Ozarks General Hospital) **1984-1999**

- **Director of Community Foundation and Education Services** **1997-1999**
Responsible for competency-based staff development, process improvement, community education and development and foundation services
 - Skills developed and refined: complex and multiple project management, fundraising, leadership, grant writing, communication, budgeting
- **Director of Education** **1992-1997**
Responsible for competency-based staff development, process improvement and community education
 - Skills developed and refined: project management, leadership, communication, teaching, mentoring, budgeting
- **Staff nurse** **1984-1992**
Responsible for providing direct patient care to patients in medical-surgical, critical care and emergency care units
 - Skills developed: clinical proficiency, critical thinking, communication, prioritization, time management

ADJUNCT FACULTY APPOINTMENTS

-
- **University of Missouri – Columbia** **2010-current**
 - Instructor for Principles of Emergency Preparedness; UMC, Masters of Public Health
 - Instructor for Introduction to Public Health; UMC, Masters of Public Health
 - Instructor for Public Health in an Era of Health Care Reform; UMC, Masters of Public Health

• **University of Missouri – Columbia, Sinclair School of Nursing**

1999-2004

- Internship mentor for master's in nursing students

CONTINUING EDUCATION

- Federal Emergency Management Agency, Center for Domestic Preparedness Pandemic Preparedness and Leadership certification 2009
- Federal Emergency Management Agency, Center for Domestic Preparedness Healthcare Leadership certification 2008
- Federal Emergency Management Agency Incident Command System 100, 200, 300, 400, 700, 800 certifications 2007-2009
- Myers-Briggs Training Instrument certification 2008
- American Hospital Association, Health Forum Community Health Leadership Fellowship 1999-2000
- American Nurses Credentialing Center, Continuing Education and Staff Development certification 1994-1999

PEER-REVIEWED PUBLICATIONS

- Wright, K.S., Thomas, M.W., Durham, D.P, Jackson, L.M, Porth, L.L., Buxton, M. (2010). A Public Health Academic-Practice Partnership to Develop Capacity for Exercise Evaluation and Improvement Planning. *Public Health Reports*. 5 (125). 107-116.

PROFESSIONAL TRADE PUBLICATIONS

- Porth, L., Sloan, L., & Wheeler, A. (2013) AHRQ Preventable Hospitalizations: 10-Year Trend Report 2003 – 2012, Missouri Hospital Association
- Porth, L., & Gatz, J. (2013) Healthcare Coalitions: An Emergency Preparedness Framework for Non-Urban Regions, Missouri Hospital Association
- Porth, L. (2013) Standardized, Plain Language Emergency Codes: Implementation Manual, Missouri Hospital Association
- Porth, L., Becker, M. (2012) Community Health Needs Assessment: Issue Brief Series, Missouri Hospital Association.
- Porth, L. (2012) Preparedness and Partnerships: Lessons Learned from the Missouri Disasters of 2011: A Focus on Joplin, Missouri Hospital Association.
- Becker, M., Porth, L. (2011). Primary Care Physicians: The Status in Rural Missouri, Missouri Hospital Association.
- Porth, L. Gatz, J., Kollmeyer, L. (2011). Missouri Hospitals' Emergency Preparedness: Accomplishments and Next Steps, Missouri Hospital Association.
- Porth, L., (2010). Community Health Assessments: Preventable Hospitalizations 2002 – 2009, with technical support from the Saint Louis University, Center for Outcomes Research, Missouri Hospital Association.
- Porth, L., (2010). Community Health Assessments: Health Behavior and Outcomes, with technical support from the Saint Louis University, Center for Outcomes Research, Missouri Hospital Association.
- Porth, L., (2007). Missouri Regional Health Status Report: Preventable Hospitalizations 2006, prepared for by the Saint Louis University, Center for Outcomes Research.
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- Porth, L., (2005). Creating Tobacco-Free Hospitals: A Resource Guide, Missouri Hospital Association.

