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Organizational Complexity, Plan Adequacy, and Nursing Home Resiliency: A Contingency Perspective

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ORGANIZATIONAL COMPLEXITY, EMERGENCY MANAGEMENT PLAN ADEQUACY, AND NURSING HOME RESILIENCY: A CONTINGENCY PERSPECTIVE

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ABSTRACT

Some social and organizational behavior scientists measure resiliency through anecdotal qualitative research, i.e. personality analyses and stories of life experience. Empirical evidence remains limited for identifying measurable indicators of resiliency. Therefore, a testable contingency model was needed to clarify resiliency factors pertinent to organizational performance. Two essential resiliency factors were: 1) a written plan and 2) affiliation with a disaster network.

This contingency study demonstrated a quantifiable, correlational effect between organizational complexity, disaster plan adequacy and organizational resiliency. The unit of analysis, the skilled nursing facility proved vulnerable, therefore justifying the need for a written emergency management plan and affiliation with a disaster network.

The main purpose of this research was to verify the significance of emergency management plans within a contingency framework of complexity theory, resource dependency, systems theory, and network theory. Distinct sample moments quantified causal relationships between organizational complexity (A), plan adequacy (B) and resiliency (C). Primary and secondary research data were collected from within the context of public health and emergency management sectors within the State of Florida.

The research unit of analysis was the licensed skilled nursing facility specified as a nursing home (NH). Most units were affiliated with healthcare systems, while 19% of the sample were not affiliates. The randomly selected sample population of 200 Florida NH administrators provided primary data through a self-administered survey of randomized questions related to the

staff's comprehension of the facility's disaster plan and disaster resource management procedures.

Internal validity from social desirability bias was minimized in two ways: 1) by using secondary data retrieved from trusted sources: CMS, MDS 3.0, and CASPER 2012 and 2) by using survey questions with a 5-point Likert scale to capture staff knowledge, skills and attitudes (KSAs). Distribution of the survey was during the end of hurricane season and the beginning of the annual plan approval cycle (November 4, 2014 until January 19, 2015).

Definitions, calculations, and interpretations of the performance data varied among sources. This lack of clarity created two research challenges: 1) no clear definition of resiliency between healthcare providers and emergency management agencies and 2) no clear definition of organizational complexity. This lack of definition created a problem with utilizing customary performance indicators of organizational behavior within a Donabedian model of medical care: structure (A), process (B), and outcomes (C).

The term resiliency was borrowed from the biological sciences as absorbing, coping and recovering from disruption of routine. In this study, the term resiliency represented disaster response and recovery capabilities for nursing homes that are derived from the complex internal system of patient care. According to Ashby, the state of complexity can be too complicated to quantify and organizational research projects determine component definitions (Ashby, 2007).

In other words, complexity factors are identified by the research methodology. This study analyzed the adequacy of emergency plans designed for nursing home staff, some of the factors were strongly correlated, for example patient comorbidities and level of staffing. For this study, organizational complexity included: acuity indexes, ADL scores, staff hours, staff ratings and occupancy rates. Due to the large quantity of available data, organizational complexity data for this research was reduced into three NH organizational components: patient acuity, workload and administrative strengths.

These factors required three standardized measurement models to improve the accuracy of predicting organizational complexity influence upon plan adequacy and NH resiliency outcomes within the context of a disability centric environment.

The primary finding from this research was the confirmation that disaster plans improve NH resiliency by 16%. The endogenous construct, Plan Adequacy (B) demonstrated a significant resiliency effect of .8 within a scale of absolute 1.

In summary, this empirical study offers strong proof for the contingency theory that NH resiliency is directly influenced by a well-written and exercised emergency plan. Even though the NH population remains vulnerable to emergencies from an organizational perspective, the results confirmed a strong contingency perspective for NH resiliency exists within four disaster plan areas: plan approval status; memorandums of agreement; disaster exercises; and network affiliations.

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LIST OF ACRONYMS

AAR	After Action Report
AMOS	Analysis of Moment Structures
CCRC	Continuing Care Retirement Community
CEMP	Comprehensive Emergency Management Plan
COOP	Continuity of Operations Plan
DF	Degrees of Freedom
DME	Durable Medical Equipment
EM	Emergency Management
EOP	Emergency Operations Plan
ESS	Emergency Status System
FEMA	Federal Emergency Management Agency
FIPS	Federal Information Processing Series
FMEA	Failure Mode and Effects Analysis
LSC	Life Safety Code
HRQOL	Health Related Quality of Life (HRQOL)
MI	Modification Index
NH	Nursing Home
NIMS	National Incident Management System
PGFI	Parsimony Goodness of Fit
SNF	Skilled Nursing Facility
SFF	Special Focus Facility
SPSS	Statistical Program for Social Sciences

CHAPTER ONE
PROBLEM STATEMENT

The problem statement for this research is: the complexity of an organization determines the adequacy of its emergency management plan and that plan determines the organization's level of disaster resiliency. In other words, organizational resiliency is contingent upon organizational complexity and disaster plan adequacy.

Another way of expressing the problem statement is in the form of a question: Do NH emergency management plans adequately improve disaster resiliency for complex organizations? Complex organizations are vulnerable to inadequate planning as experienced by New Orleans in 2005, during Hurricane Katrina.

1.1. Research Goal

The goal of this study was to prove the significance of emergency management plan adequacy in developing organizational resiliency.

The three objectives were as follows:

First, demonstrate the necessity for an adequate emergency management plan. Second, identify the most significant indicators for NH resiliency. Third and lastly, design a contingency model for disaster plans that overcomes the challenges inherent in organizational complexity and thus, enhances organizational resiliency.

1.2. Theoretical Framework

The theoretical framework for this research focused on contingency theory that considered complexity, resource dependence, network, and systems learning. Theories were derived from the continuing conversations and ongoing research projects among organizational behaviorists and emergency management scholars.

According to Louise Comfort of the University of Pittsburgh, there is a continued need for evaluation of human dependency upon nature and the risks associated with that interdependence (Comfort, 2012). Other organizational and public policy scientists attempt to incorporate this complex concept into a simple framework of contingency theories.

Contingency theory research confirms that planning ahead and allocating resources ahead of a disaster allows for better responses and quicker recovery (ICMA, 2007). In other words, contingency planning provides opportunities for an organization to be resilient. That is why, nursing home administrations are expected to include contingency strategies into a planning process that incorporates vulnerability assessments, resource management, and disaster procedures.

The traditional Donabedian model (Structure→Process→Outcomes) used in measuring healthcare quality was modified to consider the context or complexity of an organization in lieu of its structure. This study's modified Donabedian Logic Model provided the best option for demonstrating the contingency relationship of patient acuity, workload, and organizational strengths as the context for the planning process.

Also, the modified model demonstrated the potential for a synergistic relationship. In other words, the joint effects of organizational complexity (A) and plan adequacy (B) upon NH resiliency (C) were also evaluated through this framework. For a diagram, see Figure 1 Theoretical Framework.

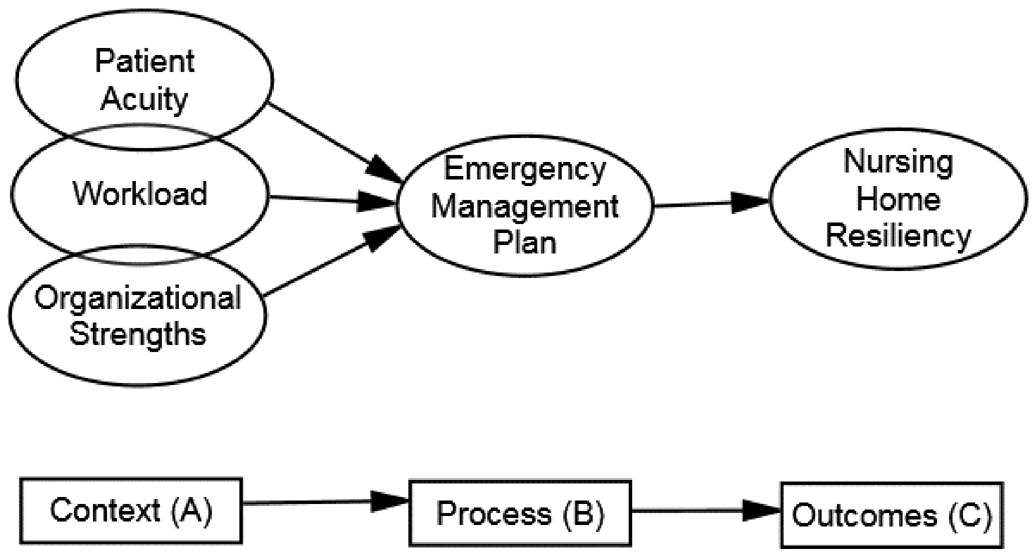


Figure 1: Theoretical Framework

Numerous emergency management studies in Louisiana, Texas, Central Florida, and Japan demonstrated that after natural disasters, multiple agencies work together to rebuild communities. These studies recognized the significance of collaboration among complex systems of resource distribution within public/private networks (Agranoff, 2003; Cutter, et al., 2008; Dosa, et al., 2010; HHS OIG, 2006; Kapucu & Demiroz, 2011; Rivera, 2012). In turn, this increased an organization's capacity for resiliency as best practices were evaluated and shared among emergency management partners through disaster plans. Thus substantiating the concept of plan adequacy as a measureable best practice.

Plan adequacy of the emergency management plan process (B) in this study, was measured within a systems learning concept based upon a contingency theoretical framework. Confidence and familiarity of the emergency management plan can be measured by NH staff knowledge, skills and attitudes (KSAs). The level of NH staff KSA's are contingent upon how much sharing of information is done through inclusion of staff in planning and training exercises.

This concept of plan adequacy as a product of staff knowledge is proposed by Fiedler's complexity theory that organizational behavior is contingent upon "the lowest common worker" and the feedback of staff experience into the organization's operational system (Richardson, 1991).

Besides, the four contingency theories, this research framework was more specifically derived from the following list of resiliency questions:

Q1. Does organizational complexity influence plan adequacy?

Q2. Does disaster plan adequacy influence nursing home resiliency?

Q3. Does organizational complexity influence nursing home resiliency?

Q4. Do organizational complexity and plan adequacy collectively influence resiliency?

These research questions considered three latent endogenous constructs within the Donabedian model as follows: NH organizational complexity (context, A) and plan adequacy (process, B) as staff knowledge and NH resiliency (outcomes C). Four propositions regarding this model and its causal paths are discussed in the next section.

1.3. Propositions

Four propositions or hypothetical statements were derived from the research questions and are discussed in this section as follows:

Hypothesis 1: The NH plan adequacy is contingent upon the NH's organizational complexity.

In other words, quality of patient care is contingent upon NH complexity, resource dependency, and systems learning. This is especially important for patients with dementia, Alzheimer's, or other cognitive disabilities, because their physical conditions deteriorate with the added stress of uncertainty or changes in routine (Bowblis & Hyer, 2013; Brown, et al., 2012). So NH administrators and frontline staff need to share information regarding resource needs and resource availability as well as disaster successes from previous experiences.

Organizational complexity as defined for this study determined the disaster plan design and resiliency strategy. Organizational considerations included multiple factors: Patient Acuity (ADL Acuity and ADL Score), Work Load (CNAHRD, LPNHRD, and OCCUPANCY), and Administrative Strengths (STAFFRATING, RNRATING, and NURSERATIO). These second order indicators of organizational complexity behave as a latent exogenous construct upon the latent endogenous construct, plan adequacy. Plan adequacy through resource sharing among affiliations with other emergency networks then directly affects resiliency.

How well the plan utilizes network collaboration and how well the plan is understood by NH staff, leads to the second hypothesis as follows:

Hypothesis 2: There is a direct positive causation from NH plan adequacy to NH resiliency.

The disaster plan design is expected to save time and adequately provide disaster resources through written agreements, as examples of network collaborations. For example, the plan to evacuate requires training of staff. NH staff must proceed quickly and efficiently while minimizing patient decompensation. Practicing the plan before an emergency increases the likelihood that the plan guidelines will be followed. Thus, the NH can absorb, cope, and recover at an adequate level of resiliency (Alexander, et al., 2010; CDC and PHPR, 2011; Drabek & McEntire, 2002). Understanding the connection between the basic principles of the emergency management plan as designed by the NH staff within the organizational structure of the facility leads to third hypothesis as follows:

Hypothesis 3: There is a direct correlation between nursing home organizational complexity and nursing home resiliency.

Contingency theory suggests an organization's reliance upon available resources and the capacity for utilizing those resources prior to, during and immediately after a disaster effect resiliency. Some scholars believe the location and placement of an organization affects its accessibility to additional disaster resources and that geographic placement is crucial to an organization's resiliency (Cutter, et al., 2008). In some cases, the location of a nursing home is beyond the control of the NH staff and therefore, they depend upon internal strengths of the organization to determine a level of resiliency. Nursing home organizational complexity includes internal procedures contingent upon the complexity of personnel availability and routine resources being supplemented with disaster resources. This hypothesis considers the direct influence of NH organizational complexity upon NH resiliency.

The possibility of a cumulative and/or synergized effect of organizational complexity and plan adequacy upon NH resiliency provided a fourth hypothesis as follows:

Hypothesis 4: There is a cumulative effect of NH complexity and NH plan adequacy on NH resiliency.

Even though an organization may demonstrate a degree of resiliency without implementing an emergency plan, professionals agree that contingency theory implies the likelihood that an adequate plan will elevate resiliency for that organization (ACHE, 2013; Alonzo-Zaldivar, 2012; Brown, et al., 2009; Dosa, et al., 2010; Drabek & McEntire, 2002). Together, the organization and the plan, are proposed to positively enhance nursing home resiliency.

1.4. Delimitations and Limitations

Research delimitations were used to control the size and homogeneity of the case studies. Case studies for this research came from the membership database of the Florida Health Care Association (FHCA) to control for licensed providers within a specific geographic area that were not retirement communities or special focused facilities.

Two other delimitations for quality measures were used: 1) facility related data from the Centers for Medicare and Medicaid (CMS) reports and 2) a structural equation model (SEM). Data from the CMS were used to maintain consistency of information across three measure models. Secondly, the SEM illustrated results from a combination of path analysis, confirmatory factor analysis, factor analysis reduction and multiple regression. This was the most efficient methodology for identifying the most influential measures of resiliency.

SEM may be criticized by some scholars as measuring only some not all of the direct influences on resiliency. However, the model can equate a measure to an “unseen” indicator such as an organization’s internal culture. Previous disaster studies reveal knowledge experience increases coping abilities overtime, especially when shared as part of an organization’s internal culture (Rivera, 2012). Therefore, SEM adds to the discussions by demonstrating internal culture as three latent endogenous indicators: organizational complexity, plan adequacy and NH resiliency.

SEM’s ability to reduce large volumes of data into a manageable format also provided a simple way of explaining a complex problem. For example it was possible to glean from multivariate first factors (i.e. quantity of patients, number of patients needing assistance with daily living (ADL), the number of patients per nurse, staff ratings and staff work hours) into three measurable secondary factors for organizational complexity.

Two limitations of this research were (1) the length of time since a community wide disaster has challenged the adequacy of NH disaster plans and (2) the element of human unpredictability. It was the human behavior component that proved the most limiting. For example: incomplete surveys, opting out after consenting to participate, changes in NH staff during time the survey link was open, and invalid email addresses.

This research was non-experimental and not related to pre- and post-disaster observations. Therefore this research relied heavily upon descriptive statistics and a KSA questionnaire.

1.5. Definition of Terms

This section defines the terms used in this dissertation that may have more than one definition in other research areas. The terms are: resiliency, nursing home, assistance with daily living, nursing home resiliency, disaster and the four phases of emergency management.

The scientific term resiliency originated from the biological and environmental sciences description of an organism's ability to survive adverse conditions. The social sciences adapted this term to describe humans that have survived unusually stress filled changes in their routine living environment. Organizational behaviorists also, contend that organizations and communities display degrees of resiliency, because they are composed of humans.

Nursing homes (NH) for the purposes of this dissertation are specialized skilled nursing facilities (SNF) that do not have to follow mandated evacuations due to the frailty of patients. They are distinct from special focused facilities (SFF) and continuous care retirement communities (CCRC). These facilities provide custodial care and higher levels of assistance with daily living (ADL) activities.

Assistance with Daily Living (ADL) is a scaled measure of patient care as the degree of assistance required to: move in and out of bed, use toilet, bathe, and eat or any other daily routine. The ADL ranges from a minimum of 0 units for self-performance to a maximum of 19 units for complete dependency. The ADL score was used in this research as one factor for organizational complexity. The ADL data were derived from CMS reimbursement forms. See APPENDIX G: ADL CALCULATIONS WORKSHEET. For an outline of ADL categories and performance definitions from the Centers for Medicare and Medicaid see Table 1: ADL Score Definitions (CMS, 2013).

Table 1: ADL Score Definitions

ADL Category	Self-Performance Score	Support Score	ADL Score
	-, 0, 1, 7, or 8	(any number)	0
Bed Mobility	2	(any number)	1
Transfer	3	-, 0-2	2
Toilet Use	3 or 4	-, 0-2	3
		3	4
	-, 0, 1, 2, 7, or 8	-, 0, 1, 2, 7, or 8	0
Eating	-, 0, 1, 2, 7, or 8	-, 0, 1, 2, 7, or 8	1
	3 or 4	3 or 4	2
	3	3	3
	4	4	4

Source: Long-Term Care Facility Resident Assessment Instrument User's Manual version 3, Chapter 6, Section 6.6

In this document the term nursing home resiliency is interchanged with performance outcomes during disasters. Resiliency is the NH's capacity to absorb, adapt, and recover from any disaster that causes a sudden disruption of utilities and/or loss of resources that interrupts routine patient care. This capability of adapting is measured as better outcomes for continuously providing quality care during and after a disaster (Lamb, Zimring, Chuzi, & Dutcher, 2010).

Organizational resiliency is customarily defined by sustainability capacity and economic resources such as operating budgets, disaster reserves, and socioeconomic resources. Some emergency management scholars believe an organization's resiliency capacity can be enhanced through a well-designed and well-implemented disaster plan. So we can go a step further and propose implementation through sustainability and flexibility provide better organization and community resiliency (Alexander, et al., 2010; Bea, et al., 2007; Blake, Howard, Eiring, & Tarde, 2012; CDC & PHPR, 2011; ICMA, 2007; Kapucu, 2010). The importance of community resiliency is recognizd at a nationl level.

The Government Accounting Office in 2009 recommended that FEMA provide better definitions and measurements for resiliency performance in reporting successes and in requesting additional disaster response funds. Therefore, performance as effective assistance after major disasters can be discussed in quantifiable terminology (Scire', 2009). Because disaster response budgets are linked to the cost of personnel and disaster response equipment, disaster professionals distinguish between disasters and emergencies by the degree of urgency needed for response and recovery.

Of course, that means first defining disaster variations and then quantifying the anticipated recovery resources within categories of capability. For example, a brushfire will require a different number of personnel and a different vehicle than an apartment fire. The size of the fire will determine the number of fire teams. In conclusion, resource definitions include categories and types: Type I, II, III, IV, or V per definitions used by the National Incident Management System (NIMS). Therefore, disaster resources are quantifiable during all phases of emergency management (i.e. prior to, during and following a disaster).

In anticipation of a disaster, emergency managers collaborate through four overlapping phases within disaster resource networks. These four phases are directed by formal and/or informal stakeholders through interagency public/private collaborations.

By definition, these emergency management phases are: preparedness, response, recovery and mitigation. They are sometimes referenced as the cycle of emergency management and are given equal amounts of significance as demonstrated in Figure 1. Emergency Management Phases (Committee on Private-Public Sector Collaboration to Enhance Community Disaster Resilience, 2011; FEMA, 2012; FHCA Education & Development Foundation, 2009; Waugh, 2012).

Figure 2: Emergency Management Phases

Each emergency management phase has goals and objectives implemented through standard operating procedures. For example, during the preparedness phase, emergency managers assess a community's vulnerabilities and write plan policies to address vulnerabilities with measurable objectives. One objective is mitigation or hardening of a community's infrastructure. (i.e. Re-fortify bridges and levees).

The mitigation phase incorporates physical activities that minimize damage during the response phase of managing a disaster. Some professionals agree mitigation crosses over into other disciplines, such as urban planning for community infrastructure and economic development (Council for Excellence in Government, 2006; Dolan & Messen, 2012; Drabek & McEntire, 2002; FEMA, 2012; IAEM, 2012; Kapucu, 2010; Waugh & Streib, 2006).

1.6. Problem Summary

The complexity of an organization determines the adequacy of its emergency management plan and that plan determines the organization's level of disaster resiliency. In other words, organizational complexity (A) influences plan adequacy (B) and organizational resiliency (C). Plan adequacy is witnessed through staff knowledge, skills and attitudes.

CHAPTER TWO
REVIEW OF THE LITERATURE

Healthcare and emergency managers are credited with protecting and saving lives during disasters. Resiliency remains contingent upon both sectors working closely together before, during, and long after a disaster. People are not expected to die from disaster related incidents.

In 2006, it was determined that local, state, and national authorities' "failure to act" exacerbated living conditions after a category 4 storm breached the city's levees. Flood waters swept into the city streets August 28, 2005 and remained in some areas at a maximum height of four feet until September 29, 2005. During that time medical staff and administrators from two skilled nursing facilities made national headlines. One facility was privately owned and operated within a one story building. It lost 34 souls. The other facility rented the seventh floor of a New Orleans hospital and was publicly owned by an out-of-state corporation. It lost 105 souls.

Forty-eight hours after Hurricane Katrina (Category 4) passed through St. Bernard Parrish, Louisiana, St. Rita's Nursing Home staff began floating patients through facility windows on top of mattresses (Alonzo-Zaldivar, 2012; Fink, 2013).

Life Care at Memorial Hospital sheltered palliative care patients and was assumed to be safe from flood waters on the seventh floor. However, after five days of isolation, no electricity, minimal back-up generators, no water, no communications, and minimal staff; Life Care survivors began to lose hope. Speculation remains that some nursing home patients were inadvertently over-medicated by disaster response physicians who were unfamiliar with and prevented from accessing patient medical histories (Fink, 2013).

Court findings in both cases, further concluded two important points: 1) the public and the nursing home owners were not warned in time of the possibility of flooding, and 2) the Lake Ponchatrain levees were not maintained to acceptable standards by local authorities. Thus, the St. Rita nursing home staff were exonerated because they relied upon their prior experiences of successfully sheltering in place through previous storms. As for the staff at Life Care, professional reputations were tarnished even though no formal charges were made against the surgeon that volunteered to assist patients languishing in the humidity without power for five days (Alonzo-Zaldivar, 2012; Florida Health Care Education and Development Foundation, 2008).

Even though these tragedies occurred in Louisiana, the escalating challenges of managing community-wide disasters continue across the nation. There remain public health service gaps during disasters, especially among nursing home patients. Because of the frailty of patients nursing homes are exempt from mandatory evacuations (Bascetta, 2006; Brown, et al., 2012; HHS OIG, 2012). Contingency planning professionals continue to be proactive and rely upon emergency management principles for mitigating disaster losses from cascading events, while simultaneously coping with the increased frequency of declared national disasters and the unpredictability of human behavior (FEMA, 2011; Kovner & Knickman, 2008; Kroch, Champion, DeVore, et.al., 2012).

The challenge of coordinating among three levels of government during a disaster creates unexpected problems when implementing response and recovery strategies. Sometimes the disaster is not wide-spread enough to involve higher levels of governmental authority. Problems begin with coordinating the timing of disaster declarations as events cascade out of the control. The bureaucratic lines of authority begin at the municipal level, then pass through state authorities and when necessary, up to the federal level. The Federal Emergency Management Agency or FEMA reports to the President and therefore cannot activate until a formal request for assistance from a state governor is received and accepted by the President. By law, disasters are considered under local authority first. A federation structure such as the United States prevents state or national interventions without local declarations of emergency. Therefore, emergency plans for nursing homes (NH) begin at the local level with strategies for coordinating additional disaster assistance, if needed.

One way of overcoming layers of authoritative bureaucracy during a disaster is by having an adequate local plan design that is familiar to facility staff members and the local emergency responder agencies. A poorly designed plan can diminish the effectiveness of an organization's ability to absorb, cope and recover from a disaster. Thus, an inadequate plan can create additional resiliency problems for a very complex organization. The complexity within a nursing home is determined by patient acuity and the severity of patient illnesses. Therefore, the emergency management plan effectiveness compensates for organizational complexity to provide quality of healthcare during less than optimal conditions.

Effectiveness of the plan guidelines are related to the NH staff's familiarization with disaster policies that differ from routine policies. Richardson points out those social groups that share experiences include stakeholders and utilize feed-back loops of thought can learn from each other (Richardson, 1991). This "learned" efficiency within the healthcare system develops overtime among NH staff as they practice the NH emergency management plan during disaster exercises.

This research study began by examining the emergency planning process between local and state policy levels. The units of analysis were skilled nursing facilities (SNF), specifically nursing homes (NH) within the State of Florida. The exogenous variables from the unit of analysis were represented by Organizational Complexity, A. The study treatment or intervention was the adequacy of the NH disaster plan or Plan Adequacy, B. The outcome measure was the NH's capacity for disaster resiliency, C. The NH was chosen as the unit of analysis, because NHs are subjected to three levels of legislative guidance: city/county; state; and national.

Firstly, at the local level, nursing home licensing contracts require certificates of need, facility permits, and Life Safety Code or LSC inspections as part of the disaster plan review. Secondly, at the state level, nursing homes are mandated to meet the Centers for Medicare and Medicaid (CMS) reimbursement guidelines and adhere to Florida Statutes 252 and 59A of Title XXIX Public Health Chapter 400 Nursing Homes and Related Health Care Facilities. Lastly and thirdly, at the national level, the Agency for Health Care Administration (AHCA) promotes the Code of Federal Regulations Title 42: Public Health, Chapter IV Section 483 for Long Term Care Facilities (δ 42 CFR 483) (GPO, 2015).

Florida's historical experience with natural disasters and the state's popularity as a retirement destination provides a cultural mix of skilled nursing facilities and acute care clinics that have been exposed to the perils of hurricanes, wildfires, and related economic shifts (Bascetta, 2006; Council for Excellence in Government, 2006; Cowles Research Group, 2012; Dolan & Messen, 2012).

In 2012, there were 679 licensed nursing homes in Florida that provided 81,657 beds with an 87.93% occupancy rate. That is approximately 71,753 nursing home residents (Florida, 2012) potentially requiring evacuation or sheltering in place during declared disasters.

Whenever a disaster forecast mandates an evacuation order, nursing homes are exempt from complying due to the fragility and comorbidity of their patients (HHS OIG, 2006). Thus, nursing home staff make decisions contingent upon four contextual elements: (1) available resources; (2) whether the nursing home is a network affiliate (i.e. member of a corporate healthcare system); (3) previous disaster experiences; and (4) imminence of the disaster.

Healthcare and emergency managers are credited with providing the best possible response and recovery during disasters affecting their communities, recovery efforts remain contingent upon both sectors working closely together before, during, and long after a disaster. People are not expected to die from disaster related incidents.

Performance measures for healthcare professionals and emergency managers are constrained on three governmental levels (local, state and national) within a federalist system by financial and regulatory legislation. The challenge to effective implementation of emergency management plans is to coordinate and collaborate through recognized mitigation performance measures. Events over the previous decade have identified performance gaps between policy analysts, emergency planners and healthcare providers (Agranoff, 2003; Alonzo-Zaldivar, 2012; Brown, et al., 2009; CDC and PHPR, 2011).

Emergency management plans consider all disasters as "local" and therefore disaster preparedness, response, recovery and mitigation efforts are initially contingent upon local response plans and local resources. On the other hand, an adequate emergency management plan requires manpower, medical supplies and expenses that may never be regained. Therefore, local elected officials and public healthcare policy experts question the cost-effectiveness of an emergency management plan relative to the expense of providing continuous quality of care to disaster survivors.

Popular media reports often illustrate, through anecdotal examples, a belief among citizens that some other outside agency or jurisdiction will "save the day." Regardless, recent events that strongly demonstrate that final outcomes rely heavily upon local preparation, local mitigation and local planning initiatives rather than reliance upon a cavalry-rescue approach from outside the impacted community (FEMA, 2012; National Council on Disability, 2007; Zinn, Mor, Feng, & Intrator, 2009). More disaster research is needed to gain empirical evidence identifying methods for closing the planning gaps and improving disaster policies at all levels.

Healthcare professionals are credited with providing the best possible patient care during the response and recovery phases of disasters affecting their community. They demonstrate resiliency during day to day operations that lay the foundation for ingrained organizational resiliency that may be replicated in other sectors. The cascading affects during disasters add another dimension of urgency whenever planning resiliency performance.

In 2005, property losses due to nationally declared disasters were over $115.4 billion dollars and totaled 1,256 disaster related deaths. Six years later the financial losses decreased to $23.8 billion with 1,019 dead (Hazards & Vulnerability Research Institute, 2012). Some scholars credit the successful implementation of emergency management plans, early activation notices for evacuations, and other local mitigation strategies for improving resiliency and for minimizing loss of lives and property (Kapucu, Augustin, & Garayev, 2009). Thus, one may conclude there is a connection between pre-planning and disaster resiliency.

Even though some communities pre-plan better than others, there remains concern about isolated segments that are more vulnerable than others (i.e. rural and shoreline areas). For example, special focus facilities, centers for independent living, and long term care facilities located in coastal areas such as the Pacific (includes the states of Hawaii, Oregon, Washington, and California) and the Gulf States (includes the states of Texas, Louisiana, Alabama, Florida, and Georgia) are more prone to natural disasters such as hurricanes. Other disaster vulnerabilities include wildfires, severe tropical storms, and tornadoes.

Crises within the last decade, put California, Louisiana, and Florida as the top three states in the amount of damages caused by natural disasters. These three states stand out because of their combination of high property values and densely settled populations that include higher percentages of the nation’s most vulnerable (i.e. elderly and frail) who will at some point be living in skilled nursing facilities (Centers for Medicare & Medicaid Services, 2013a; Hazards & Vulnerability Research Institute, 2012). That is why the skilled nursing facility’s disaster plan is of significance to public health officials.

The Health and Human Services’ Office of the Inspector General or OIG found that one year after Hurricane Katrina, there remained nationally, healthcare facility emergency plans that included less than full compliance with the Centers for Medicare & Medicaid Services or CMS. Less than 20% of these facilities knew how to contact their respective disaster assistance agencies in 2005 (HHS OIG, 2006). In addition, some professionals speculated that prior to Katrina, the disaster plan review process of existing plans was cursorily done by inadequately trained reviewers.

The OIG found that disaster plan surveyors were not trained to review emergency plans consistently and to a set standard. Other than compliance for CMS reimbursement, there remains little accountability in the adequacy or effectiveness of NH disaster plans. Therefore, the NH emergency management plan review process is considered by a few public safety officials as too subjective for implementation. A second concern is that each nursing home’s emergency and evacuation plan may or may not be fully tested prior to a disaster (Blake, Howard, Eiring, &

Tarde, 2012; CMS, 2013b; HHS OIG, 2006; Eiring, Blake, & Howard, 2012). Therefore, NH facilities remain vulnerable and potentially non-resilient without an adequate disaster plan.

Some strategists believe the effectiveness of emergency management plans have overtime been diminished into a few pages of short, non-detailed bulleted descriptions in response to items outlined on the checklist. Some emergency managers express frustration and concern that these plans are inadequate and the review process is merely a formality for new or renewing NH operating licenses (Brown, et al., 2009).

Furthermore, there is speculation that the NH plans rely too heavily upon fire evacuation procedures and ignore other vulnerabilities. The 1995 AHCA checklist or plan recommendations for nursing homes requires a fire evacuation plan per the Life Safety Codes (LSC) and a signed letter from the nursing home's local Fire Chief. Because, the LSC also requires a physical inspection of the nursing home facility every year, the fire inspection is considered by some emergency managers as adequate for all types of disasters. Never the less, others believe this is a narrow focus with limited technical knowledge of other types of hazards such as high winds and/or flash-flooding (CDC and PHPR, 2011). After all, fires are not the only impetus for nursing home evacuations. This concern requires additional attention especially when considering the political environment surrounding elderly care.

Bassett (2006) testified before the U.S. Senate Special Committee on Aging that "hospital and nursing home administrators face challenges related to evacuations caused by hurricanes" (p. 3). They must obtain specialized transportation that includes medical records and arranging a receiving facility with appropriate staffing and specialized services for functionally impaired patients (some with multiple morbidities). As pointed out earlier in Chapter One, nursing home facilitators are exempted from following mandatory evacuations given by local government because their residents may decompensate due to patient acuity. Thus, patients could unnecessarily suffer from the adverse rigors of transport to another facility. This is an important consideration in determining plan adequacy.

Other considerations that demonstrate plan adequacy and/or resiliency for healthcare systems involve plan implementation, revenue, and resource distribution. Firstly, the plan implementation is an opportunity for the staff and administrator to identify decision triggers or when to evacuate their patients and when to notify emergency managers of the need to assist the nursing home with implementing the mutual aid agreements. On the other hand the plan implementation may not be practical when needed because the procedure relies upon weak agreements between the healthcare administrator and healthcare service providers or competing vendors.

Secondly, revenue sources may be redistributed when evacuation and transportation agreements are enforced with other facilities and community vendors. When a client is transported to another location it can be extremely expensive based upon the degree of care and case management. For example, the patient's physical and mental condition may diminish or the newer facility may encourage the patient to choose to remain instead of being transported again to the original nursing home after the disaster.

Thirdly, in resource distribution, plan adequacy and NH resiliency can be managed by healthcare system administrators within an open system of inter-organizational agreements (Pfeffer & Salancik, 2003). Emergency response resource sharing through collaborating networks demonstrates the capacity to build organizational resiliency within nursing homes.

2.1. Historical Overview of Contingency Theory and Research Literature

Therefore, state legislative bodies created requirements for the emergency plan review process for public health and organizational safety. For example, Florida Statute 252 Public Safety and Statute 59 Skilled Nursing Facility Administration (FL Statutes, 2012) outline public expectations and designated lines of authority. These polices and their place within the context of this study's contingency research framework are discussed in more detail, later in this document.

Decisions to implement the emergency plan are contingent upon staff experience from previous disasters or from disaster exercises where feedback loops of information are shared to improve future performance. Some scholars call this systems learning or systems theory, where the organization's performance is described as open with vertical and horizontal sharing of knowledge within system functions (Richardson, 1991; Stevenson, 2012).

Knowledge sharing includes resource identification and training in how to most effectively use resources. In emergency management, resources are defined as logistical items that include trained personnel. In health care emergency management, resources include medical supplies, back-up power, and food as logistical items. So resource management is a key component of emergency management plan adequacy. Thus, two primary research aims were to first analyze the roles of the nursing homes' organizational complexity within and without a healthcare system and secondly analyze the emergency planning process for managing disaster resources.

The system of stakeholders in the NH community that provide direct health care services include professionally licensed employees (i.e., Registered Nurses and Licensed Practical Nurses) and certified paraprofessionals (i.e., Certified Nursing Assistants). Thus, feedback from stakeholders may be critical to the practicality of NH disaster plans and economic survival. Some scholars contend that the emergency management process operates under a social learning frame and that there are multiple layers of influences (both vertical and horizontal) that induce plausible explanations for individual and public behaviors. For example, some social resistance or “perceived barriers” exist among people that do not understand the consequences of a disaster or who need assistance when plans do not provide adequate guidance during disasters (Eiring, Blake, & Howard, 2012; Oetjen, et. al., 2012; Morse, et.al, 2006; Rivera & Settembrino, 2012; Zinn, Mor, Feng, & Intrator, 2009). Staff considerations and knowledge of the organization’s disaster plan affect performance outcomes.

Previous research has also, confirmed that employees will first take care of personal needs and family members before reporting to work or possibly, not report for duty at all, during disaster conditions (Council for Excellence in Government, 2006; Community Preparedness Division, 2011, p. 16). If the nursing home staff is expected to implement a plan that does not include their family concerns and/or is too physically demanding to follow, then the likelihood of the plan’s success may be compromised. Therefore the strength of the nursing home’s resiliency performance during an actual disaster is dependent upon staff considerations.

Staff members are significant to nursing home resiliency because of their direct influence in the implementation of consistent quality of care for the patients. The core competencies of the nursing home staff contribute to organizational complexity because the workforce can be categorized into four skill sets: direct care, administration, service personnel, and other workers. Core competencies are also significant to resiliency as staff KSAs become tested during the disaster environment. Thus the importance of recognizing the plan’s dependence upon each category of skills within the context of the organization.

The Federal Emergency Management Agency (FEMA) proposes a “Whole Community” stakeholder concept in the emergency planning process to prevent collaboration gaps such as miscommunication or misunderstanding of responsibilities within the disaster community. This concept can be applied to the structural organization of the nursing home environment. Since, FEMA recommends including an all levels of leadership approach to planning and mitigating disaster performances, then nursing home emergency plans are also expected to include all levels of leadership because the forgotten staff member could be the weakest component in strengthening resiliency.

Specifically, the inclusion of every stakeholder into each phase of the emergency management process, especially in the preparedness planning phase has proven to be the best practice. Some policy analysts suggest planning sessions within a healthcare network that also includes personal emergency planning for personnel and their families during a disaster. This active inclusion has been demonstrated to successfully build and strengthen community resiliency for other populations (Council for Excellence in Government, 2006; FEMA, 2009a; National Organization on Disability, 2009a).

Whenever designing an emergency management plan, nursing home administrators are encouraged by the Agency for Health Care Administration (AHCA) to include employee contingency planning into their facility's emergency management plan. Citizen surveys after Hurricane Katrina (the second most costly U.S. natural disaster to date, after Super Storm Sandy) revealed that 45% of businesses did not have contingency plans for employees and important personnel (i.e. security officers and first responders) abandoned their assignments to take care of family needs (Federal Emergency Management Agency, 2011, p. 12). Therefore, most disaster experts propose that all employee stakeholders and their families be included in the emergency plan as an internal network of resources.

Network theorists understand the importance of sharing emergency resources internally, externally, and across agencies, especially within non-profits (Gazley & Brudney, 2007; ICMA, 2007). Collaborative efforts among healthcare networks within the height of a disaster are the basis for effective emergency management through collaboration guidelines designed from multiple levels. These guidelines come in the form of a disaster plan with the goal of determining strategies for tough decisions. These decisions might be to evacuate or to remain in place during and immediately after a disaster (i.e. roof damage, power outage, or water encroachment).

The rationale for choosing to shelter in place versus evacuation is contingent upon three determinants: (1) patient acuity, (2) timeline and (3) resources. First, will each patient need assistance from more than one staff member? Second, how long will it take to gather enough staff and supplies to evacuate patients? Third, is there an alternate facility large enough to accommodate the evacuated patients? All three concerns involve transportation needs.

Other considerations include transporting patients and supplies whenever routine travel and delivery routes are blocked by disaster debris. Also, is there enough back-up power available during the disruption of utility services? How long will patients suffer when the facility is isolated or without power? Are enough transport vehicles available to accommodate all of the patients, their respective caregivers, and relevant patient records plus medical supplies? Will there be enough beds available in the alternate receiving facility? Emergent staff and patient behavior will likely need leadership familiar with the disaster plan.

Many disaster sociologists and organizational psychologists utilize leadership concepts designed by Fred Fiedler to examine human and organizational behavior. Prior to Fiedler, analysts researched only human traits and personalities (Ashby, 2007). Fiedler postulated that leadership styles and learned behaviors can create performance effectiveness within an environment. However, the degree of complexity and stressfulness creates the need for controlling a situation through leadership. Two measures are important in Fiedler's model: context and task orientation. Some still use the scale designed by Fiedler to measure leadership effectiveness. Criticisms of Fiedler's task measurement (Least Preferred Coworker) scale contend that it is inaccurate when measuring leaders' interpersonal feelings and it provides inflexible solutions.

On the other hand, proponents of Fiedler's scale believe it works well for leadership effectiveness measurement within the context of disasters (Agranoff, 2003). They assume the disaster response is task oriented and that survivors are unfamiliar with emergent volunteer responders. Fiedler contends a natural leader will arise from the disaster environment and organize the chaos using innate skills.

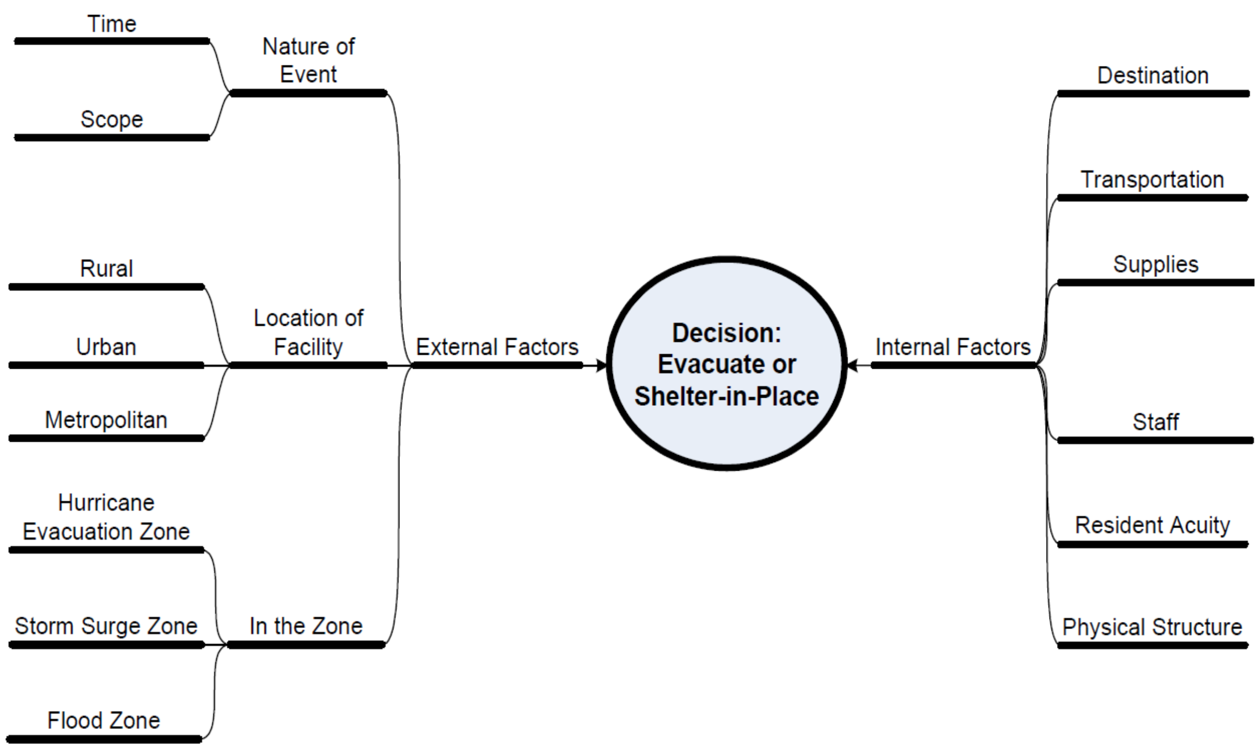
However, this may not always be the most effective or efficient way of handling a situation, especially without appropriate training to the tasks, as during the 1983 earthquake in Mexico City.

In 1983, 113 volunteers died from injuries they received while responding to an earthquake. Emergent volunteers working frantically among strangers in a debris field, did not coordinate tasks well. Thus, endangering themselves and increasing the number of casualties. From that single event came the idea for a community-wide civilian training program. The Community Emergency Response Team (CERT) or neighbor helping neighbor concept was formalized in 1987 in Los Angeles, California by the fire department (FEMA, 2011). CERT is designed for developing community disaster leaders and for training volunteers their task assignments prior to working together during emergencies. Trained volunteers lead other volunteers. Some disaster contingency scholars think human capabilities are measured within the context of managing resources inside a stress filled environment. CERT is an example of a shift in contingency theory by replacing Fiedler's weak measurement scale of Least Preferred Worker (LPC) (untrained and unknowledgeable) with a trained professional volunteer. Public health managers and NH administrators can, also, be trained in emergency management contingencies.

In 2008, another transformation in the health field entailed a recommitment to "transcend complexity" through the ten steps of systems thinking (WHO, 2009, p. 33). This required an indepth comprehension of each element within the relationships that make a system. One relationship is that of Emergency Management (EM) as a disaster planning partner of healthcare providers. The EM sector already plans interventions with system wide outcomes, because EM is a network partner in risk aversion.

Healthcare systems benefit from shared information and emergency plans that promote continuity of operations following a disaster. Stakeholder buy-in and joint emergency planning increase the likelihood a disaster plan will be followed and therefore overcomes limitations of a traditional approach. Systems thinking allows EM plans to become useful tools in maintaining patient care during all types of complex disasters because they save time and task redundancy through simplification of priorities and flexible systems thinking (Richardson, 1991).

One demonstration of a "flexible and responsive cause and effect" decision process is also based upon pre-identified criteria of internal and external considerations or systems thinking. This contingency theory based model is redrawn in Figure 2 from the *National Criteria for Evacuation Decision-Making in Nursing Homes* (Florida Health Care Association, 2009, p. 2).



Source: National Criteria for Evacuation Decision-Making in Nursing Homes
(Florida Health Care Association, Florida Health Care Education and Development Foundation, 2009, p.2)
Figure 3: National Criteria for Decision to Evacuate or Shelter in Place

A strong disaster response network requires collaboration to be successful. Some scholars point out the importance of both vertical and horizontal relationships in managing complex disasters effectively. High organizational performance is equivalent with high organizational resiliency and the capacity to respond quickly to restore organizations back to a previous level of operations (Kapucu, Arslan, & Demiroz, 2010). The network collaboration components provide opportunities to share knowledge and disaster experience as well as material goods. This collaboration can extend to all levels of government. Florida nursing homes not only have access to resources provided by their local network of healthcare systems, there are national organizations wishing to collaborate through other network collaboration research.

2.1.1. Complexity Component of Contingency Theory

Healthcare professionals evaluate the knowledge, skills, and abilities (KSAs) of their staff as core competencies within three tiers of responsibility. These competencies are proven by Fielder's complexity theory requirements for situation and task orientation measurements. In this study, these competencies were compressed into three elements of organization complexity based upon relevant correlations: patient acuity, workload, and administrative strengths. These competency sets are discipline specific and apply to front line staff as well as supervisory positions in the healthcare field. Occasionally, this is referred to as a medical model for complexity.

The Institute of Medicine's report *The Future of Public Health* introduced the idea of an "ecological model of public health" and included a recommendation for teaching leadership management skills. That report led to a 2003 Institute of Medicine study *Who Will Keep the Public Healthy? Educating public health professionals for the 21st Century*. The study focused on five areas: epidemiology, biostatistics, environmental health, heath services administration, and social behavioral sciences (Council on Linkages, 2012).

Also, the IOM recommends that healthcare professionals incorporate the public health ecological model into areas of communication, policy, and thus create a culture of competence through staff retention and professional development. That recommendation led to eight core competencies used today by health care professionals to evaluate their workforce and training programs. These eight core competencies were identified by nineteen members of the Council on Linkages between Academia and Public Health Practice (Public Health Foundation, 2013).

The eight core competencies for public healthcare professionals are: 1) analytic/assessment skills, 2) policy development/program planning skills, 3) communication skills, 4) cultural competency skills, 5) community dimensions of practice skills, 6) public health sciences skills, 7) financial planning and management skills, and 8) leadership and systems thinking skills. These skills are measured in each of three levels of accountability or position "tiers" (Council on Linkages, 2010).

These core competencies are also important to nursing homes as they pertain to emergency management objectives. For example, a cultural competency skill (item four in the above paragraph) prevents discrimination when implementing an emergency management plan among fifty-seven self-identified race combinations.

Among researchers, it is accepted that race be defined as a group of physical characteristics, while culture is an accumulation of learned behaviors, personal development, and mores. Ethnicity, on the other hand is the self-identified origin of a person. Sometimes the literature interchanges the term race with ethnicity as a cultural identity and this creates confusion for research analysts. This is a problem, whenever collecting information from more than one data source. Therefore, race and ethnicity are considered by the Office of Management and Budget (OMB) apart from cultural identification (Humes, Jones, & Ramirez, 2011, p. 2). The federal government recognizes only two ethnicities: Hispanic and Non-Hispanic (United States Census Bureau, 2010). Nevertheless, access to healthcare during disasters remains equitable acorss racial, ethinic, and cultural barriers. The challenge comes when emergency management agencies attempt to identify who needs help.

During the 2004 hurricane season, survivors identified as Hispanic demonstrated reluctance in requesting and accepting disaster assistance. This particular social dynamic was demonstrated in an analysis of Puerto Ricans who survived a natural disaster. The level of personal discomfort in requesting and receiving disaster assistance from others formulated emergent disaster response behaviors within this ethnic group (Rivera, 2012; Rivera & Settembrino, 2012). Head of households did not wish to be seen as weak or unable to provide for their families. They refrained from reaching out for disaster assistance after three hurricanes came inland to Central Florida. This was an example of how difficult it is to quantify resiliency performances within some healthcare environments, because of cultural perceptions and attitudes of emergency personnel.

Therefore, ethnicity dynamics within organizational complexity as defined by the nursing home context affects plan adequacy and nursing home resiliency. Aggregate ethnicity data are available at the community level and not at the nursing home level. However, an estimated break down of Florida's cultural diversity provides a demonstration of emergency managements challenges in reaching out to 24% of the state population (U.S. Census Bureau, 2013). See Figure 3 Florida Cultural Diversity.