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- Porth, L., (2003). Missouri's Health Care Workforce: Education, Missouri Hospital Association.
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- Porth, L., (2001). Primer: Health Education Evaluation, Missouri Hospital Association.
- Becker, M., Porth, L., Horner, J.,(2001). Workforce Status in Missouri Hospitals: An Overview, Missouri Hospital Association.
- Porth, L., (2001). Primer: Population Health, Missouri Hospital Association.
- Porth, L., (2000). Quick Guide to Community Assessments, Missouri Hospital Association.

NATIONAL AND KEY STATE PRESENTATIONS

- Porth, L., Chronic Disease Disparities: Losing Ground, Health Literacy Missouri, Improve Practice and Change Lives, Kansas City, Missouri, October 2014.
- Porth, L., The Triple Aim Journey. University of Missouri Center for Health Policy, The ACA and Beyond: The Ethics and Future of Health Care Reform, Columbia, Missouri, October 2014
- Porth, L., Roadmap to Zero: Hospitals as Partners in Public Safety, Missouri Department of Transportation, Roadmap to Zero, Saint Louis, Missouri, September 2014
- Porth L., A Statewide Strategy for Standardized Emergency Codes, Texas Hospital Association, Annual Emergency Preparedness for Healthcare Conference, Austin, Texas, August 2014
- Porth, L. Comparing Regional Urban and Non-Urban Health Care Structures for Emergency Preparedness, Walden University Residency Four, New Orleans, LA., August 2014
- Porth, L., Community Health Needs Assessment: A Foundation for the Triple Aim. American Hospital Association, Public Relations Personal Membership Group, Portland, Oregon, April 2014
- Porth, L., Community Health Needs Assessment: A Foundation for the Triple Aim. Kearney, Nebraska. January 2014
- Porth, L., Smith, C., Schulte, L. Building Resilience in Healthcare Coalitions in Non-Urban Areas. National Healthcare Coalition Conference, New Orleans, Louisiana. December 2013
- Porth, L., Building Resilience in Healthcare Coalitions in Non-Urban Areas. Wyoming Hospital Association, Sheridan, Wyoming. September 2013
- Porth, L. Building Healthcare Coalitions in Rural and Small Metropolitan Cities. Region VII HHS workshop, Kansas City, Missouri. May 2013
- Douglas, D., Porth, L. Legal Lessons: Statewide Mutual Aid Response During the 2011 Joplin Tornado, Webinar, American Health Lawyers Association, April 2013
- Porth, L. First Annual Healthcare Coalition National Conference, moderator. Arlington, Virginia. November 2012
- Porth, L., Patterson, R., Thomas, R. The Joplin Tornado: Preparedness, Response and Recovery. The California Hospital Association Annual Emergency Preparedness Conference. Sacramento, California. October 2012 (keynote)
- Porth, L. Manley, D. The Joplin Tornado: The Role of Coalitions. The Eastern Washington Healthcare Region. Spokane, WA. June 2012 (keynote)
- Porth, L., Patterson, R., Thomas, R., Henry, J. The Joplin Tornado: Preparedness, Response and Recovery. The National Integrated Training Summit on Emergency Preparedness. Nashville, TN. May 2012
- Porth, L. Preparedness, Response and Recovery: The Roles of a Hospital Association. The American Hospital Association Emergency Preparedness Membership Group. Nashville, TN. May 2012