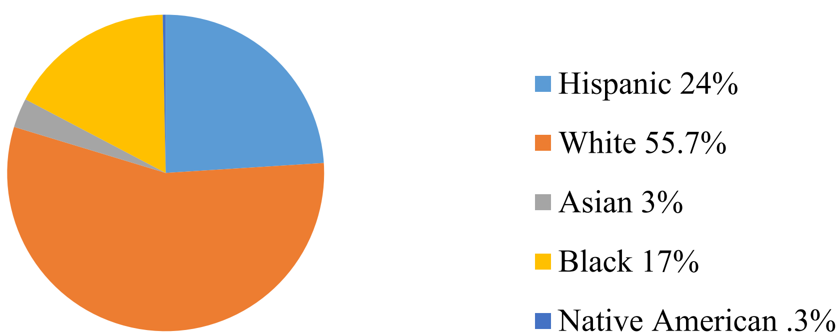


Figure 4: Florida Cultural Diversity

Florida is comparatively dense with a population of 350.6 persons per square mile. Of 19.5 million Florida residents approximately 18.7 percent are over 65 years of age and approximately 2.1% of that population are over 85 years old. The Disability & Health Data System approximates 33.9 % of this age group live in Florida with one or more disabilities

(Centers for Disease Control and Prevention, 2014). See Appendix B: Disability Status Overview. Previous studies of NH complexity reveal that the majority of NH patients are elderly females (RTI Insitute, 2012). This may be due to longevity across genders. The percentage of elderly females (both Black and White) in Florida exceeded the national percentage. See Table 3 for Demographics and Geography of Florida and USA.

Table 2: Demographics and Geography of Florida and USA

	Florida	USA
Population, 2013 estimate	19,552,860	316,128,839
Persons 65 years and over, percent, 2013	18.70%	14.10%
Female persons, percent, 2013	51.10%	50.80%
White alone, percent, 2013 (a)	78.10%	77.70%
Black or African American alone, percent, 2013 (a)	16.70%	13.20%
American Indian and Alaska Native alone, percent, 2013 (a)	0.50%	1.20%
Asian alone, percent, 2013 (a)	2.70%	5.30%
Native Hawaiian and Other Pacific Islander alone, percent, 2013 (a)	0.10%	0.20%
Two or More Races, percent, 2013	1.90%	2.40%
Hispanic or Latino, percent, 2013 (b)	23.60%	17.10%
White alone, not Hispanic or Latino, percent, 2013	56.40%	62.60%
Land area in square miles, 2010	53,624.76	3,531,905.43
Persons per square mile, 2010	350.60	87.40
FIPS Code	12	

(a) Includes persons reporting only one race.

(b) Hispanics may be of any race, so also are included in applicable race categories

Source: http://quickfacts.census.gov/qfd/states/12000.html

2.1.2. Resource Dependency Component of Contingency Theory

Researchers believe resource dependency theory among network partners may generate potential strengths that can create additional sustainability opportunities for the nursing homes' network agents. Overtime and with increased familiarity with the principles of disaster resource management, NHs can restructure their resiliency capacity, especially in the area of resource management.

Nursing home (NH) leadership initiates a disaster plan, then authorizes disaster revenue, that pays for and distributes available resources. Some scholars call this series of activities plan implementation. Thus resource dependency as a contingency theory ultimately identifies those revenue resource variables that influence leadership decisions. Identifying appropriate and adequate resources is significant for designing effective response activities and to sustain long term recovery procedures that develop into NH resiliency (Alexander, et al., 2010; Glaser & Strauss, 1967; Kapucu, Augustin, & Garayev, 2009; Kroch, et. al., 2012; National Council on Disability, 2007).

Other emergency plan integrity factors are evacuation and/or shelter in place items required by AHCA such as: the frequency of staff disaster training; planned notifications to patient family members during times of a disaster; employee hotline; financial reserves; medication reserves; and mutual aid agreements to procure additional resources such as specialized transportation and facility arrangements for an alternate shelter. This concept of resiliency is an adaptive process for vulnerability assessment and for identifying available resources needed for recovery (Agranoff, 2003; Council on Linkages, 2012; Cutter, et al., 2008).

2.1.3. Systems Learning Component of Contingency Theory

As discussed earlier, the theory of systems learning is demonstrated by nursing homes when causal factors are considered in emergency plans. Systems learning or systems thinking is the theory that resiliency can be taught as a ten or more step system. Some resiliency scholars observed among school children that resiliency techniques can be learned through shared experiences (Sandfort, Selden, & Sowa, 2008). These findings can be generalized to an adult population of employees and patients within a nursing home environment. Systems learning can be used to effectively design resiliency strategies (HHS OIG, 2006; FHCA, 2009; WHO, 2009).

Emergency managers use similar planning principals during all four disaster management phases (Drabek & McEntire, 2002; FEMA, 2012). One of the outcomes of systems learning for emergencies is the National Incident Management System (NIMS). Common terminology and system definitions can be taught to any and all emergency response practitioners. Using resiliency tools such as NIMS can curtail misunderstandings whenever emergency managers and nursing home administrators collaborate across disciplines. NIMS accommodates the four cyclical phases of emergency management.

Systems learning goes beyond cause and effects, it also teaches partners how to work more efficiently across units. The two cultures of healthcare and emergency management can be brought together in one unified system with a plan of common objectives using common terminology. Common language that crosses cultural barriers is important because organizations that insist upon their own internal communications may feel excluded and thus isolated from other groups among the disaster response network (Waugh, 2003). EM planning becomes more intuitive by using systems learning combined with resource dependency in managing complex disasters for complex organizations. For example the use of the National Incident Management

System (NIMS) as common language and universal principles (i.e. chain of authority) to shift traditional paradigms across cultures such as public health, law enforcement, fire suppression, and local politics.

Even though it has only been around since 2002, this system is composed of two proven concepts that are effectively used during disasters: incident command structure (ICS) and tactical support terminology (i.e. TYPE I, II, III, or IV).

Components from organizational systems that are important to contingency planning come together to provide a common working language and common disaster task assignments. These management principles were gathered from across collaborating networks , such as the forestry and wildfire service, the military, public health, and fire departments, that traditionally respond to wide spread emergencies. One of the most important principles in NIMS is the ability to assign appropriate resources into action using tactical support terminology.

For example, the term ambulance can mean different things to different groups so the capabilities of the ambulance are distinguished by Type and capability Level in NIMS. In other words a Type I ambulance has less capability than a Type II because it may have only a paramedic while the Type II carries a registered nurse. Thus, systems learning allows diverse members within multiple agencies within a network, to understand each other's rationale in contingency plans.

This systematic collaboration is vital to what Richardson describes as maintaining "social homeostasis" during times of chaos (Richardson, 1991, p. 52). The systems learning feedback loop allows for systematically streamlining and prioritizing disaster dynamics through plan adequacy.

Thus the plan becomes a more useful tool in maintaining the quality of patient care during all types of disasters, especially across emergency response cultures. The two cultures of healthcare and emergency management can be brought together into one unified plan of common objectives with common terminology. Common language crosses cultural barriers and organizations that insist upon their own internal communications may feel excluded and isolated from other groups. There needs to be adequate planning among the disaster response network that includes both NH and EM (Waugh, 2003). A common communication language between NH personnel and public safety responders may have prevented the misstep in turning away rescue helicopters as described by Sheri Fink in her book, "Five Days at Memorial" (Fink, 2013). Fink's interviews with the Coast Guard pilots sent to rescue patients from hospital roofs revealed the confusion created by inappropriate hand movements from staff untrained in aviation signals.

Healthcare systems can benefit from other forms of shared information as emergency plans promote continuity of operations (i.e. uninterrupted patient care) following a disaster. Systems learning proves the idea that NH staff share technical expertise during joint planning opportunities with other NH staff, NH administrators, and NH owners. Other stakeholders that need to be included in the joint planning are the local emergency managers (EM).

Stakeholder buy-in and joint emergency planning increase the likelihood a disaster plan needs feedback from disaster staff that are familiar with written disaster procedures. Therefore the emergency management plan becomes a living document of frequent updates as new knowledge is acquired and shared. More terminology and definitions common to both emergency managers and NH administrators can enable each to understand the other's capacity for future rescue collaborations. Once that is identified, then one can begin to quantify degrees of readiness in the form of collaboration capacity.

In other words, the plan review process uses a feedback loop between healthcare and emergency managers as a systems thinking tool that enhances plan adequacy along with network collaboration. Multidisciplinary systems thinking creates better outcomes during opportunities for network collaborations.

2.1.4. Network Collaboration Component of Contingency Theory

Recent literature suggests that problems between healthcare facility administration and emergency management responders include multiple interagency challenges that hinder effective coordination, communication, and collaboration before, during and after a disaster (Gazley & Brudney, 2007). Network Collaboration is significant to nursing home resiliency as disaster recovery and the sustainability of the nursing home uses additional resources and operational knowledge during actual crises. Some scholars consider network stability is derived from sustained internal relationships among sub-networks of collaboration and mandatory network collaboration does not need to be funded by partners outside of the network (Agranoff & McGuire, 2004; Gazley, 2008). Multiple reports from all three levels of government (local, state, and national) confirm the need for better emergency management planning that emphasizes shared financial responsibilities and accurate communication of disaster needs across disciplines.

Disaster resiliency may be contingent upon federal, state, and local partnerships as seen through mandatory collaborations within a network of other healthcare providers and emergency management agencies. The measurement of that collaboration capacity begins with a measurement of the factors affecting resiliency capacity or the disaster recovery performances. The measurement of collaboration capacity within network theory can be demonstrated as factors for NH resiliency: caregiver to travel with patients during evacuations (TRAVCAREGIVER), the estimated travel time needed to evacuate patients (TRAVTIME), procedures for contacting network partners (ESSPROC) and network membership in the Emergency Services Status network (ESS). These factors have been identified by other research projects as potential indicators of resiliency derived from healthcare and emergency management network affiliations (Institute of Medicine, 2009; National Research Council & Geographical Science Committee, 2011).

Because interagency collaboration is so vital to public health and safety, Florida Statute 252 was written to establish collaboration between county emergency management agencies and healthcare facilities in emergency management planning. Florida Statutes 58 and 59 provide specific criteria for Skilled Nursing Facility emergency plans (Florida Senate, 2011; Florida Statutes, 2012; ICMA, 2007). Since legislation is so stringent for nursing homes, some professionals believe the NH leadership's emergency planning policies can guide future management practices for all units of a healthcare system (Florida Health Care Education and Development Foundation, 2008).

2.1.5. Routine Networks and Disaster Response Networks

Research literature of healthcare facility emergency management plans and the administration networks that implement those plans does not demonstrate specific professional network development. Written agreements of mutual understanding formalize the network. More research is needed regarding the direct correlation between informal healthcare networks and formal requirements (i.e. legislation for facility certification) for an emergency plan in healthcare facilities and systems. On the other hand, nursing home administrators discuss the importance of their role as leaders and contingency plan designers as well as risk managers. These leadership skills become part of the emergency management plan process for healthcare facilities (American College of Healthcare Executives, 2013).

The formal or authorized healthcare leaders may have initial “command or control” in writing the emergency plans however the coordination of vendor contracts and mutual agreements with other facilities may have to rely upon informal collaborations built upon social capital and trust built over time and through prior experience.

There is an assumption that competition for clients rule disaster policy and the decisions to evacuate or to shelter in place.

Could this be the result of healthcare administrators remaining within a vertical silo when planning for disasters? Are there unrealistic expectations that having a plan is adequate to meet any disaster? There are missing components such as emergency response training and regular exercising of or practicing the emergency plan. Will implementation with network partners work prior to a disaster? There could be lack of horizontal networking across agencies or missing collaborations with vital organizations such as the local chapter of the American Red Cross and local emergency managers.

More research is needed regarding the possibility that healthcare facility emergency planners working within a normal network still need to consider how and when to change the normal network into the disaster response network while using the same resources.

Five differences between routine networks and the disaster response networks are in the type of leadership, funding sources, the scale of the network mission (or disaster complexity), how resources are managed and the degree of sharing information. Routine networks share information informally and use available resources as collaborations among network partners.

A routine network leader is chosen from within the network based upon proven skills or access to needed resources. The network mission that brings the routine network together is a manageable commonality among interdependent network members. The routine network may transform into a disaster response when a formal declaration and formal leader is authorized to manage an extreme situation.

All together these five measures comprise what motivates collaboration among network partners. For example FEMA launched its Project Impact 1997 series of disaster resistant community workshops to mitigate loss of lives and property while the Institute for Business and Home Safety generated new business for the Blue Sky Foundation's fortified home program and other network partners providing local, state, and federal public education programs in building safety construction. In all fairness, not only were these network partners motivated by funding sources they were also encouraged by recognition from other agencies.

In some cases, the same agency would be collaborating formally and informally among other organizations that they ordinarily would not have been associated with outside the common mission of disaster response and mitigation (Waugh, 2003; Waugh & Strieb, 2006).

Not all routine networks qualify as a potential disaster response network, however, disaster response networks may operate as a normal network prior to a disaster. See Table 2 for a concept matrix of the characteristics of these networks.

Table 3: Routine Networks and Disaster Response Networks

Measure	Description	Routine network	Disaster response
Leadership	Type	Informal	Formal
Funding	Source	Availability dependent	Government Reimbursements
Complexity	Scope	Manageable mission	Extreme threat to life and property
Management	Resources	Collaboration	Procedures and formal processes
Communications	Info Sharing	Informal	Formal Declaration

Besides the difference in types of leadership between routine and disaster response networks there is a difference in the way effective leadership is developed. Some routine network leaders may be formal or informally determined by the amount of influence they have over the network's resources and the internal coordination activities among network partners selecting their leadership.

However, in disaster response networks, leadership may occur in the form of authorized command with a formalized hierarchal structure. A disaster response network stresses accountability in the selection process of leadership. For example, when the 9/11 Commission and House Select Committee investigated Hurricane Katrina's poor performance. This committee placed the root cause for the poor emergency response at the feet of the 2005 disaster response network leadership at all levels of government.

Also, there seemed an unwillingness to initiate any action even when imperfect weather predictions and a 2003 Army Corps of Engineers vulnerability assessment pointed out the fragility of the Ponchatrain levees. The committee found elected officials failed to adapt existing plans while Hurricane Katrina developed offshore in the Gulf of Mexico. So lessons learned from the 9/11 emergency response were forgotten and not applied in managing response strategies.

Even though a comprehensive emergency management framework provides room for collaboration in hard mitigation there remained a lack of leadership in understanding how to braid together disaster recovery and response missions into a flexible and adaptive plan. Waugh and Strieb (2006) speculate there was lack of good information sharing or lack of leadership coordination that led to a "lack of imagination" and "failure of initiative."

Leadership in the Department of Homeland Security emergency management network may be too dependent upon its command and control structure. Perhaps Charles Wise as cited by Waugh and Strieb (2006) is correct and the Domestic Homeland Security processes could be more flexible in sharing information across agencies thus stimulating more collaboration and creating an atmosphere of adaptive management. Adaptive management provides opportunity for organizational learning and network improvisation.

The nursing home emergency management process often appears well thought out on paper, yet the plan could actually be too weak to be effective whenever needed. Therefore, the reliance upon CEMPs as the only measurement may be inadequate to give a worthwhile study of a nursing home's resiliency.

Another concern associated with depending upon CEMPs outside an established network is the expectation that one or the other tool is not necessary for disaster recovery. After action reports from famous disasters such as Hurricane Katrina prove the idea of a "disconnect" or false assumption that nursing home emergency management plans alone are sufficient to provide adequate services to clients during and after disasters.

Successful nursing homes may need to be involved in a participatory network that is flexible within its structure and adaptable to changes in membership. Thus, a network analysis provides an additional measurement tool that may reflect the potential for collaboration capacity building and another perspective of community resiliency.

Nursing homes share an internal network within a healthcare system or corporation. However, some nursing homes are stand-alone and need to find collaboration partners thorough an external network. So an online system of healthcare partners was created to share resources during disasters; the Emergency Status System (ESS).

This member network is the collaboration or affiliation indicator for this study. The ESS is used real-time before an anticipated disaster and during the response phase. Nursing home administrators choose to become members of the ESS and activate their online account to locate available facilities or extend assistance to other members. For example, one nursing home may have ten empty beds available to receive patients from another facility that is damaged and needs to transfer some patients.

2.2. Research Literature Specific to Resiliency

The terms resilient, resiliency, and resilience may have originated during the Roman Empire from the Latin word *resilio*. In the biological sciences a plant is considered to be resilient when it continues to grow after being cut back, trampled on, or subjected to other adverse conditions such severe weather (drought or hard freeze).

Overtime social scientists began to resiliency to describe the ability of individuals and organizations to overcome adversity, economic hardship, or environmental disruptions. Similarly, resiliency is used in the public administration of emergency management to describe the absorption of damage, recovery from adversity, and the ability to continue as before or to improve after a change in circumstances (de Bruijne, Boin, & van Eeten, 2010; Wachtendorf & Kendra, 2004; Waugh, 2011).

Resilience is understood by some professionals as the ability of individuals and communities to recover quickly from the physical and economic damages of a manmade or natural disaster. Resilience also describes organizations, communities, cultures and any other arrangement of individuals with the potential to survive adverse situations. In order to measure something such as resiliency, it must first be defined within a range of possibilities (Cutter, et al., 2008). For example, a nursing home facility's staff resiliency may be defined by the amount of adaptability demonstrated through modified knowledge, skills, and attitudes (KSAs). These modified KSAs can be seen in the decision to shelter in place and/or to evacuate.

Some experts believe resiliency is strengthened through community education projects and building code implementation (Comfort, 2012). However, there does not seem to be an agreed upon framework or methodology for measuring private-public or community resiliency (CPPSC, 2011), particularly within ethnicities and cultural communities.

Some researchers consider performance outcomes as qualitative measures for resiliency in nursing homes (Hyer, Brown, Berman, & Polivka-West, 2006; Thomas, et al., 2012; Thomas, Hyer, Castle, Branch, Andel, & Weech-Maldonado, 2012). There are other examples of people being self-reliant upon their own experience rather than someone else's plan.

In some cultures, requests for assistance are viewed as admission of weakness or failure and actions follow belief systems, so will fatigued nursing staff ask for help after long hours working a disaster when their ethnic inclination is to "tough it out" (Kapucu, 2009; Rivera F. , 2012; Rivera & Settembrino, 2012). Additionally, there appears to be no empirical explanation for an administration's determination when to move patients into another facility, except that it is perhaps due to subjective judgment and the decision maker's attitude towards risk aversion (Council for Excellence in Government, 2006; Mileti, 2009).

To help with the decision process, in 1994, the Agency for Health Care Administration designed a "checklist" for nursing home emergency management plans. That checklist is still used today by some but not all nursing homes. The list recommends separate written agreements for each disaster resource provider. However, these agreements may not be enforceable during a disaster. Also, small communities share the same vendors and services may not be available during community-wide disasters.

This creates the potential for conflict among NH plans that rely upon the same providers. Disaster service demands from multiple NHs can overwhelm resource providers while also creating a surge in NH services. Additional complexity ensue whenever both sectors are simultaneously delivering relief and supplies (i.e. alternate facility, additional staff, ambulance service, durable medical equipment, and prescription medicines) to multiple NHs affected by a disaster.

Consider that if NH disaster plans include memorandums of agreement among the same pool of resource providers then supply and demand become incongruent and the agreements unenforceable. For example, more than one NH contract can overload available local resources such as durable medical equipment (DME); special needs case managers; supplemental disaster staff; qualified ambulance drivers; dietary suppliers; and other public safety response services (i.e. Police, Fire, and EMS).

However, within the context of this study, the profit status and system or non-system affiliation directly affects the endogenous latent construct "nursing home resilience." If the NH is affiliated with a for-profit system (corporation), then there may be additional resources and economic resources available from outside the disaster area (i.e. corporate system vendor contracts in another county).

The significance of belonging to a corporation may not guarantee that a NH administration will implement the disaster plan as designed by "out of area" leadership. Facility staff knowledge and understanding of procedures for emergency resource management is crucial to success. Employees respond to a disaster per their interpretation of the procedures outlined in their NH plan. This sociological perspective affects resiliency (Alexander, et al., 2010; Fink, 2013; FHCA, 2009; Rivera & Settembrino, 2012). So the plan design process is correlated to the facilty owenership.

This study examined the correlations between the NH organizational variables that indirectly affect the adequacy of the plan design (Kapucu, Hawkins, & Rivera, 2013; Weech-Maldonado, et al., 2012).

As the healthcare system became more complex two planning design tools were created: The National Criteria for Decision Making in Nursing Homes (Florida Health Care Education and Development Foundation, 2008) and the Emergency Management Guide for Nursing Homes (Florida Health Care Association, 2009). Also, as an assessment and accountability process, the Centers for Medicaid and Medicare Services (CMS) have guidelines for patient care and legislative compliance for reimbursement (Centers for Medicare & Medicaid Services, 2013).

Future emergency management professionals, community leaders and nursing home administrators have to consider these legislative and financial drivers along with their other changing roles in society that influence how they collaborate on nursing home emergency plans. They also work together within a context of decreased predictability and increased service expectations from varying ethnic groups at the risk of diminished healthcare due to a rapid occurring disaster and its cascading effects (FEMA, 2012; Mileti, 2009; Wachtendorf & Kendra, 2004).

Recent restructuring of healthcare delivery systems has encouraged an interest in the Performances Management Movement because of the debate around what defines quality of care. Some scholars assess Quality of Care by four effectiveness measurements: management capacity, management performances, program capacity and program performances.

Four characteristics of the performances movement are “greater reliance on standards and guidelines; routine and systematic interval measures of patient function and well-being…pooled clinical and performance data, and appropriate results from the data base analyzed and disseminated to meet the concerns of each decision maker” (American College of Emergency Physicians, 2012, p. 2).

In 2009, the Center for Disease Control financed a study conducted through the Emory Rollins Preparedness and Emergency Response Research Center. The survey of 27 nursing home administrators in California, Florida, and Georgia found that local emergency management agencies had less influence on the resiliency planning for nursing homes than the local fire and law enforcement. Of those nursing homes surveyed, 64% exercised their disaster plans twice or more times a year without participation from their local emergency management agency (Eiring, Blake, & Howard, 2012). These findings reconfirmed what the Department of Health and Human Services (HHS) found in their 2006 study of nursing home failures during the 2005 Hurricane Katrina evacuations.

Five years after the OIG’s initial findings it stated that the plans remained inadequate with some of the previously identified disaster preparedness and response concerns. Nursing home plans and disaster response procedures “lack relevant information,” and have “unreliable transportation contracts, negative effects on residents, and lack of collaboration with local emergency management” (HHS OIG, 2012, p. 22). Where were the gaps in the emergency management planning process?

The emergency management process has four elements in the preparedness cycle described as: planning, response, recovery, and mitigation. This cycle is ongoing throughout the life of an organization and therefore can have overlapping activities. Never the less each element requires an amount of collaboration between the nursing home and its disaster resiliency partners. This collaboration is through written agreements of understanding and just in time contracts. In turn that stakeholder collaboration strengthens the organization (Alexander, et al., 2010; Kapucu, Hawkins, & Rivera, 2013; ICMA, 2007).

A contingency model for NH resiliency performance can be cumulatively derived from both the NH organizational complexity and the adequacy of the NH's disaster plan. The contingency theory framework proves the dynamics of this second order model can be measured as defined by the organizational characteristics used by healthcare practitioners to distinguish between service providers (Atkinson, Martin, & Rankin, 2009; Government Accountability Office, 2007; Hazards & Vulnerability Research Institute, 2012; Grandbois & Sanders, 2009; Jackson, Firtko, & Edenborough, 2007).

2.3. Disaster Network Collaboration

There are multiple levels of social influence that minimize or eliminate emergency management collaboration that are too advanced for this study and will be reserved as latent or unobserved indicators in future research regarding healthcare emergency plans (Langan & Christopher, 2012).

Collaboration is not only significant to NH disaster response it is also linked to the recovery and sustainability of the nursing home. Some scholars consider network stability is derived from sustained internal relationships among sub-networks of collaboration (Agranoff & McGuire, 2004; Gazley, 2008). Thus, resource dependency theory and systems thinking among network partners may generate potential learning that can create sustainability opportunities for the nursing homes' network agents to restructure their collaboration capacity; hence, the NH system's institutional collective actions can transform into a resiliency process for resource distribution (Kroch, Champion, DeVore, Kugel, Lloyd, & Rothney-Kozlak, 2012; Neely, et al., 2000). For example networks of nursing home administrators and local emergency managers collaborate together to provide equitable and quality patient care during and immediately after manmade and/or natural disasters.

An online tool for this collaboration is called the Emergency Status System (ESS). This system allows nursing home administrators to share their bed availability or need for assistance with other facilities. Essential health care provider information can also be tracked immediately as the emergency impact is reported through this password protected electronic system. ESS provides individual user accounts for health care providers, affiliates, and provider partners. Accounts must be approved and identified with an AHCA User Code. In addition, network affiliates require provider approval for access to the system.

Prior to a disaster, ESS partners are required by Florida Statute 408.821(4) to provide updated points of contact information and current phone numbers. Other operational information is also required such as the facility's utility service account and type of existing generators. Network activities are linked to disaster events. For example, an approaching hurricane or a near-by wildfire will determine the type of account entries made into the ESS.

The Emergency Status System (ESS) assists with prioritizing response activities and can be a resource in implementing the disaster response strategy of the nursing home (NH). Disaster activity reports in the ESS can be viewed by the Emergency Operations Center, the Attorney General Office Staff and the Long Term Care Ombudsman Staff. If the ESS is written into the EM plan design then appropriate NH staff that is assigned authority to log into the ESS can collaborate with other ESS partners. Inventory and sharing of disaster resources can be streamlined with more efficient transmittals of updated information. For example, a facility can report through ESS the availability of additional beds to nursing homes needing an alternate location for evacuation. Pre-storm information may include evacuation status of the provider and the plan for transporting to a safer destination. Evacuation time can be minimized by sharing pertinent information ahead of time. Special needs such as oxygen, dialysis dependency, danger of patient elopement, and caregiver contact information can also be supplied prior to the disaster. Of course the patient census and bed availability can be updated as the disaster event progresses overtime and patients evacuate or family members join them as they shelter in place. The ESS is an example of a formal network with structure and accountability built into the collaboration process. However, there are less formal and informal disaster networks.

Other studies of informal internal networks among nonprofits and their government partners in Georgia demonstrated that when the non-contractual relationships are weakly collaborative and temporary, there is no sharing of knowledge or network learning. This lack of knowledge sharing or network learning can also occur across multiple teams within a contracted network system because tension created by the diversity of leaders creates a need for unity of purpose. For example, the Ortho Infrared Project and Iowa Geographic's collaboration network that mapped a community's growth corridor using GIS technology teams demonstrated that collaboration capacity includes joint information sharing activities and events (Gazley, 2008). However, core organizations evolve overtime to an increased status and thus stabilize the overall collaboration network.

Thus, effectiveness can be learned overtime when the internal network is stable enough to sustain itself through continuous sharing of information (Gazley). Therefore, NH system collaboration can be an indicator of resiliency as derived from a nursing home being part of a healthcare system or not part of a healthcare system.

2.4. Critique of the Validity of Contingency Theory Research

Contingency theory alone is not enough to capture the causality of healthcare network agents that can restructure a nursing home's collaboration capacity within the context of a multi-layered healthcare system. Hence, the validity of contingency planning requires additional theories to capture the NH system's institutional collective actions that transform contingency planning into a manageable resiliency process for emergency resource distribution (Kroch, Champion, DeVore, et.al., 2012; Neely, et al., 2000).

Contingency theory research alone may not always include resource dependency theory and/or systems learning and/or network collaboration. These three other grounded theories are partitioned as stand-alone cause/effect analysis by resiliency experts. Resiliency research actually relies upon multiple jurisdictions and cross-sections of a population. Therefore the validity of resiliency research within a framework of contingency theory that encapsulates resource dependency, network collaboration and systems learning is necessary for a robust study.

2.5. Summary of What Is Known About Contingency Models

In the public health sector there is minimal empirical evidence for minimizing observed disparities when prioritizing emergency response activities to save time and expense. Previous disasters revealed that external factors weighed internal decisions. For example staff family members need shelter so employees are unencumbered and can then attend to fragile patients; or transporting less frail patients first to alternate locations accommodates for less available resources. Other case studies demonstrate that systems knowledge improves overtime as shared through networks. New knowledge and experience gained during a disaster can be applied to increase coping abilities for the next disaster (Rivera, 2012). The significance for "thinking ahead" thorough an emergency plan and designing disaster response activities that are prioritized before-hand is understood to save time, expenses and lives.

A grounded framework for adaptive public health management research and emergency management contingency scholars is composed of four theoretical possibilities: complexity theory, systems learning, network collaboration, and resource dependency. Even though many theories are available the contingency framework allows analysis for some of the same variables indicated in other frameworks. For example, contingency theory includes the leadership consideration that the SNF Corporation creates internal communication barriers for the on-site NH staff working during a disaster.

Along with internal corporate challenges, implementation of NH emergency management plans may also be hindered by confounding variables within a latent context of organizational structure, socio-economic effects, broader environmental influences and public policies (i.e. AHCA checklist). These indicators could not adequately be evaluated during the short timeline of this study, therefore secondary data were collected and correlated through the CMS. This data can be used as proxies for organizational variances among cases. The quality rating and total nursing hours per patient have been used in previous studies as proxies to demonstrate structure characteristics within a contingency framework (Kovner & Knickman, 2008).

The ability to think ahead may not be quantifiable or demonstrated in a path analysis alone, therefore a contingency model contributes to the literature because it can show latent endogenous constructs for resiliency as an index for measuring plan adequacy.

This study also adds to the literature discussions about the NH disaster planning process and the complexity of NH culture. Thus, emergency managers will have a better understanding of the importance of the NH staff's knowledge and inclusion in designing disaster plans. Also the significance of the NH cultural environment as a major consideration whenever designing collaborative disaster networks.

There are two major literature and public discussion contributions generated from this contingency modeling of resiliency. Firstly, additional material for future presentations and increased dialogue during annual conferences and local mitigation strategic planning meetings among professionals responsible for community governance and urban plan development (i.e. Central Florida Disaster Coalition Strategic Planning Meeting and FEPA Biannual Workshop).

Secondly, multi-disciplinary literature contributions from this research in the form of white papers and journal articles. Future discussion articles will be submitted across disciplines to varied publications such as: Public Health, Emergency Management, Local Governance, and Risk Management. Contingency theory articles will be submitted to the Journal of Public Administration Research and Theory; the Journal of Organizational Behavior and Human Performance; the Academy of Management Journal; the American Journal of Psychology; the Journal of Personality and Social Psychology. White papers will be submitted to relevant associations and agencies such as: the Florida Division of Emergency Management; the Florida Emergency Preparedness Association; the Florida Association of Health Care Administrators; and the Florida Department of Health Special Needs Agency.

CHAPTER THREE
RESEARCH DESIGN

The unit of analysis was a regulated nursing home (NH). The study was non-experimental without a pre-test and post-test, because a disruption of routine activities was prohibited within the nursing home. This scholar considers the process of planning for an emergency as a form of treatment for organization's with limited resources. Therefore a context-process-outcome model research design used a structural equation model (SEM) to demonstrate contingency variations of resiliency.

There are three recognized forms of resiliency: individual, organizational, and community. Since, the unit of analysis is an organization, the SEM demonstrated contingency variations of organizational resiliency (NH resiliency). Characteristics of organizational resiliency included an alternate facility, communications, written agreements to procure disaster resources and affiliation within a disaster network.

3.1. Research Methodology

This research was a non-experimental descriptive analysis of an organization's performance capacity. The beginning logic model design illustrated the causal path relationships between the context of organizational complexity (A) and disaster plan adequacy (B) in the outcome of nursing home disaster resiliency (C).

Linear regression analysis could not fully demonstrate correlations among the nursing home's first order factors in organizational complexity (A), plan adequacy (B) and NH resiliency (C). So, additional methods were used in SEM to quantify the fluidity of casual paths of resiliency (C). SEM was the preferred research design because it incorporates confirmatory factor analysis (CFA), correlational regression coefficients (R^2) and complex paths simultaneously into one model ((Hox & Bechger, 2011, p. 356; Wan, 2002, p. 89).

Confirmatory factor analysis (CFA) identified the first order elements for each latent construct. Maximum Likelihood Indexes (MLI) were used as the optimal estimation technique for all three of the proposed independent measurement models. The final covariance model or SEM illustrated the causal paths within a contingency framework of organizational complexity (A) and plan adequacy (B) toward organizational resiliency (C).

Four causal paths for NH organizational resiliency (C) were illustrated as follow:

$$A \rightarrow B \rightarrow C$$

$$A \rightarrow C$$

$$B \rightarrow C$$

$$AB \rightarrow C$$

Contingency indicators identified in the literature were analyzed with software designed for "analysis of moment structures," also called AMOS. Emergent properties needed to be identified, especially when examining bivariate correlational analysis of mean and covariance structures to illustrate both the direct and the indirect effects of organizational complexity (A) through disaster plan adequacy (B) upon nursing home resiliency (C). Thus a structural equation model provided a simple, traditional analysis perspective for measuring this complex problem of NH resiliency (Byrne, 2010, p. 17). For example, measuring emergent collaborations of NH staff, alternate facilities and NH disaster plan procedures (i.e. NH staff familiarity with the Emergency Status System for confirming the availability of an alternate facility for evacuees).

Organizational complexity (A) was determined by the context of the Florida nursing home environment (patient acuity, workload, and administrative strengths) as eight exogenous variables: patient acuity (ACUINDEX), the number of patients needing assistance with daily living (ADLSCORE), the number of hours patients spend with certified nursing aides (CNAHRD), the number of hours patients spend with licensed nurses (LPNHRD), the percentage of occupied beds (OCCUPANCY), overall staff rating (STAFFRATING), registered nurse rating (RNRATING) and the number of nurses required per patient (NURSERATIO).

Plan adequacy (B) was determined by the NH administrators' knowledge of and/or confidence in plan components: alternate facility (ALTFACIITY), primary communications (PRIMCOM), transportation agreement (TRANS), additional disaster staff (ADDSTAFF), back-up power supply (POWER), and medical reserves (MEDS).

NH resiliency (C) was demonstrated by disaster performance indicators: travel caregiver for evacuees (TRAVCAREGIVER), knowledge of estimated travel time needed to evacuate patients (TRAVTIME), knowledge of procedures to activate disaster network (ESSPROC) and affiliation with the emergency status system (ESS). These four indicators were the most statistically significant factors for resiliency in the dataset.

3.2. Sample

Traditionally, scholars recommend using the "10 Responses per Parameter Rule." However, this formula could not work for this over-identified measurement model for two reasons. Firstly, there are 52 parameters in the hypothesized measurement composition and with the predicted response rate of 520 from a population frame of only 680 (or approximately 76% proportion) deemed impractical and created the possibility of a Type I error in rejecting the hypothesis when it is true (Bickel, 2007). A precise, sample estimation was needed to prevent this error. Therefore, Soper's sample formula was chosen because it accommodated the three hypothesized constructs that required individual estimations.

David Soper designed a simulated statistical method that considered each proposed construct in the final covariance structural model. These calculations were done with proper simulation techniques and power analysis for each model. The proper sample size for the cumulative SEM model was determined by using the following inputs:

Anticipated effect size = .3
Desired statistical power level = .9
Number of latent (unobserved) variables = 19
Number of indicator (observed) variables = 14
Probability or p-value (rule out Type I error) = .05

The recommended sample size used the above listed assumptions as threshold parameters. Dr. Soper's software calculated a recommended optimal sample size of 200 with a minimum sample size of 75 participants to detect the medium effect (Soper, 2013).

After determining the sample size, a descriptive analysis of the NH population in the state of Florida was done to ensure that the sample was a true representation. Thirty-one of the sixty-seven counties in Florida were represented in the sample. The majority of survey participants worked in Orange (15.7%) and Pinellas (12.7%) counties. Of the 102 survey respondents 90% were facility administrators and the remaining 10% were directors of nursing, facility managers, or regional administrators in charge of more than one facility.

The context of the nursing home included a mixture of patients described as frail, elderly, chronically ill, and with disabilities (See APPENDIX B: DISABILITY STATUS OVERVIEW). Elements used for sample integrity comparisons were: number of dialysis patients (DIALYSIS), the number of patients with ostomies (OSTOMY), the mean of patients requiring assistance with daily living (ADLINDEX), the mean of patient acuity (ACUINDEX), the number of times changes were made ownership within the previous twelve months (CHG_OWN) and the number of certified beds (CERTBEDS).

Facilities averaged between two to four patients on dialysis (population = 2.09 +/- 2.3 and sample = 2.26 +/- 2.3) and between five to twelve ostomy patients (population = 5.06 +/- 6.69 and sample = 5.15 +/- 7.14).

The change in ownership count was based upon administrative changes reported to CMS within the previous twelve months. In this study, the frequency of changes in ownership among the sample (1 +/- 0) did not proportionately represent the frequency of ownership changes within the FL NH population (2 +/- 2.). Changes in administration are considered by most scholars as an indication of administrative strength and stability within an organization (Agranoff, 2003; Kahan, Allen, George, & Thompson, 2009; Oetjen, et al., 2012). Other research revealed that new and frequent changes in ownership created additional internal stress from unfamiliarity with routine operations (Delaney & McWhorter, 2010).

The number of certified beds was used as facility size. The largest facility in the FL NH population had 462 certified beds, while the largest facility in the NH sample had 300 certified beds.

The average NH size among the population was 120.83 +/- 49.794 certified beds and the average size within the sample was 116.44 +/- 44.423 beds.

These six indicators demonstrated that the study sample was a fair representation of the FL NH population. Therefore, the research design could be generalized to a larger community. Also, the research findings could be replicated in future studies.

For added convenience, the descriptive statistics for the unit of analysis are listed in Table 4: Descriptive Statistics for NH Population and NH Sample.

Table 4: Descriptive Statistics for NH Population and NH Sample

	FL NH Population (N=680)				Randomly Selected 200 FL NH				Survey Sample (n=102)			
	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max	Mean	S.D
Dialysis	0	13	2.09	2.26	0	38	6.5	2.33	0	15	2.26	2.33
Ostomy	0	52	5.06	6.69	0	41	5.15	7.14	0	41	5.15	7.14
ADL Index	6	16	10.42	1.21	10	12	10.32	1.63	0	16	10.47	1.63
Acuity Index	6	19	10.70	1.30	10	12	10.81	1.79	0	19	10.77	1.79
Owner Change	0	10	2.03	2.13	1	1	1	0	1	1	1	0
# of Beds	15	462	120.83	49.79	20	300	120	44.52	20	300	116.44	44.42

The study sample was a fair representation of the FL NH population as illustrated in the bar graph of Figure 5 Survey Sample Represents FL NH Population.

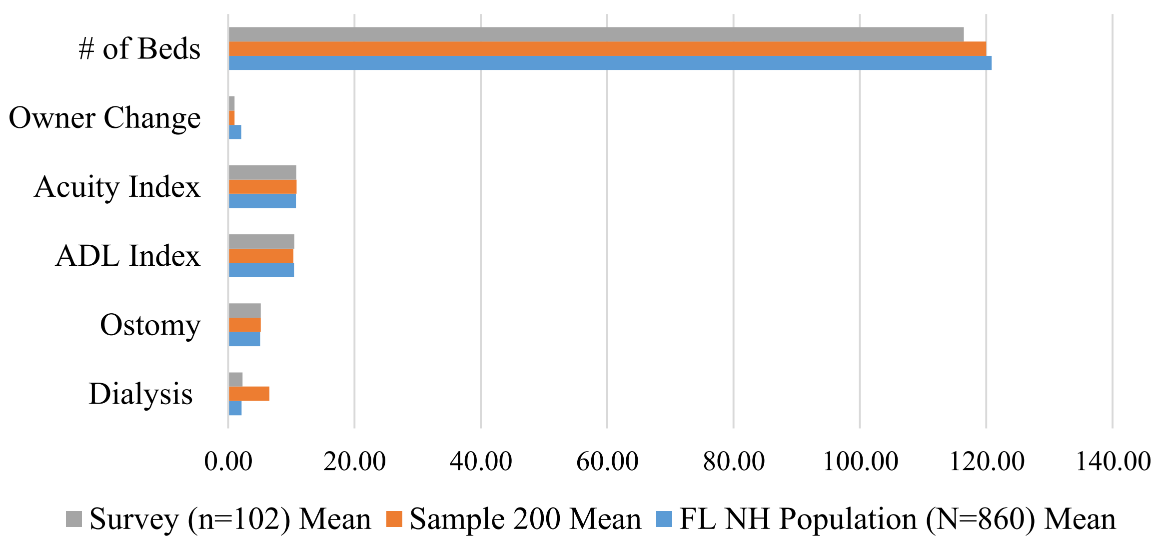


Figure 5: Survey Sample Represents FL NH Population

3.3. Research Procedures

Prior to the research, site visits were conducted in three geographic areas: Florida Panhandle, Central Florida and South Florida. These informational interviews and site visits provided guidance in constructing a workable survey instrument. They also provided additional anecdotal material for future research.

All Florida licensed nursing homes (NH) were initially identified by cross-checking CMS information with the Florida Health Care Association membership database. Three control variables for protecting the homogeneity of the sample were: license status, percentage of elderly and the service area (urban or rural).

After the secondary data for 681 NH facilities in Florida were collected, a consent letter was emailed to each facility. From this outreach, 277 administrators expressed interest in helping with the research, while others opted out or their email messages bounced back. Participant enthusiasm for this project was further demonstrated by the facility administrators who followed up with phone calls and invitations to visit their facilities.

The optimal sample size needed for this study was 200 with a minimum of 75 participants (Byrne, 2010, p. 53; Soper, 2013). Therefore, only 200 randomly selected NH administrators from the 277 consenting group received an electronic link to the knowledge/skills/attitudes (KSA) survey instrument.

3.4. KSA Survey Instrument

An online logic survey was designed to capture NH staff knowledge of disaster plans. The design and distribution software was Qualtrics through the University of Central Florida's license. See APPENDIX A: KSA SURVEY INSTRUMENT.

The survey instrument's twenty-five questions were pilot tested for comprehension and approximate completion times. Both the KSA survey instrument and accompanying consent letter were reviewed and approved by the UCF IRB (See APPENDIX C: UCF IRB APPROVAL LETTER). The twenty-five questions were randomly arranged and used a 5-point Likert scale of "none," "less than enough," "enough," "more than enough," and "do not know."

Electronic links embedded with unique identification numbers eased the burden of correlating CMS data (i.e. county, ownership, and workload). Three phone numbers were provided for those requiring assistance with completing the survey. Only ten participants actually called with general questions about the research or to explain that corporate headquarters would need to approve the questions before they could be answered. Three of these callers were sharing their evacuation experience during 2004, 2005, and one case was in another state. Other communications from participants came through emails as contact updates thus survey links were reissued to these newer addresses.

Consent forms were initially distributed electronically on October 28, 2014 to 277 email accounts associated with a skilled nursing facility. Of those emails, 33 were bounced back. This may be due to security filters because each email was verified by phone prior to distribution. Twelve facilities opted out of participating and were removed from this initial distribution list as well as the 33 bounce backs. Thus, 200 of the consenting facilities were randomly selected and the survey electronic link with an "opt out" option were redistributed on November 4, 2014.

Reminders were emailed every two weeks until January 19, 2015. This timeframe was during the last month of hurricane season and during holiday weeks when facilities tend to be short-staffed and awareness of emergency plans may be minimal. Primary data from completed surveys were combined with secondary data collected by CMS.

3.5. Treatment of Data

Five treatment steps were needed to glean and cross check pertinent data from four sources into one manageable dataset of relevant information. For example, quantitative nursing hours and the number of certified beds came from CASPER and quality rankings came from CMS. The Florida Health Care Association reconfirmed facility size and service areas. Data was cross checked using the minimum data set, MDS 4.0 of February 2012. The five treatment steps are as follows:

First, before researching other databases, a tracking method was needed to correlate data from multiple reports. So, the CMS provider number was embedded into the facility's KSA survey. This CMS provider number was used as a reference point among other reports until all facility related data was confirmed then the CMS provider number was discarded and replaced with an anonymous random case number.

Second treatment was adding the qualitative data collected from the KSA surveys with related quantitative data collected from CASPER and MDS 4.0 (i.e. number of Non-English patients and for-profit or non-profit affiliation).

Third treatment included descriptive analyses using SPSS 22.0 for frequencies and degrees of variability among the cases.

Fourth treatment was a confirmatory factor analysis that identified the strongest bivariate correlations among the dataset.

Fifth and last treatment factor analysis reduction to decrease the data into manageable size.

3.6. Descriptive Analysis

The control variable, license status verified that each facility in the sample was familiar with AHCA emergency management plan requirements. Other control variables were the rural/urban service area and the percentage of elderly in the county population.

Only eight percent (8%) served rural communities while ninety-two (92%) served urban communities. See Figure 6: Percentage of Rural Florida Nursing Homes.

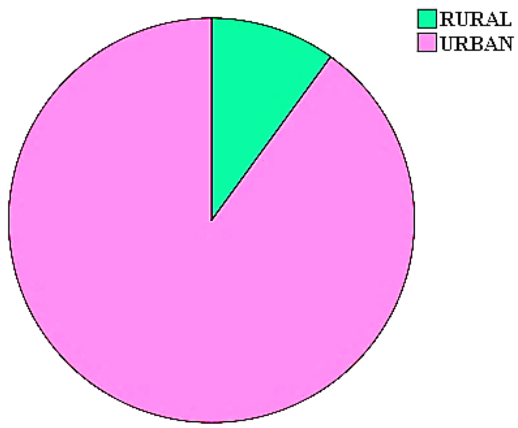


Figure 6: Percentage of Rural Florida Nursing Homes

The percentage of elderly ranged from 10 to 35% of the county population with a mean of 19% +/- 6 %.

Descriptive analysis of ownership affiliations of the sampled facilities revealed 83% were affiliated with a healthcare system while the remainder were not affiliated with any type of system.

The average age of the nursing facility was 26 years (based upon the initial participation date). The oldest facility in the sample was 47 years with the newest facility being less than a year (See Table 33 Aggregated Descriptive Statistics).

3.7. Correlation and Regression Analyses

According to the literature, multicollinearity occurs at a level of correlation that is greater than .9 (Bickel, 2007). Therefore, the maximum correlation threshold for this study was .9 with .30 as the minimal threshold. This range was predetermined earlier, when calculating the desired optimal sample size (Bickel, 2007; Pallant, 2007; Soper, 2013).

Correlation analyses were done on all proposed indicators to rule out duplication of data (multicollinearity) and to identify causal relationships within three latent endogenous constructs: organizational complexity (A), plan adequacy (B), and NH resiliency (C).

The correlation analysis for this study also included Cronbach's coefficient alpha to demonstrate internal validity of the data, as recommended in the literature (Bickel, 2007; Pallant, 2007). This coefficient indicated an average correlation among the scale of items within a value range of 0 to 1.

Thus the closer to 1 then the more robust the data. In other words, the strength of the indicator effect depended upon its proximity to absolute 1 (positive or negative). Therefore, the factor loading effect in the measurement model was 1. Some of the proposed indicator pairings were too insignificantly related as causal effects and therefore were eliminated or relocated within the final contingency model based upon stronger correlations found during the CFA.

3.8. Confirmatory Factor Analysis

The CFA for organizational complexity confirmed eight variables as first-order factors in determining organizational complexity (A). These first-order factors or exogenous variables were: ACUINDEX (X1), ADSCORE (X2), CNAHRD (X3), LPNHRD (X4), OCCUPANCY (X5), STAFFRATING (X6), RNRATING (X7), and NURSERATIO (X8).

A factor reduction analysis provided flexibility as a regression analysis and sorted collinearity of these first-order factors into three second-order components. In other words, the second-order components were derived from the most significantly correlated indicators for organizational complexity (A).

These second-order components for the latent endogenous construct, NH organizational complexity were: patient acuity (ξ_1), workload (ξ_2), and administrative strengths ($\xi 3$) . See Figure 7: Proposed Measurement Model for Organizational Complexity.