- Porth, L, Gatz, J., Smith, C. Building and Sustaining Coalitions in Rural and Small Metropolitan Settings, National Integrated Training Summit on Emergency Preparedness. Nashville, TN. May, 2012 (poster)
- Porth, L., Manley, D, Denton, R. Preparedness Pays: The Joplin Tornado. The American Red Cross. St. Louis, Missouri, March 2012
- Porth, L., Pulsipher, G., Duncan, G., Denton, R. Preparedness Pays: The Joplin Tornado. Utah Hospital Association. Salt Lake City, Utah. December 2011
- Porth, L., Manley, D, Thomas, R., Preparedness Pays: The Joplin Tornado, Saint Louis University Best Practice Showcase, National Webinar, November 2011
- Porth, L. Missouri Health Care Coalitions: Building Sustainable Partnerships. Intermedix Annual Conference, Milwaukee, WI. September 2011
- Porth, L. Response to the Joplin Tornado: The Role of a Hospital Association during Response. American Hospital Association Professional Membership Group of Attorneys (A2), Kansas City, Mo. September 2011
- Subject matter expert for the American College of Emergency Physicians and the Federal Emergency Management Agency Course, “Building Collaborative Disaster Planning Processes Between Hospitals and Emergency Management,” Web-based offering, August 2011
- Armbrecht ES, Porth L, Burroughs TE. No Change in Preventable Hospitalizations for Diabetes Over Seven Years in a Midwestern State. American Diabetes Association 71st Annual Scientific Sessions, San Diego, CA, June 2011. (poster)
- Porth, L, Gatz, J., Patrick, W., Thomas, R., Coalition Development in Rural Settings, National Integrated Training Summit on Emergency Preparedness. Dallas, Tx, May, 2011 (poster)
- The Fourth National Conference on Quality Health Care for Culturally Diverse Populations, “Providing Language-Assistance Services in Health Care,” Washington, D.C., 2004
- The American Hospital Association and State Hospital Association Community Health Improvement Summit, “Bridging Quality and Health With Performance Measurement,” Chicago, IL. 2003
- The Health Forum The Leader’s Edge Summit, “Engaging Hospitals in Health Improvement,” San Diego, California, 2001
- Moderator: Partnerships for Health in the New Millennium, Healthy People 2010, Washington, D.C., 2001
- The Health Forum Healthy Communities Leadership Summit, “Outcomes Measurement in Missouri,”
- San Francisco, California, 1999

NATIONAL AND STATE APPOINTMENTS

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| • The University of Missouri, Center for Health Policy Health Equity Conference, Planning group, member | 2013-current |
| • The American Hospital Association, Association for Community Health Improvement Annual Conference planning group, member | 2012-current |
| • The National Healthcare Coalition Conference, planning group, member | 2012-current |
| • The HHS ASPR Hospital Preparedness Coalition Subject Expert Workgroup, member | 2012-current |
| • The HHS ASPR Hospital Preparedness Program Capabilities Expert Panel, member | 2011- current |
| • Missouri Executive Roundtable for Healthcare LGBT Equity, invited participant | 2011-current |
| • University of Missouri – Columbia, Graduate School of Public Health, External Advisory Committee, member | 2011-current |
| • University of Missouri – Columbia, Sinclair School of Nursing, External Advisory Committee, member | 2010-current |
| • The HHS ASPR Hospital Preparedness Program Measurement Expert Workgroup, member | 2009-current |
| • American Hospital Association Emergency Preparedness Committee, member | 2006-current |

- Missouri Hospital Association Disaster Preparedness Advisory Board, chair 2005-current
- St. Louis Area Regional Response System Hospital Subcommittee, ex-officio member 2005-current
- Missouri Pandemic Planning Subcommittee for Healthcare Readiness, chair 2006-2009
- Missouri Pandemic Planning Advisory Board, member 2006-2009
- Joint Commission National Performance Measurement Data Strategy Roundtable, member 2006-2007
- National Quality Forum, member 2003-2006
- Excellence in Missouri Foundation, Missouri Quality Award, reviewer and member 2003
- University of Missouri – Columbia, School of Allied Health Advisory Board, member 2002-2006
- Missouri Tobacco Prevention Advisory Board, member 2001-2003
- Missouri Asthma Advisory Board, member 2002-2010
- Missouri Physical Activity Advisory Board, member 2002-2003
- Missouri Cardiovascular Advisory Board, member 1999-2010
- Governor’s Council on Physical Fitness and Health, member 1999-2004

AWARD

- Recipient of the Governor’s Award for Community Health Initiatives for a Rural Community 1998

COMMUNITY INVOLVEMENT

- Waste Watchers Recycling, volunteer 2008-2011
- Camdenton R-III Project Graduation, chairperson 2005-2006
- Camdenton R-III Curriculum Redesign Advisory Committee, member 2004-2006
- Camdenton R-III Growth and Infrastructure Committee, member 2003-2005
- Camdenton R-III Community Health Advisory Committee, member 1996-2000
- School of the Osage R-II Health Advisory Committee, member 1996-2000