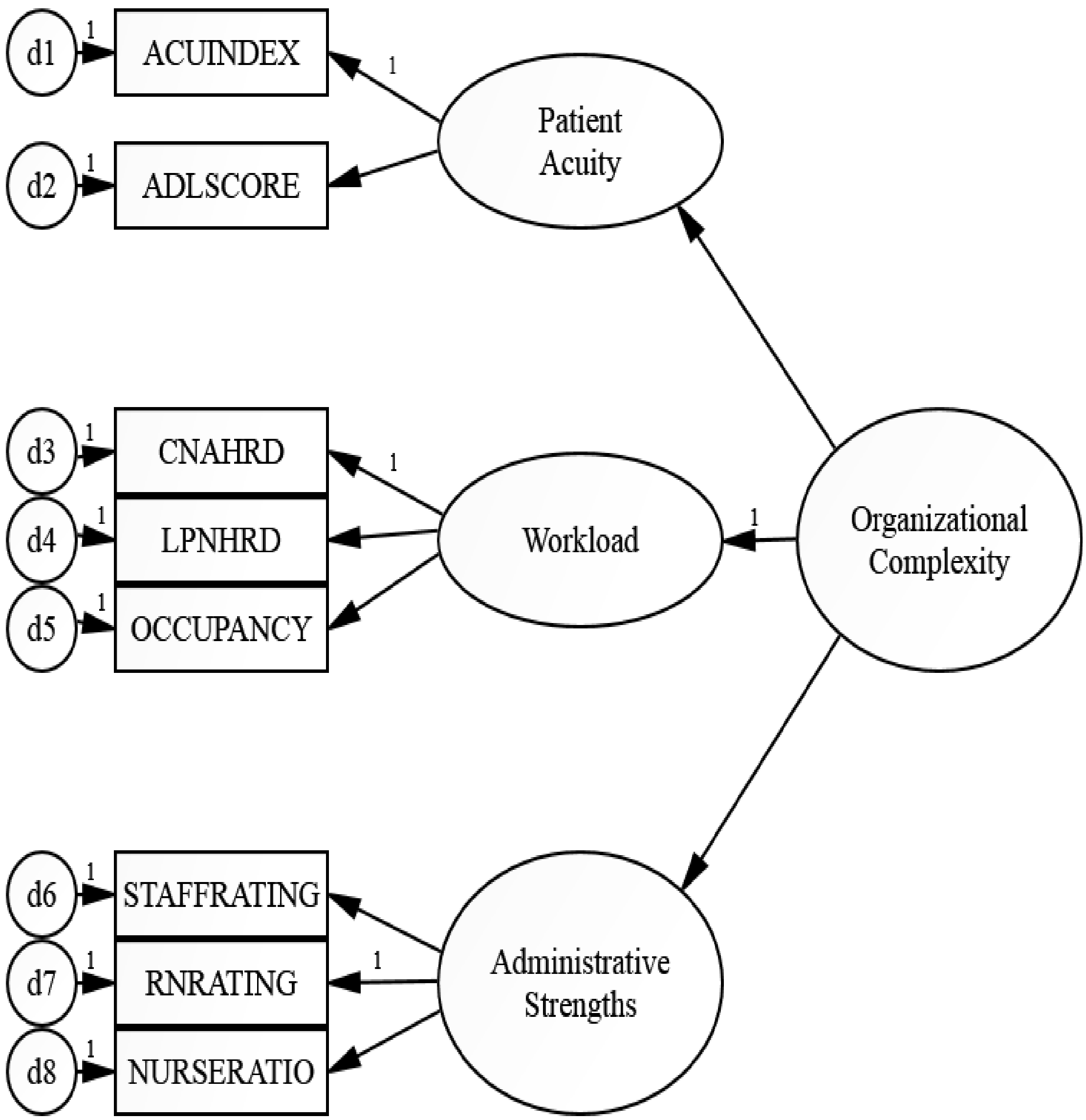


Figure 7: Proposed Measurement Model for Organizational Complexity

The following section discusses the measurement model for plan adequacy (B).

The proposed indicators for plan adequacy (B) were chosen for two reasons. Firstly, these indicators were included in the AHCA criteria for licensure. Secondly, these indicators were recognized in an earlier disaster research study conducted by the CDC and the University of South Florida through a grant from the Hartford Foundation (Eiring, Blake, & Howard, 2012).

The CFA for plan adequacy (B) found three of the nine proposed indicators did not meet the predetermined threshold for significance (< .30). Therefore, only six remain as first order factors for the latent endogenous construct, plan adequacy (B). The confirmed factors were as follows: ALTFACILITY (Y1), PRIMCOM (Y2), TRANS (Y3), ADDSTAFF (Y4), POWER, (Y5) and MEDS (Y6). See Figure 8: Proposed Measurement Model for Plan Adequacy. The next paragraph discusses the CFA for NH Resiliency (C).

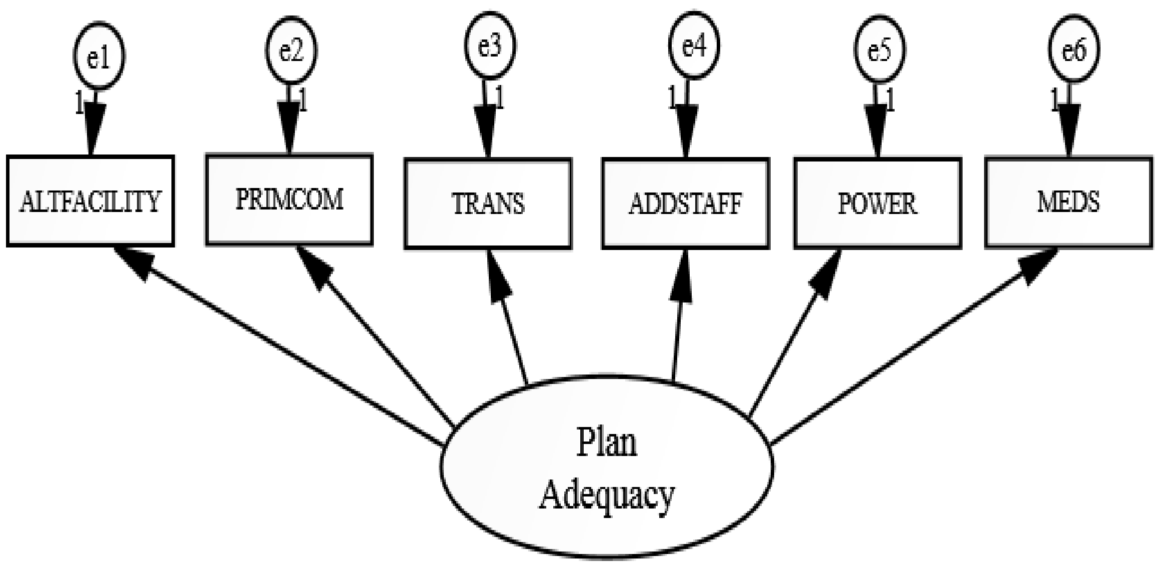


Figure 8: Proposed Measurement Model for Plan Adequacy

Factor analysis for NH Resiliency was most difficult as this research has never been done for organizations as complex as a nursing home. However, the factor analysis did confirm that primary data collected from the KSA survey does provide quantifiable indicators for NH resiliency. The CFA confirmed four out of ten proposed indicators for NH Resiliency (C). The confirmed factors were: TRAVCAREGIVER (Y7), TRAVTIME (Y8), ESSPROC (Y9), and ESS (Y10). See Figure 9: Proposed Measurement Model for NH Resiliency.

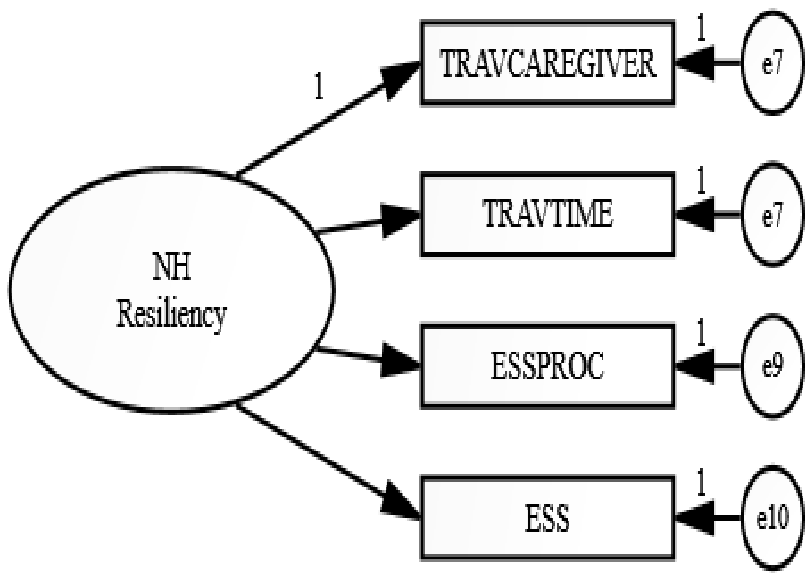


Figure 9: Proposed Measurement Model for NH Resiliency

Now in the next section, results from all three CFAs are gathered into an easy to read compilation of the confirmed indicators used in each of the revised models. Factor descriptions have been listed alongside their respective data sources in Table 5: Confirmed NH Factors.

Table 5: Confirmed NH Factors

Second Order	First Order	Variable	Database Code	Factor Description	Data Source
		CON-TROLS	COUNTY	% elderly/county	CENSUS
			RURAL	Rural or Urban	CASPER
Organizational Complexity Latent Endogenous Construct η1	Patients Acuity ξ1	X1	ADLSCORE	Patient severity	CASPER
		X2	ACUINDEX	Patient acuity	CASPER
	Workload ξ2	X3	CNAHRD	CNA time with patient	CASPER
		X4	LPNHRD	LPN time with patient	CASPER
		X5	OCCUPANCY	Percent beds occupied	CASPER
	Administrative Strengths ξ3	X6	STAFFRATING	Staff Rating	CASPER
		X7	RNRATING	Nurse Rating	CASPER
		X8	NURSERATIO	RN per patients	CASPER
Plan Adequacy η2		Y1	ALTFACILITY	Evacuation point	KSA Survey
		Y2	PRIMCOM	Cellphones & text	KSA Survey
		Y3	TRANS	Written agreement for disaster transport	KSA Survey
		Y4	ADDSTAFF	Additional staff for disaster	KSA Survey
		Y5	POWER	Back-up for outages	KSA Survey
		Y6	MEDS	Reserves for 3 days/patient	KSA Survey
NH Resiliency η3		Y7	TRAVCAREGIVER	Evacuation staff w/patient	KSA Survey
		Y8	TRAVTIME	Know time needed to travel out of harm's way	KSA Survey
		Y9	ESSPROC	Network Procedures	KSA Survey
		Y10	ESS	Network affiliation	KSA Survey

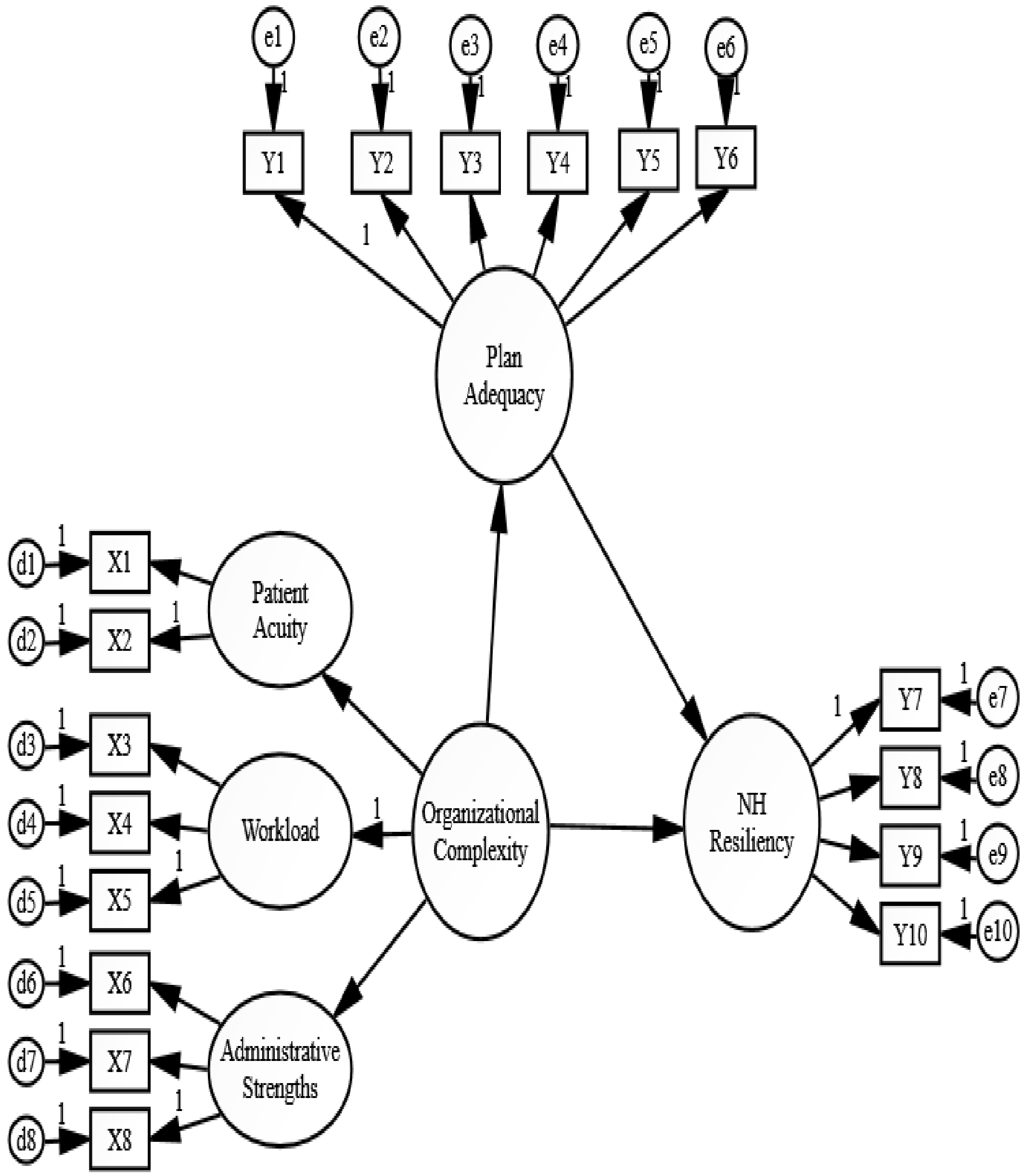


Figure 10: Covariance Structure Model for NH Resiliency

3.9. Analysis for Reliability

Descriptive data of the nursing homes in Florida have been collected from the Florida Association of Healthcare Agencies member database and cross referenced with CMS. A self-administered questionnaire of 25 elements was distributed to randomly selected nursing home administrators that consented to participate in this research (see APPENDIX A: KSA SURVEY INSTRUMENT). These questions were adapted from a 2009 nursing home research project conducted by the University of South Florida for the John Hartford Foundation (FL Healthcare Foundation, 2008, pp. 14-20). Each nursing home survey was addressed to the administrator because they are the contact person for local emergency response agencies.

Factor loadings were checked for significant affect of indicators on latent constructs. The larger the loading then the more effect of that indicator on correlated constructs. The t-value or Critical Ratio (C.R.) range was larger than 1.96 or less than -1.96. This ensured that there was a good model fit and that the stastically significant effect was .05 (Byrne, 2010).

Consideration of the importance of an indicator to the study was determined when estimating the sample size. The indicator threshold was established as .30, so any indicators above .30 and below .90 remained in the final contingency model.

Other measures for model reliability were likelihood ratios: CMIN (x^2/df), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), parsimony goodness of fit index (PGFI), root mean squared (RMS), root mean squared equity adjustment (RMSEA) and Tucker-Lewis index (TLI). Pearson distribution coefficient was also considered for normal curve distribution as another indication of goodness of fit (Spatz, 2008; Wan, 2002).

Some analysts consider the Hoelter critical N as confirmation of the sample size as significant at .05. Hoelter rejected models with more than 200 participants because chi-square goes from nonsignificant to significant in samples greater than 200. Instead, Hoelter believed sample sizes between 75 and 200 are acceptable confirmation of the chi-square goodness of fit test (Pallant, 2007). However, some scholars continue to ignore Hoelter and prefer Cronbach's alpha.

This ensured that the data were reliable and can be repeated in other studies. The acceptable minimum threshold for Cronbach's alpha was set at .7 as recommended in the literature (Bickel, 2007; Pallant, 2007). However, the closer to 1 then the more robust were the data. As the last reliability step, the modification index (MI) list of values were used as recommended adjustments to the model for a parsimonious fit. The MIL identified measurement error correlations that were too high and considered redundant among the latent constructs (Bickel, 2007).

3.10. Delimitation of Social Desirability Bias

There was concern regarding social desirability bias affecting the resiliency outcomes. Since the 1960's some scholars believe there are two paths of social desirability bias. One is *self-deception* and the other path is *other-deception*. Self-deception occurs whenever the participant chooses an answer based upon their belief that socially unacceptable characteristics should be ignored. Therefore, they provide a preferred or acceptable answer. Other-deception bias is evident whenever participants provide inaccurate data to impress an observer. Either type of bias is intended to protect that participant's self-image. It was important to protect the validity of KSA survey results in this research.

Therefore, not all resiliency indicators in this study were derived as latent constructs from staff KSA surveys. The self-reported data were anonymously linked with other facility data, therefore the need for social approval, various response styles, evaluation apprehension, pre-survey effects, and social desirability bias were minimized as aggregated results (Azlina & Jamaluddin, 2010; de Jong, Pieters, & Fox, 2010; Nederhof, 1985).

CHAPTER FOUR
FINDINGS

This study considered the context of the nursing home environment as a complex organization with highly structured leadership. The internal complexity of the NH was measured by patient acuity, staff workload, and administrative strengths.

Findings confirmed that the sample (n=102) represented the research population (N=680). Findings from the 102 surveyed facilities were generalizable and testable for future studies of complex organizations. However, the findings may not be generalized to lesser regulated organizations, because the surveyed nursing homes were isomorphic, adhere to regimented licensure criteria and mimic other nursing homes or health units.

Some scholars of organizational behavior categorize regulated organizations (i.e. nursing homes) as isomorphic and prone to suffer from "regulatory capture." Highly complex organizations present with highly correlated characteristics and adopt routines learned from similar organizations (Drabek & McEntire, 2002; Salamon, 2002). Regulatory capture explains why in this study, some of the bivariate correlations within the construct A (organizational complexity), met or exceeded the maximum threshold (.9) for significance among the first-order factors.

Therefore, some correlations greater than .9 were not interpreted as a multicollinearity issue in this dataset. Close approximations and stronger than expected correlations were due to regulatory capture of the unit of analysis as an isomorphic, licensed health facility.

This multivariate non-experimental research incorporated only the most significantly related indicators extracted from three measurement models; nested within a structural equation model (SEM).

4.1. CFA and Measurement Modeling

An extraction technique was used for determining the three multivariate models: (A) organizational complexity, (B) plan adequacy, and (C) nursing home resiliency. The extraction began with a confirmatory factor analysis (CFA) and then an over-identification of the best fitting factors for each of six latent constructs (Wan, 2002). The methodology used was a two part process.

The first step was to run a confirmatory factor analyses (CFA) using SPSS 22. Then the graphic software, AMOS was used to assign a factor regression weight of 1 to a factor. This method scores the regression weights of the other factors within the latent construct. Then the modification indexes (M.I.) were used to identify previously unseen correlations.

Standardized regression weights (SRW), unstandardized regression weights (URW), critical ratio (C.R. or t-value) and sample probability (p) values provided further proof that correlations at the .05 level or above were significant indicators for each construct. In addition, these measures are indicators of a parsimonious model goodness of fit.

However, there are other likelihood indexes designed specifically for SEM. They include chi-square (x^2) per degrees of freedom (df), the parsimony goodness of fit index (PGFI), goodness of fit (GFI), adjusted goodness of fit (AGFI), Tucker-Lewis Index (TLI) and root mean squared error adjustment (RMSEA). In addition there is the Hoelter sample index for .05 reliability that the sample size represents the population.

The findings specific to organizational complexity (A) begin in the next paragraph and are followed by discussions regarding the findings related to the other two latent endogenous constructs: plan adequacy (B) and NH resiliency (C).

4.2. Organizational Complexity Measurement Model

First consideration is the context of the nursing home. Significant similarities between the Florida population of nursing homes and the sample are described first, followed by organizational complexity factors in order of their contribution to the final measurement model. Data were from the 2012 CASPER dataset.

The FL NH population ADL Index mean for patient severity was 10.42 +/- 1.21. The study sample mean for ADL Index was 10.47 +/- 1.63 units. This finding was a significant indicator of patient acuity within the construct organizational complexity (A).

The ADL Score ranged from 0 (independent patient) to 5 (totally dependent patient). The average score among the sample was 4.12 +/- .57. The skewness of distribution within the nursing home sample was toward the left (-3.76 with standardized error of .24). The FL NH population ADL Score average in 2012 was 4.18 +/- .016 while the skewness of distribution was -.5 with standardized error of .1.

The Acuity Index measured patient cognitive abilities and ranged from 0 to 19. The study sample (10.77 +/- 1.8) was a good representation of the population (10.70 +/- 1.3).

Findings revealed that some patients required advanced life support (ALS) as administered only through licensed practitioners. In other words, in the study, the severity of the patient conditions increased the staff workload, as additional specialized staffing were required that ultimately elevated operating costs while it diminished revenue.

Facilities had an average of 2 +/- 2 patients on dialysis. The highest number in one facility was 15 dialysis patients. Ostomy patients per facility were higher in numbers with an average of 5 +/- 7 patients. One NH in the sample housed 42 patients with ostomies!

Besides patient acuity and chronic health conditions, some social science scholars believe cultural barriers can also influence patient and staff dynamics within the context of healthcare.

Group diversity affects community members' expectations and can either lessen or enhance the organization's problem-solving experiences (Rivera F. , 2012; Rivera & Settembrino, 2012). For example, cultural language and methods for overcoming obstacles can determine the internal culture of an organization through client expectations and staff qualifications. During times of disaster, the nursing home patients expect to use the language that they are most familiar and comfortable using during times of emotional distress. Thus, resiliency begins by overcoming communication barriers. Therefore, in this study, the variable NON_ENG was used as a proxy indicator for cultural diversity within FL NHs.

The number of patients that use another primary language are reported each quarter to CMS as Non-English. The count used for this study came from the last quarter of the 2012 Minimum Data Statistics (MDS) database. Facilities in the survey sample with Non-English speaking patients averaged 4 +/- 7 patients that did not have English as their primary language. This was significant to organizational complexity because translators, interpreters, or multi-lingual assistance may be needed to provide quality of care during a disaster.

Another descriptive statistic was the organization's dependence upon Medicaid for revenue. The indicator PCTMCAID, demonstrated the percentage of Medicaid reimbursements for each facility. Of the 102 facilities in the sample, 4.9% +/- .22 did not have Medicaid patients while the other 95.1 % +/- .22 received Medicaid compensation. As a socioeconomic indicator, this was seen as non-representative of the population because it was disproportionate to the state average of only 55.7% (+/- .8) Medicaid patients. This may be because the sample facilities were cross-referenced with the CMS database.

Organizational complexity descriptive statistics included the NH population as the number of NH residents compared to the number of licensed beds. The percentages of beds occupied in each facility were identified by the variable, OCCUPANCY. In the NH sample, facilities averaged 87% +/- .15% of available beds filled. This was an indicator for revenue and affected the overall workload as levels of staffing hours and as levels of required resources.

Physical therapy per patient per day (PTHRD) was extremely small when compared with other healthcare services. Perhaps due to the endurance levels of frail patients and the frequency of therapy sessions offered. In other words, the therapist may not be meeting with individual patients each day, but in groups or as weekly sessions. The CASPER reports for the survey sample indicated the average PTHRD was .13 +/- .09 hours per day (or 5 to 12 minutes a day). This variable was ruled out in the correlation regression analysis as less significant and was eventually removed from the structural equation model. However, PTHRD was included in the variable for total staff/patient contact hours (TOTHRD).

The dataset also provided the Total Staff hours per patient per day (TOTHRD). The average among the survey sample was 4.33 +/- .98 hours (or 260 +/-59 minutes). Both CNAHRD and TOTHRD were assumed to have a strong correlation because CNA's provide the majority of TOTHRD hours. Now that we have described the nursing hours, let us describe the staff ratings found in the quality assurance reports included in CASPER.

The NH facility staff (STAFFRATING) are evaluated on a scale of 1 (low) to 5 (high). All patient care services and administrative staff are included. STAFFRATING of the research sample averaged 3.45 with a deviation +/- 1.02. The highest percentile rating was 4 and 58.8% of the sample were rated 4 while 5.9% were rated a 5. So approximately 64% of the sample NH staff were rated above average.

Registered nurse ratings (RNRATING) averaged 2.96 +/- 1.12 with 56% of the sample ratings at 3 or above. Only 32% of the RN staff were rated below 3. Staff ratings are only one measure of the organizational complexity within a nursing home, there is also the nurse to patient ratio.

The nurse/patient ratio average was 4.29 +/- .98 or roughly 3 to 5 nurses per patient. This statistic indicated the length of time each certified nurse, licensed nurse and registered nurse spends with each patient each day.

Confirmatory factor analysis for the organizational complexity measurement model identified eight first-order factors that were reduced into three second-order factors.

Eight correlated first-order factors were: acuity index (X1), ADL score (X2), total patient contact hours per day (X3), percentage of beds occupied (X4), number of nursing staff per patient (X5), overall facility rating (X6), staff rating (X7) and registered nursing staff rating (X8).

This section shows the evidence of the validity of organizational complexity as seen in the secondary data collected from Certification and Survey Provider Enhanced Reports (CASPER). A descriptive analysis of the data demonstrated the organizational complexity of NH facilities within the sample. The analysis results for mean and standard deviations across the 102 participating facilities can be seen in Table 10: Descriptive Statistics for Organizational Complexity.

Table 6: Descriptive Statistics for Organizational Complexity (n=102)

	Mean	SD
ADLINDEX	10.47	1.63
ACUINDEX	10.77	1.79
ADLSCORE	4.12	.57
DIALYSIS*	.70	.5
OSTOMY*	.86	.4
PCTMCAID*	.95	.2
NON_ENGL*	.71	.5
OCCUPANCY*	.87	.2
CNAHRD**	2.7 hrs.	.64 hr.
LPNHRD**	.95 hr.	.28 hr.
RNHRD**	.67 hr.	.26 hr.
PTHRD**	.13 hr.	.09 hr.
TOTHRD**	4.3 hrs.	.98 hr.

*Percentage of facility population **hrs./day/patient

The Assistance with Daily Living (ADL) Index is a scaled measure of patient severity used by CMS as a service indicator. The index minimum is 0 with 16 being the maximum. The FL NH population averages 10.42 +/- 1.212 and the study sample represents this population with an average ADL of 10.47 +/- 1.630.

The Acuity Index was a measure of patient cognitive ability and ranges from 0 to 19. Again the study sample is a good representation of the population with 10.70 +/- 1.303 for the population and a mean of 10.77 +/- 1.794 in the sample.

Certified Nurse Hours per Patient per Day (CNAHRD) were the average time certified personnel spent with patients. The average CNAHRD times in the surveyed sample were 2.72 +/- .64 hours (or 163.20 +/- 38.4 minutes). The maximum time a CNA spent per day per patient in the survey sample was 4.95 +/- 2.72 hours, or between 2.23 and 7.67 hours per day. This was more than the combined averages of RN and LPN patient hours. Thus confirming that nursing homes try to contain costs through appropriate staff assignments (Oetjen, McSweeney-Feld, Welch, Warthen, & Kopera-Frye, 2012).

CNAHRD was the highest patient/professional contact indicator and subsequently was used as a first order factor for the second order factor workload. The next highest contact hours were with licensed nurses with the ability to administer patient care outside the scope of certified nurses.

The total patient contact hours with licensed nurses (LPNHRD) were between .5 and 1.5 hours with a mean of .95 hours and a standard deviation of .28 hours per day. This data combined with the CNAHRD and OCCUPANCY (85 -89%) data were significant to organizational complexity as indicators of the second order factor for workload.

Data collected for physical therapy demonstrated the lowest patient/professional contact indicator between .04 and .22 hours with a mean of .13 hours or 7.8 minutes per patient per day. This small number may be due to several unknowns such as weekly therapy sessions distributed as daily contact quotas in the reports when the sessions actually occur biweekly. Other justifications for the small numbers may be due to Medicaid reimbursement schedules and/or number of patients in each physical therapy sessions. The data were deemed unclearly defined and showed an insignificant effect, therefore the PTHRD data were not used in the revised measurement models.

Occupancy rates were calculated using the total number of residents reported by the respective facility in the 2012 CASPER with the number of CMS licensed beds for that same provider. Total number of residents (RESTOT) and total nurse hours (TOTHRD) were used to calculate the Nurse Ratio.

The correlation analysis of the exogenous variables identified eight indicators for organizational complexity: X1(1); X2 (.618, $p < .01$); X3 (.234, $p < .05$); X4 (.501, $p < .01$); X5 (.956, $p < .01$); X6 (.449, $p < .01$); X7 (.645, $p < .01$); and X8 (.789, $p < .01$). See Table 7 Correlation Matrix for Organizational Complexity Construct.

Table 7: Correlation Matrix for Organizational Complexity Construct (n=102)

	X1	X2	X3	X4	X5	X6	X7	X8
ACUINDEX (X1)	1							
ADLSCORE (X2)	**.618****	1						
TOTHRD (X3)	.170	**.234***	1					
OCCUPANCY (X4)	**.216***	**.329****	**.501****	1				
NURSERATIO (X5)	.183	**.263****	**.956****	**.518****	1			
OVERALLRATE (X6)	.075	.096	**.449****	.128	**.412****	1		
STAFFRATING (X7)	.085	.096	**.645****	.154	**.588****	**.568****	1	
RNRATING (X8)	-.001	.086	**.470****	.082	**.463****	**.553****	**.789****	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Other important first order elements were reduced by using SPSS 22 Factor Reduction Analysis. A Varimax rotation was performed after the principal component extraction. This separated out the three constructs: patient acuity (ξ_1), workload (ξ_2), and an administrative strengths (ξ_3). These second-order factors then behaved as exogenous indicators of the latent endogenous construct: organizational complexity (ζ).

The first-order factors for organizational complexity are highlighted in yellow in Table 8: Factor Loadings of Organizational Complexity: Rotated Component Matrix.

Table 8: Second Order Factor Loadings of Organizational Complexity

Rotated Component Matrix[a]

	Component		
	WORK	PATIENTS	ADMIN
ACUINDEX	.065	.841	.103
ADLINDEX	.048	.858	.097
ADLSCORE	.137	.772	-.063
DIALYSIS	.071	-.231	.036
OSTOMY	.032	-.005	.251
NON_ENGL	-.067	-.219	.088
NURSERATIO	.467	.255	.873
OCCUPANCY	.818	.468	.056
PCTMCAID	.184	.582	.258
PROFITSTATUS	-.216	.029	.180
LPNHRD	.759	.325	.009
PTHRD	.280	.087	-.024
RNHRD	.773	-.084	-.068
CNAHRD	.811	.235	-.081
TOTHRD	.605	.233	-.067
RESTOT	.058	.276	.516
STAFFRATING	.823	-.100	.823
QUALITYRATE	.507	.209	.043
OVERALLRATE	.663	-.088	-.038
RNRATING	.729	-.221	.829
OWNERSHIP	.226	-.224	-.040
BEDS	-.147	.048	.541
RURAL	.025	.051	-.136
CERTIFIEDBEDS	-.156	.032	.538

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
[a] Rotation converged in 4 iterations.

Each of the measurement models in this study used the Parsimony Goodness of Fit Index (PGFI) because it was specifically designed for SEM by James, Mulaik, and Brett (1982). The PGFI includes complexity with parsimony of fit and is usually a lower value than GFI (Byrne, 2010, p. 78).

See Table 10: Parameter Estimates and Regression Weights for Organizational Complexity for other critical model values.

Table 9: Parameter Estimates and Regression Weights for Organizational Complexity (Revised)

	SRW	URW	S.E.	C.R.	P	LABEL
Patient_Acuity	1.00	.663	.158	4.201	***	
Workload	1.00	.363	.059	6.178	***	
Administrative_Strengths	1.00	1.00				
ADLSCORE (X1)	.481	.630				X1
ACUINDEX(X2)	.249	.980	1.60	1.73	.08	X2
CNAHRD (X3)	.435	1.00	1.91	4.60	***	X3
LPNHRD (X4)	.397	.610	.50	4.63	***	X4
OCCUPANCY (X5)	.738	.500				X5
STAFFRATING (X6)	.619	.950	.10	5.88	***	X8
RNRATING (X7)	.393	.800	.11	3.52	***	X6
NURSERATIO (X8)	.506	.660				X7

Modification Indexes for the revised measurement model provided better understanding of correlations among unseen variables and corresponding parameters. This revised organizational complexity measurement model was considered over identified and parsimonious with a reasonably good fit for the data.

The PGFI was .568 and the GFI was .929. Also this study's participant size of 102 met Hoelter's recommended sample size for 95% reliance. The reliability scale coefficient or Cronbach's α for internal consistency was .7 for eight items.

See Appendix H Table A for model fit summary of Organizational Complexity. Organizational Complexity with three correlated second-order factors are labeled as Patient Acuity, Workload, and Administrative Strengths in Figure 11: Measurement Indicators for Organizational Complexity.

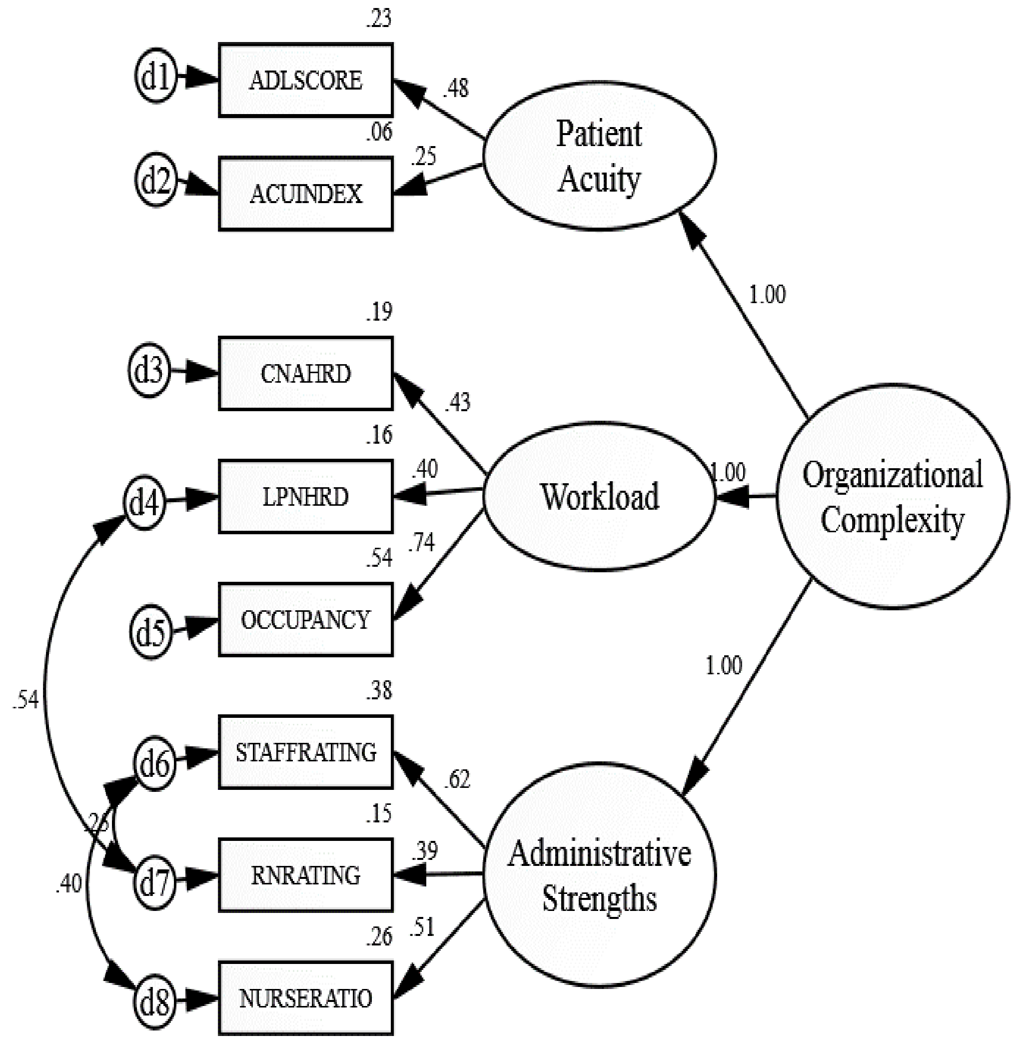


Figure 11: Measurement of Indicators for Organizational Complexity (Revised)

This revised measurement model for the latent endogenous construct organizational complexity is included in the covariance structural model (CSM) and nested within the final structural equation model (SEM). The SEM demonstrates the effect of organizational complexity directly and indirectly through plan adequacy.

This concludes the section on findings regarding NH organizational complexity (A). Other findings concerned plan adequacy (B) and NH resiliency (C), as discussed in the next sections.

4.3. Plan Adequacy Measurement Model

This study considered plan adequacy (B) as a representation of the NH staff's knowledge, skills and attitudes (KSAs) regarding key elements in the process of designing and implementing a NH emergency management plan.

These plan elements included disaster resource management items: alternate facility for evacuations (ALTFACILITY), primary communications for staff during emergencies (PRIMCOM), transportation arrangements for evacuations (TRANS), additional disaster staff (ADDSTAFF), back-up power that was enough to last three or more days (POWER), and reserved medical supplies for three or more days (MEDS). There were three major findings regarding plan adequacy based upon the planning process:

First, the emergency plan checklist and review process were outdated. Of the survey sample, 93% of the NH staff members did not use the AHCA checklist. Among those facilities surveyed, 29% used a corporate template and 29% used the Florida Healthcare Association template. The majority of facilities (55%) included NH staff in designing a template.

Second, 45% of the NH staff surveyed were unfamiliar with the written emergency plan and specific disaster procedures for their facility.

Third, NIMS was incorporated into only 23% of the NH plans. However, 100% of the facilities practiced the NH plan as an annual exercise for staff as required by AHCA.

The intent of the survey was to quantify staff confidence levels within their knowledge of their facility's disaster plan. Therefore, the following discussion evaluates staff knowledge, skills and attitudes regarding disaster resources and written agreements within the plan design.

The descriptive statistical report comes from data regarding the plan design, apart from plan implementation policies. Even though, planning a response strategy prior to a disaster may save time and lives, it is important to recognize the importance of staff KSAs regarding that strategy. In other words, the adequacy of a particular disaster management strategy remains unpredictable, due to changes in human behavior.

In this study, plan adequacy was measured using fourteen parameters that included six observed variables: availability of an alternate facility (ALTFACILITY), primary communications (PRIMCOM), transportation agreement (TRANS), additional disaster staff (ADDSTAFF), back-up power (POWER), and medical reserves (MEDS). The mean distributions of these strategy characteristics among the sample are listed in Table 11: Descriptive Statistics for Plan Adequacy.

Table 10: Descriptive Statistics for Plan Adequacy (n=102)

	Mean	Std. Deviation
ALTFACILITY(Y1)	.90	.299
PRIMCOM(Y2)	.92	.270
TRANS (Y3)	.80	.399
ADDSTAFF(Y4)	.79	.406
POWER(Y5)	.92	.270
MEDS(Y6)	.98	.139

Alternate Facility (ALTFACILITY): Contingency theory literature proposes the decision to shelter-in-place or to evacuate to another facility is dependent upon internal management KSAs. For example, NH Staff confidence that the NH emergency management plan provided an alternate location to house patients during a disaster was quite high with 90.2% of the respondents knowing there was a pre-identified Alternate Facility. Therefore, there is a strong likelihood that the NH will be more resilient. However, the remaining 9.8% did not know about an alternate location for patient evacuation. Nevertheless, their resiliency may be contingent upon other factors than having an alternate facility.

Facility Primary Communications (PRIMCOM): Historical after-action reports (AAR) declare communications to be a major concern and often interoperability of communications equipment is the largest short-fall in response and recovery strategy (Mileti, 2009; Waugh, 2011). Of the NH facilities surveyed, most of the staff (92.2%) were aware of the primary communications strategy to be used during a disaster. Not all plans used the same technology. A few organizations provided satellite phones while the majority rely upon text messages through cell phone. Since only aggregated numbers were collected to protect staff identities, the findings only specify what percentage of the sample have a primary communications technology in place (92.2%) and what percentage of the sample (7.8%) does not have a primary communications component in the NH disaster plan.

Transportation Agreement (TRANS) is a written contract hiring a transportation company on an “as needed” basis or a contingency partner during disasters. These agreements vary in the amount of detail with specifications for the type of equipment needed for frail patients. This survey tried to quantify the KSA of NH staff that would implement these agreements. Confidence seemed high with 80.4% answering the question “How adequately does your CEMP provide transportation of patients during an evacuation to another facility when sheltering in place is not an option?” It is interesting to note that 19.6% answered “do not know” or were not confident the plan was adequate. Qualitative interviews with facility managers explained transportation agreements are their largest concern because they are “contingency agreements” that may nor may not be enforceable during local disasters (E. Carter, personal communication, November 2014; Reynolds, 2014)

Additional Disaster Staff (ADDSTAFF) for relief of exhausted employees was enough for 79.4% of the respondents, while over 20% did not feel the plan would provide enough additional people during a disaster.

Back-up power (POWER) for 72 hours is recommended by the majority of emergency response agencies because that is the average time needed to activate and transport additional resources from one location to another (FEMA, 2012). Ninety-two percent (92%) of the survey respondents felt confident that there would be enough back-up generator power and fuel for the generators to last 72 hours. Of that number 77% felt their facility had more than enough.

Medications (MEDS) for 72 hours: the question regarding medical reserves asked "Does your Comprehensive Emergency Management Plan provide Medical Supplies for seventy-two hours?" Of the online respondents, only 2.18% answered "less than enough" with 97.81% respondents displaying higher confidence levels by replying "More than enough (78.36%)" and "Enough (19.57%)." See STATISTICS for additional survey distributions.

The next portion of this section will discuss findings that further justify a revised model for the latent endogenous construct Plan Adequacy. The correlation and regression findings are listed in Table 12 Parameter Estimates and Regression Weights for Plan Adequacy.

Table 11: Parameter Estimates and Regression Weights for Plan Adequacy (Revised)

	SRW	URW	S.E.	C.R.	P	Label
ALTFACILITY (Y1)	.881	.995	.088	11.315	***	Y1
PRIMCOM (Y2)	1.000	1.016	.071	14.213	***	Y2
TRANS (Y3)	.496	.749	.141	5.327	***	Y3
ADDSTAFF (Y4)	.573	.876	.139	6.294	***	Y4
POWER (Y5)	.322	.327	.098	3.321	***	Y5
MEDS (Y6)	.222	.116	.051	2.257	.024	Y6

Even though the factor weight of Y6 (MEDS) was only .22, this factor was retained in the model for two reasons. Firstly, the modification index (MI) identified a significant correlation between Y5 (POWER) and Y6 (MEDS). Secondly, disaster reserves of medications and back-up power are required by the ACHA Checklist criteria for licensure.

Lastly, these two factors are also indicators of resource dependency within the study's theoretical framework of contingency theory. The revised parameters are illustrated in Figure 12: Measurement Model for Plan Adequacy.

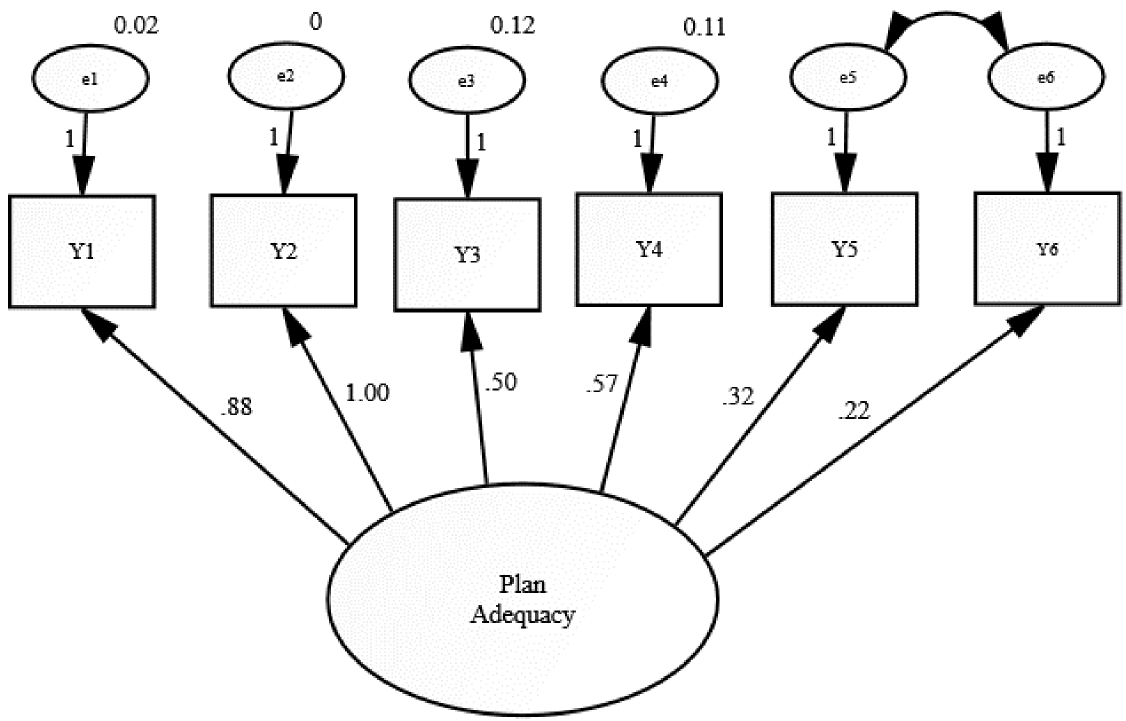


Figure 12: Measurement Model for Plan Adequacy (Revised)

The likelihood ratio test for the measurement model for plan adequacy included chi-square (x^2) of 29 and 13 degrees for freedom (df). The PGFI was .566 and is considered the most realistic index for structural equation models because it considers the number of parameters in saturated model as hypothetical complexity (Byrne, 2010). Cronbach's α or the internal consistency of the data was .7 for six items.

A complete list of all the likelihood ratio tests can be found in Appendix H. Table B. Plan Adequacy. For convenience a short summary of the model fitness indices is listed in Table 13: Model Fitness Indices for Plan Adequacy. Pre-determined thresholds were adequately met for this revised measurement model.

Table 12: Model Fitness Indices for Plan Adequacy

Model	RMSEA	GFI	AGFI	PGFI	PCLOSE
Default model	.050	.914	.861	.566	.037
Independence model	.409	1.000			.000
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	8	29.002	13	.007	2.231
Saturated model	21	.000	0		
Independence model	6	268.437	15	.000	17.896

The next section will look at evidence for a revised measurement model of the latent endogenous construct, NH resiliency.

4.4. NH Resiliency Measurement Model

Factor analysis confirmed that primary data collected from the KSA survey does provide quantifiable indicators of NH resiliency. These strongly correlated resiliency factors were: caregiver to accompany patient during evacuation (TRAVCAREGIVER), travel time needed to evacuate (TRAVTIME), procedures to activate disaster network (ESSPROC), and affiliation with disaster network (ESS).

The resiliency indicator, TRAVCAREGIVER had a mean of .84 +/- .365. Thus, displaying a high level of staff confidence that during patient transfers to another facility there will be enough qualified personnel to continue providing quality of life care during the transport.

There is still the likelihood that social likeability bias skewed these findings, even though the question used a five-point Likert scale and was presented randomly in the survey.

However, other indicators are more empirical. For example, the distance between one location and another can be measured in miles and estimated travel time. The resiliency indicator TRAVTIME represents the staff knowledge of estimated mileage and traffic times between facilities. In the study sample of 102 NH administrators, the mean for TRAVTIME knowledge among staff was .75 +/- .438. This indicator is a mandatory part of the disaster plan. Therefore staff knowledge of TRAVTIME was expected to be a strong indicator in this study on resiliency.

Two other resiliency indicators were also factors for network collaboration. The NH staff's resiliency was indicated by their knowledge of the Emergency Status System (ESS) and the procedures for contacting other network members during a disaster (ESSPROC).

Of the 102 surveyed facilities the mean of ESS awareness was .87 +/- .34 and the ESSPROC mean was .71 +/- .46. These network collaboration items are not mandatory items; however, they were included as part of the research theoretical framework for disaster resiliency. See Table 14: Descriptive Statistics for NH Resiliency.

Table 13: Descriptive Statistics for NH Resiliency (n=102)

	Mean	Std. Deviation
TRAVCAREGIVER (Y7)	0.84	0.365
TRAVTIME (Y8)	0.75	0.438
ESSPROC (Y9)	0.71	0.458
ESS (Y10)	0.87	0.335

In the MI of the measurement model for NH Resiliency there were two unseen correlations. The first correlation identified was between TRAVCAREGIVER (Y7) and TRAVTIME (Y8). The second correlation was between ESSPROC (Y9) and ESS (Y10).

The factor ESSPROC might have been eliminated from the measurement model because of the low standardized weight (SRW) of .204. However, the strong correlation with ESS maintained the significance of ESSPROC as an indicator for NH Resiliency. See Table 15 for Parameter Estimates and Regression Weights for NH Resiliency.

Table 14: Parameter Estimates and Regression Weights for NH Resiliency (n=102)

	SRW	URW	S.E.	C.R.	P	Label
TRAVCAREGIVER(Y7)	.463	1.099	.138	7.963	***	Y7
TRAVTIME (Y8)	.267	1.000				Y8
ESS (Y9)	.500	1.053	.190	5.534	***	Y9
ESSPROC (Y10)	.204	.919	.282	3.261	.001	Y10

See the final measurement model for NH Resiliency illustrated in Figure 13: Measurement Model for NH Resiliency (revised). This is an over-identified non-recursive measurement model.

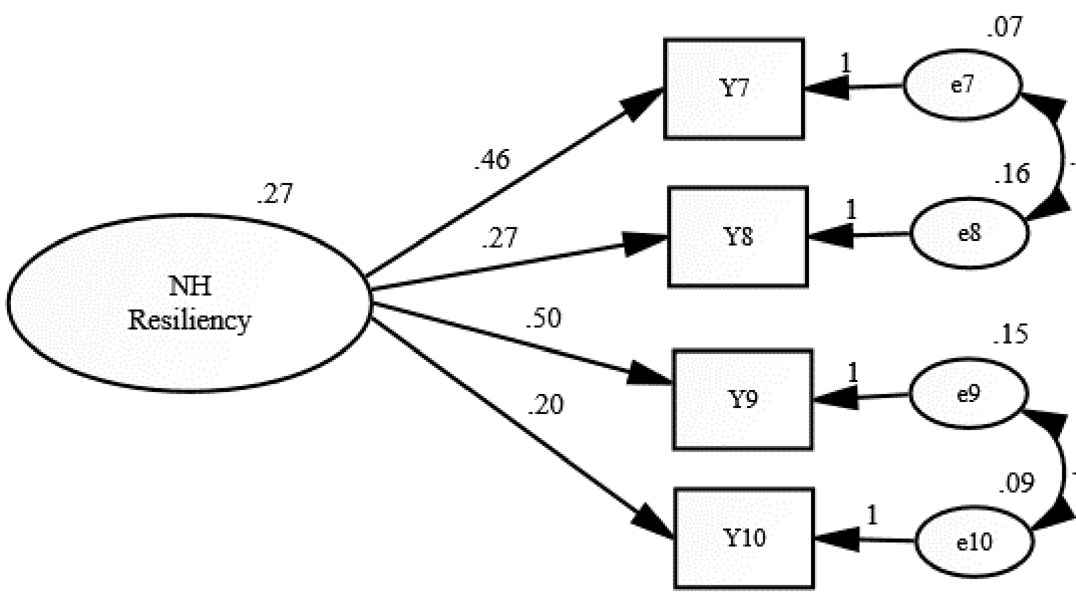


Figure 13: Measurement Model for NH Resiliency (Revised)

The likelihood ratio test for the measurement model for plan adequacy included chi-square (x^2) of 32 and 10 degrees for freedom (df). The PGFI was .869 and is considered the most realistic index for structural equation models because it considers the number of parameters the in saturated model as hypothetical complexity (Byrne, 2010). Cronbach's α or the internal consistency of the data was .7 for four items.

Table 16: Model Fitness Indices for NH Resiliency was proven to be significant per the predetermined thresholds.

Table 15: Model Fitness Indices for NH Resiliency

Model	RMSEA	GFI	AGFI	PGFI	PCLOSE
Default model	.047	.869	.869	.869	.004
Independence model	.044	1.000			.000
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	0	31.884	10	.000	3.188
Saturated model	10	.000	0		
Independence model	4	114.913	6	.000	19.152

The correlation matrix for the endogenous construct Plan Adequacy had six correlation pairings. These pairings demonstrated staff knowledge regarding the facility's disaster plan. The correlation coefficient values ranged from .322 to .885. Two indicators, alternate facility (Y1, 1) and primary communications (Y2, .885) were outside the predetermined thresholds. These indicators were retained in the measurement model because they are mandated for plan adequacy and are so highly correlated because 100% of the sampled participants had emergency plans. Other indicators for plan adequacy measured the knowledge levels of NH staff.

The complete list of significant indicators for Plan Adequacy are defined as follows: arrangements for an alternate facility during evacuations (ALTFACILITY, Y1, 1), primary communications for staff (PRIMCOM, Y2, .885, p < .01), a transportation agreement (TRANS, Y3, .499, p < .01), payroll policy for additional staff during disasters (ADDSTAFF, Y4, .573, p < .01), and a back-up power source with enough fuel to operate for three days (POWER, Y5, .322, p < .01) and enough medical supplies for each patient to last three days (MEDS, Y6, .485, p < .01).

The correlation matrix for the facility staff knowledge of the emergency management plan is provided in Table 17: Correlation Matrix for Plan Adequacy Construct.

Table 16: Correlation Matrix for Plan Adequacy Construct (n=102)

	Y1	Y2	Y3	Y4	Y5	Y6
ALTFACILITY (Y1)	1					
PRIMCOM (Y2)	**.885****	1				
TRANS (Y3)	.418**	**.499****	1			
ADDSTAFF (Y4)	.484**	**.573****	.298**	1		
POWER (Y5)	.272**	**.322****	.040	.212*	1	
MEDS (Y6)	.191	.222*	-.070	.103	**.485****	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis among the proposed six (6) indicators for Plan Adequacy had correlation coefficient values from .322 to .885. The predetermined range for the correlation coefficient for this study was from .30 to .85. Even though Y1 and Y2 exceeded the range, they remained in the construct as required by the mandated plan design and healthcare legislation.

The NH resiliency correlation pairings included: network membership in the Emergency Status System (ESS); knowledge of ESS procedures for network collaboration (ESSPROC); knowledge of amount of travel-time needed to evacuate patients (TRAVTIME) and having enough staff to accompany patients during evacuations (TRAVCAREGIVER). These were important indicators proven by network theory (Brown, et al., 2009; Blake, Howard, Eiring, & Tarde, 2012; FEMA, 2012; Kapucu, Arslan, & Demiroz, 2010; W.L. Waugh & Streib, 2006).

The correlation matrix for NH resiliency can be seen in Table 18: Correlation Matrix for NH resiliency.

Table 17: Correlation Matrix for NH Resiliency

		Y7	Y8	Y9	Y10
TRAVCAREGIVER (Y7)	Pearson		1		
	Sig. (2-tailed)				
TRAVTIME (Y8)	Pearson	**.676****	1		
	Sig. (2-tailed)	.000			
ESSPROC (Y9)	Pearson	**.313****	**.215***	1	
	Sig. (2-tailed)	.001	.030		
ESS (Y10)	Pearson	**.482****	**.384****	**.463****	1
	Sig. (2-tailed)	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

4.5. Structural Equation Model

All the measurement models for the three latent endogenous constructs (organizational complexity, plan adequacy and resiliency) were joined into one covariance structure model (CSM) also known as a structural equation model (SEM). Since this research was conducted within a theoretical framework of four contingency theories and SEM is the universally accepted methodology to describe the dynamics within contingency models, further discussion will reference SEM principles.

The three-step process of analysis used earlier was repeated for the SEM. First, any weak factor weights were removed. Second, the summary of model fit was verified. Lastly, the MI recommendations were considered for a final parsimonious model. The chi-square was 483 with 129 degrees of freedom. The RMSEA was .051 and the SEM specific index PGFI was .537.

The complete summary of model fit indices and other likelihood measures can be found in Appendix G.

The final SEM design for a contingency model of NH resiliency was composed of 171 moments of structure parameters. These included 47 variables consisting of 18 observed and 29 unobserved. The latent exogenous variable, organizational complexity ($\xi 1$), and two latent endogenous variables: plan adequacy ($\eta 1$), and NH resiliency ($\eta 2$). Path coefficients among the latent constructs were statistically significant above the predetermined effect threshold of .3

There were four hypothesized causal paths. Of these paths, three demonstrated direct relationships as: first path ($\gamma 1$) was "organizational complexity toward plan adequacy"; second path $\beta 1$ was "plan adequacy toward resiliency;" and third path ($\xi 2$) was "organizational complexity toward nursing home resiliency."

The fourth causal path ($\gamma 1 * \beta 1$) was the indirect influence of organizational complexity on nursing home resiliency via plan adequacy. Another way of expressing these four causal paths are as follows in Table 18: SEM Causal Path Labels.

Table 18: SEM Causal Path Labels

Causal Path	Label
$\xi 1 \rightarrow \eta 1$	$\gamma 1$
$\eta 1 \rightarrow \eta 2$	$\beta 1$
$\xi 1 \rightarrow \eta 2$	$\gamma 2$
$(\gamma 1) * (\eta 1) \rightarrow \eta 2$ Indirect effect	

See Figure 14: Structural Equation Model for NH Resiliency for complete illustration of causal paths and construct relationships.

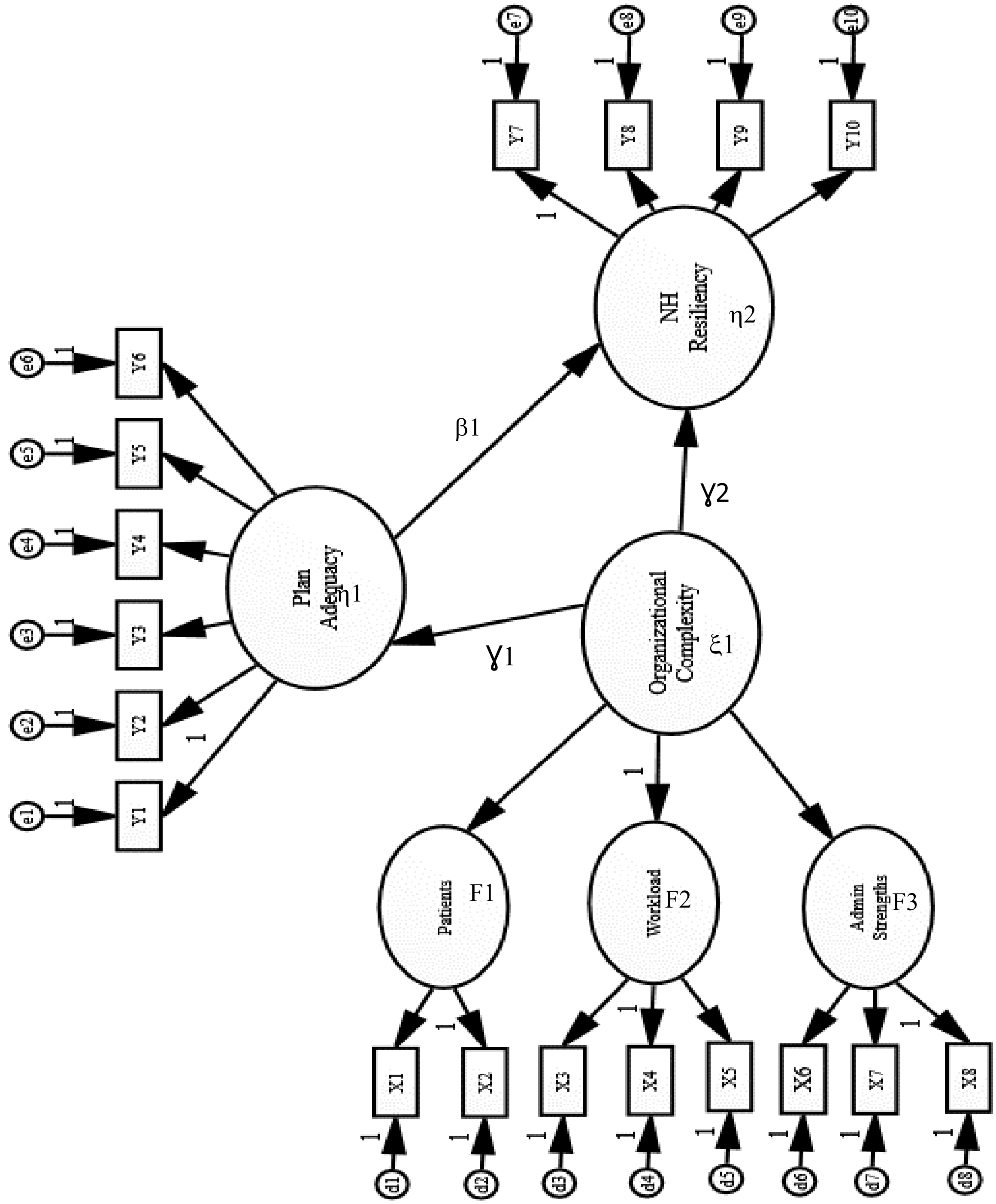


Figure 14: Structural Equation Model for NH Resiliency

See Table 19: Parameter Estimates and Regression Weights for SEM for NH Resiliency, which indicates significant correlations greater than .01 for the retained 23 endogenous variables. These findings provide a contingency perspective of organizational complexity, emergency management plan adequacy and nursing home resiliency (see Figure 15: Evidence of Effects on NH Resiliency (Revised).

Table 19: Parameter Estimates and Regression Weights for SEM for NH Contingency

	SRW	URW	S.E.	C.R.	P
Plan_Adequacy (η1)	.143	.479	.346	1.383	.167
NH_Resiliency (η2)	.819	.792	.119	6.650	***
Patient_Acuity(F1)	.282	1.879	.775	2.429	.015
Workload (F2)	1.051	1.000			
Admin_Strengths (F3)	.802	11.916	2.434	4,895	***
ADLSCORE (X1)	.918	1.000			
ACUINDEX (X2)	.673	2.305	.978	2.357	.018
CNAHRD (X3)	.893	7.630	1.309	5.827	***
LPNHRD (X4)	.714	2.691	.516	5.214	***
OCCUPANCY (X5)	.504	1.000			
STAFFRATING (X6)	.679	.594	.091	6.525	***
RNRATING (X7)	.393	.372	.110	3.385	***
NURSERATIO (X8)	1.189	1.000			
ALTFACILITY (Y1)	.885	1.000			
PRIMCOM (Y2)	1.000	1.022	.065	15.618	***
TRANS (Y3)	.499	.753	.136	5.536	***
ADDSTAFF (Y4)	.573	.880	.134	6.593	***
POWER (Y5)	.322	.329	.098	3.362	***
MEDS Y6)	.222	.117	.051	2.269	.023
TRAVCAREGIVER (Y7)	.703	1.000			
TRAVTIME (Y8)	.594	1.016	.149	6.801	***
ESSPROC (Y9)	.441	.789	.210	3.756	***
ESS (Y10)	.667	.871	.159	5.485	***

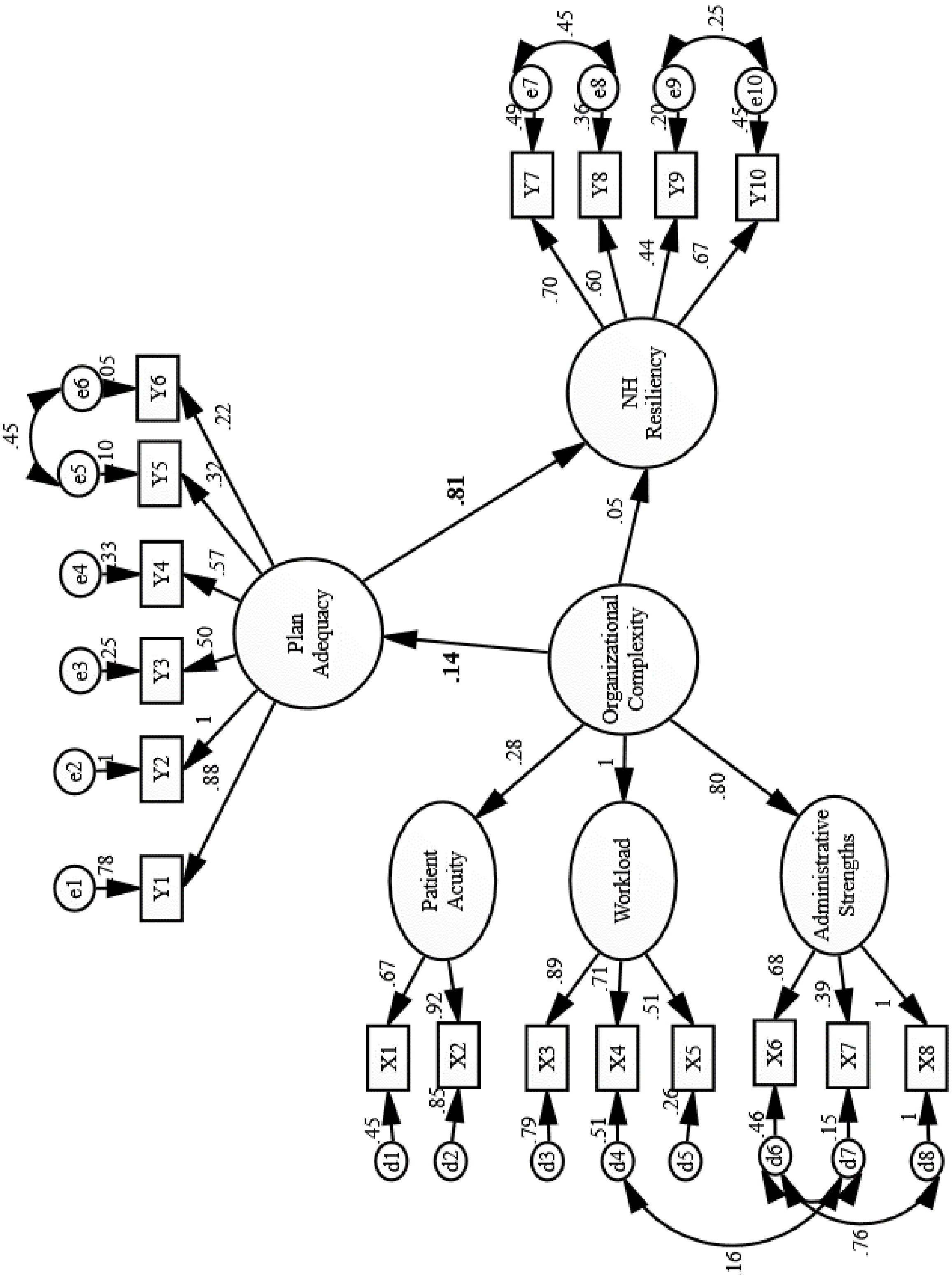


Figure 15: Evidence of Effects on NH Resiliency (Revised)

CHAPTER FIVE HYPOTHESIS TESTING

Emergency management scholars still debate whether plan adequacy (B) can compensate for organizational complexity (A) within the context of a disaster. Legislation mandates require that emergency management plans provide equitable access to disaster resources, regardless of organizational complexity (i.e. functional needs service support or FNSS). But definitions of organizational complexity and plan adequacy remain unspecified in resiliency research.

Most disaster behavior scholars agree that organizational complexity and emergent disaster elements can be defined by the research unit of analysis and the scope of the disaster (Ashby, 2007; Mileti, 2009). Therefore, this research defined organizational complexity as the level of patient acuity, the severity of the workload, and the organization's administrative strengths. Plan adequacy was defined by the nursing home staff's disaster knowledge of their facility's written disaster agreements, disaster procedures, and disaster network affiliation.

Four hypotheses were based upon these definitions and their relationship toward organizational resiliency from a contingency perspective. Next will be discussions of evidence proving each hypothesis followed by a summarization in the final section of this chapter.

Hypothesis 1: There is a positive causal effect of Nursing Home organizational complexity (A) upon Nursing Home plan adequacy (B).

The first hypothesis regarded the relationship between plan adequacy (B) and organizational complexity (A). The exogenous latent variable, organizational complexity (A) was defined by the second-order factors of Patient Acuity, Work Load, and Administrative Strengths. These organizational characteristics, along with previous disaster experience, material resources and staff knowledge affect plan adequacy (B). In other words, the quality of care patients receive during a disaster is contingent upon complexity theory, resource dependence theory and systems learning. Pfeiffer and Salancik contend that the development of relationships outside the context of an organization is necessary for guaranteed access to resources. They found a 10% variance in performance among leaders in their analysis of resource dependence upon outside vendors (Pfeffer & Salancik, 2003). In this study, variances among plans were measured by external resource dependence items such as alternate facility for evacuations, back-up power, additional staff, and medical supplies.

The first hypothesis statement that plan adequacy is contingent upon organizational complexity was proven true and expressed as: A (organizational complexity) affects B (plan adequacy).

The study dataset proved a one-way causal relationship, $\gamma 1$ between organizational complexity ($\zeta 1$) and plan adequacy ($\eta 1$) with a standardized regression weight of .143. Even though, this dataset did not meet the predetermined threshold of .30 for strength, it did meet the statistical standard for significance ($p > .05$) as a positive causal path.

The correlation coefficient ($r = .143$) implied a positive causal relationship that plan adequacy (B) was statistically significant and therefore contingent upon the complexity within an organization (A). Thus, empirical evidence proves the complexity theory that organizations adapt to the environment and that the emergency management plan provides flexibility during a dynamic change in the environment caused by an unexpected disaster. The causal path demonstrated that the disaster plan relies upon external resources to compensate the organization's vulnerabilities. Therefore, the latent endogenous construct organizational complexity can be treated as an exogenous variable for the latent endogenous construct, plan adequacy.

Therefore the hypothetical statement 1 was accepted as a true statement. See Figure 16: Hypothesis 1 Test.

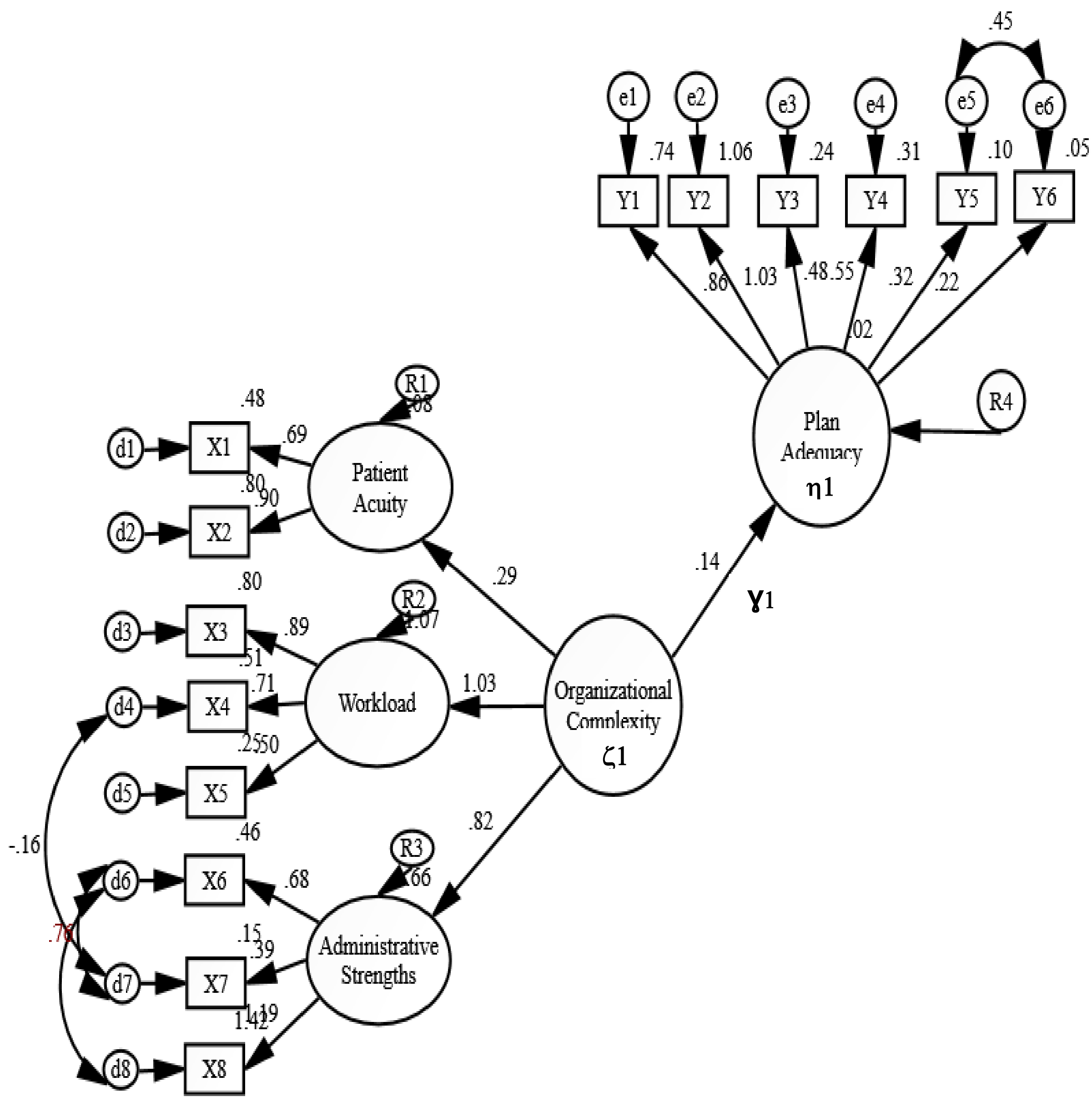


Figure 16: Hypothesis 1 Test

Hypothesis 2: There is a direct positive causality between Nursing Home plan adequacy and Nursing Home resiliency.

The disaster plan design (B) was expected to save time and adequately provide NH staff knowledge of disaster resources through written agreements and to provide NH staff additional skills and confidence as provided through affiliation with the Emergency Status Support (ESS) network. Specialized knowledge before an emergency increases the likelihood that staff will perform to the plan guidelines and thus respond, cope, and recover at an adequate level of resiliency (CDC and PHPR, 2011).

The second hypothesis regarded the relationship between plan adequacy (B) and resiliency (C). The endogenous latent variable resiliency is a function of the exogenous latent variable, plan adequacy. This research demonstrated the importance of and a better understanding of the connection between the basic principles of the emergency management (a.k.a. disaster) plan and the facility's capacity for resiliency.

Data provided empirical evidence that there is a strong one way causal relationship, $\beta 1$ between plan adequacy ($\eta 1$) and NH resiliency ($\eta 2$) with a standardized regression weight of .82. In other words $\beta 1 = .82$, $p < .05$ at a 95% confidence level can be duplicated in future renderings of this dataset.

Thus, Hypothesis 2 is proven by the data: there is a strong and positive causal direction from NH plan adequacy (B) toward NH resiliency (C). Therefore, nursing home resiliency is considered a function of the emergency management plan and Hypothesis 2 is accepted as a true statement. See Figure 17: Hypothesis 2 Test.

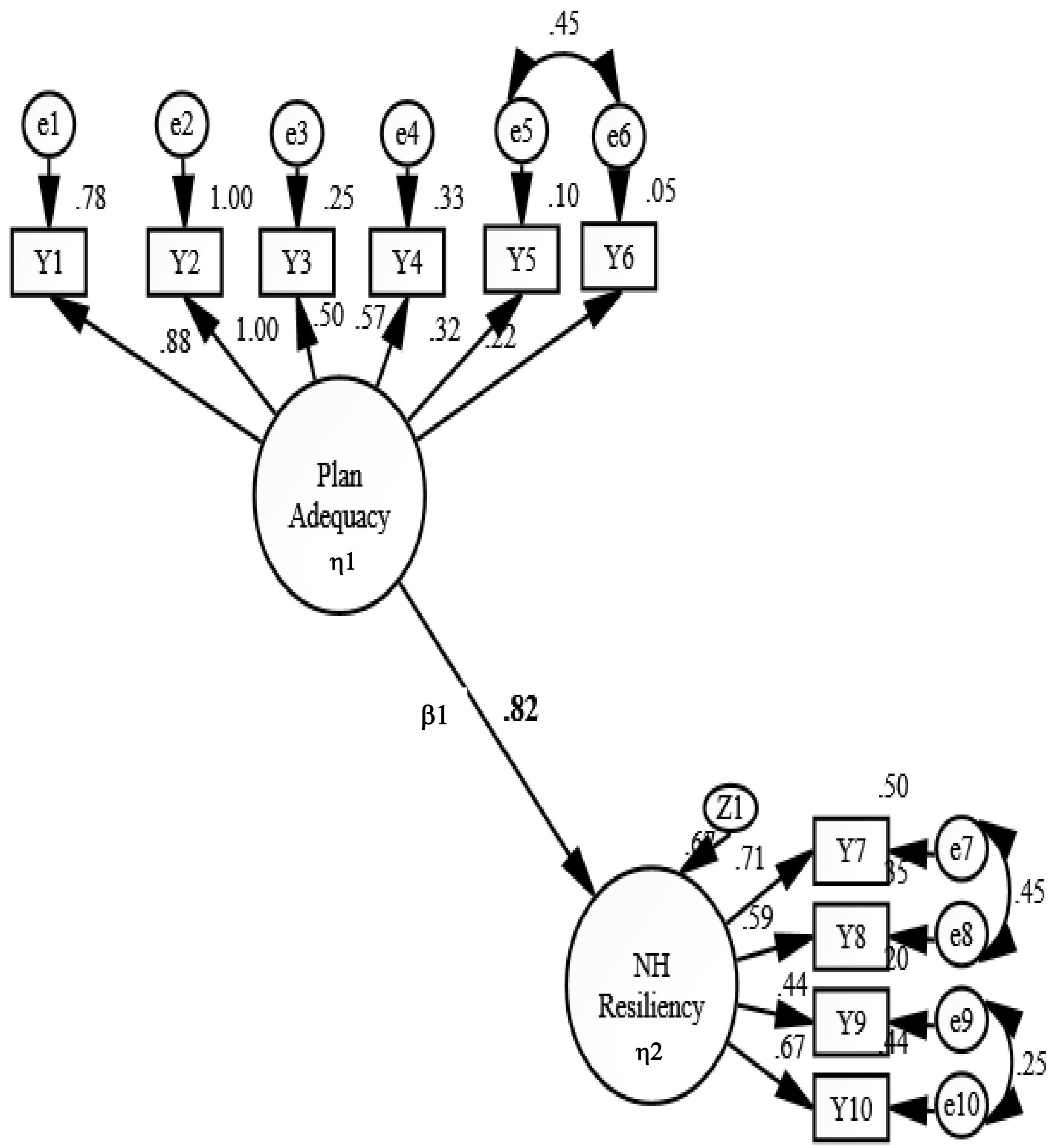


Figure 17: Hypothesis 2 Test

Hypothesis 3: There is a direct positive causality between nursing home organizational complexity and nursing home resiliency.

The third hypothesis proposes organizational complexity has a direct positive causality to NH resiliency. Complexity theory suggests an organization without a plan is adequate within the context of a structured hierarchy that relies solely upon internal resources.

It is proposed that resiliency for regaining optimized order from chaos is contingent upon leadership alone. This is demonstrated by the organization's hierarchical control over internal resources during a disaster (Cutter, et al., 2008). Unfortunately, the dataset in this study did not meet the predetermined threshold (r = .30) to be considered moderately relevant. Nevertheless, the dataset did prove there was a weak and statistically significant direct effect ($\gamma 2 = .13$, $p < .05$) of organizational complexity ($\zeta 1$) on NH resiliency ($\eta 2$). In other words, even though a direct relationship was witnessed, it was too weak. Therefore, Hypothesis 3 was rejected.

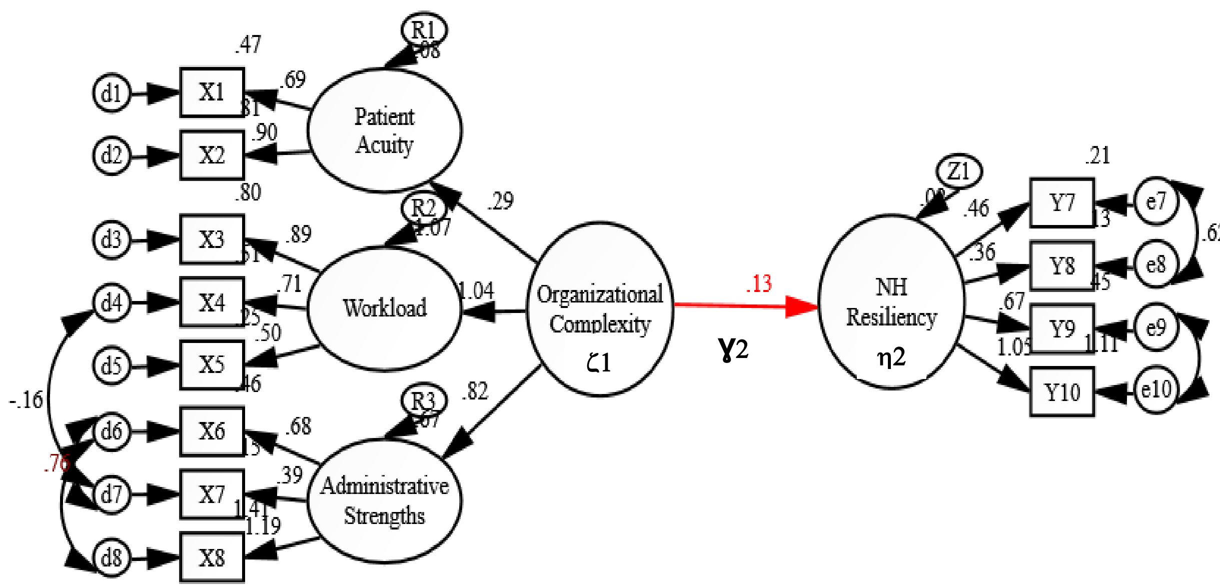


Figure 18: Hypothesis 3 Test

However, the cumulative or joint effect of both organizational complexity and plan adequacy was further examined in the test of Hypothesis 4.

Hypothesis 4: There is a cumulative positive effect of nursing home complexity and nursing home plan adequacy upon nursing home resiliency.

Earlier it was confirmed that the latent organizational complexity construct ($\xi 1$) does have a direct effect ($\gamma 2=.13, p<.05$) upon resiliency ($\eta 2$) without implementing an emergency plan. Even though the direct effect is not statistically significant, the complexity theory implies there is a likelihood for an adequate plan ($\eta 1$) to significantly enhance resiliency ($\eta 2$) outcomes. In other words, organizational complexity (A) with plan adequacy (B) may have an indirect influence or joint effect (AB) on resiliency (C). Therefore, it was proposed that together the two independent direct causal paths of $\gamma 2$ (organizational complexity on resiliency) and $\beta 1$ (plan adequacy on resiliency) would increase the capacity for NH resiliency ($\eta 2$).

However, as demonstrated in Figure 19: Hypothesis 4 Test, the degree of that organizational complexity effect is so minor (.05) that it was considered too weak to be a significant contributor to the variability in NH resiliency. On the other hand, plan adequacy's independent effect (.82) remained significantly strong. To reconfirm this, the cumulative effect data were illustrated through R-square values. Both regression paths remained .673, $p <.05$ as illustrated in Table 20 the Cumulative Effects on NH Resiliency. Therefore, Hypothesis 4 statement was not proven by the data and therefore rejected as a true statement.

Table 20: Cumulative Effects on NH Resiliency

	R^2
Independent Effect of Organizational Complexity	0.017
Independent Effect of Plan Adequacy	0.673
Joint Effect of Org Complexity & Plan Adequacy	0.673

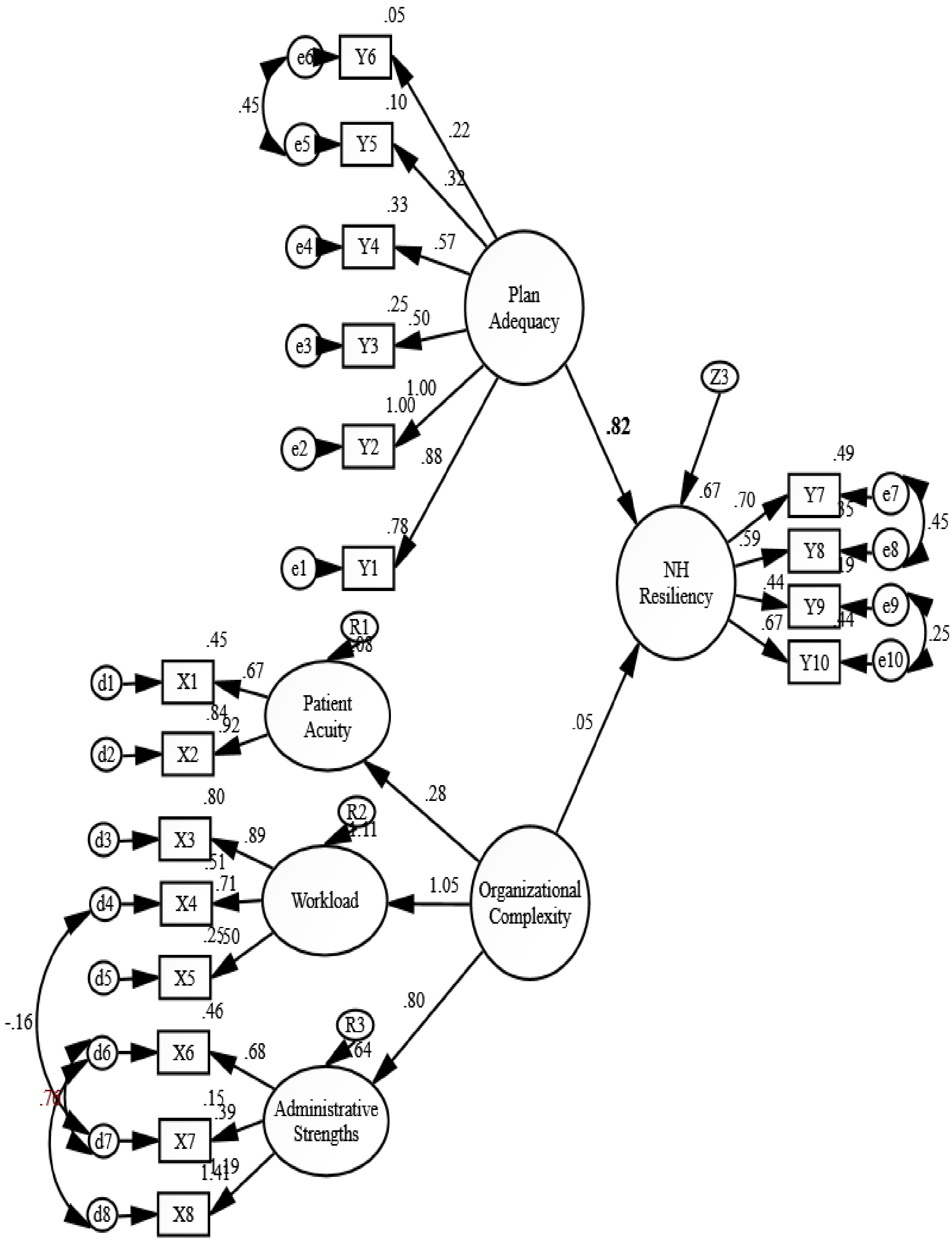


Figure 19: Hypothesis 4 Test

In summary, resiliency outcomes are contingent upon plan adequacy as it provides appropriate resources and simplifies chaos. The context (A, NH organizational complexity) positively affected the process (B, NH plan adequacy) with a statistically significant direct causal coefficient of .14.

The process (B, NH plan adequacy) positively and strongly affected outcomes (C, NH resiliency) with a significantly direct causal coefficient of .81.

The context (A, organizational complexity) indirectly influences (C, NH resiliency) by way of implementing the process (B, plan adequacy). This indirect causal path was demonstrated by the R-square coefficient of .017. However, this was a weak correlation as it remained well below the minimum threshold of significance (.05). Another consideration was the cumulative or joint effect of context and process upon outcomes.

The joint effect was evaluated by using the R-square correlation coefficient .673. It was determined that the joint effect of A (.017) and B (.673) upon C was the same strength as the independent direct effect of B (.673) upon C and again A was an insignificant influence. Thus the emphasis of a well-designed emergency management plan remains significant, regardless of the context of an organization.

This further proves the contingency theory that systems mimic other systems to compensate for structural weaknesses. A unit within a system (NH) learns by repeating historical successes of other units within their system (healthcare system) (Ashby, 2007; Richardson, 1991).

Considering that plans become isomorphic and are designed to compensate for previous shortfalls as recognized within the context of an organization, these findings are not surprising. If the context (A, organizational complexity) is weak then it stands to reason the process (B, Plan adequacy) is mandatory to strengthen performance outcomes (C, NH resiliency). Thus, outcome (C) is contingent upon the process (B), as structured by the context of the organization (A).

However, within the context of nursing home facilities during 2012, the influence upon process (B) was weak at .14 while the effective minimum threshold was held at .30. This weakness may be due to outside parties determining the plan design as mandated through three levels of legislation and using plans not guided by the healthcare model but an emergency management cycle.

The dataset showed the causal path from plan adequacy to resiliency ($\beta 2=.82$, $p <.05$) increased NH resiliency by sixteen (16) percent. This included the less than significant organizational effect (.14).

Another consideration was the organizational complexity direct causal path to NH resiliency ($\gamma 2$) as .05, $p <.05$ with .95 confidence. Again this was a relatively weak direct effect. However, the indirect effect of organizational complexity through plan adequacy on NH resiliency $[(\gamma 1 * \beta 1) = (.14 * .82) = .11]$ was greater than its direct effect (.05).

The cumulative effect of plan adequacy independent path (.673) and organizational complexity independent path (.017) was not evident when examining the change in R^2.

Findings from this study through hypothesis testing are summarized in Table 21: Hypothesis Testing Summary.

Table 21: Hypothesis Testing Summary

	Hypothesis statement	Status
H1	There is a positive causal path from NH's organizational complexity NH plan adequacy.	Accepted as a true statement.
H2	There is a positive causal path from NH plan adequacy to NH resiliency.	Accepted as a true statement.
H3	There is a direct positive causal path from nursing home organizational complexity to NH resiliency.	Rejected as a true statement.
H4	There is a cumulative positive effect of NH complexity and NH plan adequacy on NH resiliency.	Rejected as a true statement.

Some professionals believe organizations have "built in" resiliency through staff experience, ownership stability and resource acquisitions (Alexander, et al., 2010). Other scholars believe some organizations may be less resilient because of structural complexity and the enormity of internal hierarchies (Ashby, 2007). Contingency theory implies that written disaster plans, cannot directly affect resiliency without hierarchical organizational complexity to implement the plan. More research needs to be done to evaluate the effectiveness of an organization's implementation of the disaster plan.

None the less, this research provided empirical evidence that the disaster plan (B) has a stronger direct influence ($\beta 1 = .82$, $p < .01$) on NH resiliency (C) regardless of organizational complexity (A). In other words, the most important finding from this limited study was the confirmation that resiliency is improved by the disaster plan process, regardless of organizational complexity. The next chapter will discuss possible conclusions and the implications of this research.

CHAPTER SIX
CONCLUSIONS & IMPLICATIONS

This chapter outlines conclusions for and implications from collecting NH information to design a contingency model for NH resiliency. Research questions are answered based upon the findings from Chapters Four and Five. The last section of this chapter offers recommendations for future research based upon a multidisciplinary approach to collaboration across jurisdictions, specifically in disaster planning and evacuation decisions.

6.1. Contingency Framework Conclusions

Nursing home resiliency is contingent upon many aspects within the context of a disaster. According to contingency theory, a complex organizational structure (A) does not directly ensure the attainment of expected outcomes (C, resiliency) because the structure is too complicated to actually measure. Considering, the vulnerabilities inherent within the organizational complexity (A) of the nursing home environment, complexity theory was proven to be true. Thus, preparing an adequate emergency management plan (B) could compensate for organizational complexity's vulnerabilities with a stronger direct effect on NH resiliency (C).

The descriptive analysis of the FL NH population is proven by the complexity theory as an organizational structure that is too multivariate within a system of internal and external operational contingencies. The organizational characteristics are too numerous to ever be quantifiable and therefore should be defined within and by previous healthcare research (Ashby, 2007; Vesterby, 2008). For this study organizational complexity was defined and measured by patient acuity, workload, and administrative strengths. These three parameters are accepted by systems theorists as quantifiable measurements for a complexity measure (Kahan, Allen, George, & Thompson, 2009).

Plan adequacy was concluded to be the strongest predictor (.81, $p < .05$) of resiliency even though the data did not consider intervention tests for measuring the implementation success or failure of the plan.

Since Hurricane Andrew (1991), skilled nursing facilities are legislatively mandated to write comprehensive emergency management plans that use a mimetic system of strategies (Florida Senate, 2011). Isomorphic plan designs meet common legal requirements, but vary in adequacy. This study focused upon plan adequacy as a tool for implementing performance strategies grounded in three contingency theories: resource dependency, systems learning and network collaboration.

Resource dependency was demonstrated by organizational behaviors that conformed to external and more powerful organizations that control access to disaster resources (Pfeffer & Salancik, 2003). Nursing homes are resource dependent upon local vendors, corporate systems, and AHCA licenses. Of the sample surveyed, 92.2% had primary communications for contacting outside agencies for assistance. Additional medications and medical supplies are available to 98% of the surveyed facilities and 97% had enough food set aside for three days as required by the AHCA license.

Systems learning was demonstrated by shared disaster experiences and stakeholder feedback (Richardson, 1991). Nursing homes mimicked best practices from other nursing homes and from previous disaster experiences. In 2005, during Hurricane Katrina, some emergency response personnel did not report to work because of family needs (Bea, et al., 2007). This research illustrated the importance of NH employees and their families within the healthcare system as 60.8% of the NH facilities, surveyed in 2014, had employee hotlines and 86.3% provided shelter for employee families.

Network collaboration was displayed by high levels of confidence in disaster partnerships through written agreements and affiliations within a healthcare system and/or the emergency status system (ESS) and the National Incident Management System (NIMS). For example, 80.4% of the facilities had written agreements for disaster transportation and 81.4% of the NHs were affiliated with a for-profit corporate chain or healthcare system. Staff awareness of the ESS was higher (87.3%) than its familiarity with ESS procedures (70.6%) or the National Incident Management System (22.5%). It is concluded from these findings that disaster plans need to be practiced within a network of disaster partners, because there is the need for more practice in shifting from routine networks toward disaster networks (77.5% of the sample did not use NIMS).

Multiple variables could be used to measure patient acuity. For this study it was concluded that two exogenous variables in the form of indexes would simplify the contingency model. The two exogenous variables most significant to patient acuity were patient cognitive ability (ACUINDEX, .64) and patient physical ability (ADLSCORE, .96). The Acuity Index (mean score of 10.77 +/-1.79 S.D.) and ADL score (mean score of 4.12 +/- .57) provided a snapshot of the first aspect of the complexity within the daily environment of the NH.

Another complexity measure was the time professional staff spend with patients because patients experience varying amounts of time with different levels of care. Analysis of the dataset concluded that the number of patients served (OCCUPANCY) and the levels of care (CNAHRD and LPNHRD) were strongly correlated as workload. Another variable affecting workload was the size of the facility. A summation of the NH workload is as follows:

The average size of the FL NH facility in 2012 was 118 CMS certified beds with a mean occupancy of .87 +/- .15. Patient time with a CNA ranged between two to four hours a day with a mean of 2.7 +/- .64 hours. Patient time with an LPN ranged less than one hour to an hour and a half with a mean of .97 +/- .28 hours.

From the above descriptive statistics, it was further concluded that the workload of a NH is high with 87% occupancy requiring a daily minimum of three hours of direct professional contact with each NH patient.

It was further concluded that NH patients spend more time with certified nursing assistants (CNA's) than other professional staff, thus deducing bonds of trust between patients and certified caregivers create overtime, a culture of trust and dependency (Rivera & Settembrino, 2012) as another contextual layer of organizational complexity.

This frequent dependency upon another human being escalates during times of disaster as a patient decompensates in direct proportion to elevated levels of stress, such as may be experienced during emergency evacuations into hallways during a facility fire (Brown, et al., 2012). This study added to the ongoing NH research in culture change regarding nursing home environments and quality of care (Bowblis & Hyer, 2013; Chisholm, Weech-Maldonado, Laberge, Lin, & Hyer, 2013).

Another significant conclusion regarding complexity, resource dependency, network collaboration and systems learning within a framework of contingency theory was the realization that administrative strengths can be measured and can make a difference when utilized during the resiliency planning process.

This third and last complexity component, administrative strengths was derived from the first-order factors depicting the quality of professional staff (OVERALLRATING and RNRATING). The overall staff rating in 2012, among the study sample was 3.4 +/- .8 within a scale of 1 to 5, with 5 being the highest level. Registered nursing staff in 2012, among the study sample was 2.96 +/- 1.12 within a scale of 1 to 5, with 5 being the highest level.

This research was based upon other studies regarding high turn-over in NH staffing and professional burn-out within the healthcare field (Azlina & Jamaluddin, 2010; Bowblis & Hyer, 2013; Delaney & McWhorter, 2010; Eiring, Blake, & Howard, 2012; Lamb, Zimring, Chuzi, & Dutcher, 2010; Oetjen, McSweeney-Feld, Welch, Warthen, & Kopera-Frye, 2012)

Thus, it is concluded that the context of organizational complexity (A) did not pose a significant influence on the process, plan adequacy (B) because the administrative strengths as measured by staff rating, RN rating and nurse ratios are not actually included in the disaster planning process. In some cases, facility staff are missing from the plan design and therefore, that further weakens the organization's contribution to NH resiliency. FL NH quality ratings ranged from average to above-average and further explains the conclusion for organization complexity (A) having a weak affect with resiliency (C).

On the other hand, when considering organizational complexity (A) as only internal and external resources instead of structure alone, then the theory of resource dependency is proven by the findings of this study. Nursing homes are dependent upon other organizations that control access to the specialized healthcare resources needed by their patients.

Resources as defined by eight exogenous variables can be measured as the first order factor: administrative strengths. The ratio of nurse to patients (NURSERATIO) was calculated using CMS data reports of professional staff total daily hours (TOTHRD) per total residents or patients (RESTOT). The mean ratio of nurse to patients was 4.29 +/- .98 or 3 to 5 nurses per patient on average. These components for measuring organizational complexity are major considerations in designing an emergency operations plan or disaster response plan for a FL NH as they become resources during times of disaster.

Administrative strengths was not the only factor for organizational complexity. Workload also, was a first order factor proving systems theory as organizational mechanisms are structured for maintaining an acceptable level of social homeostasis within the NH during disasters (Richardson, 1991, p. 52). This is especially significant during moments of crisis, such as a high wind event or other unforeseen damage to the facility. Thus proving the first hypothesis as a true statement.

H1. The NH plan adequacy is contingent upon the NH's organizational complexity.

Organizational characteristics and vulnerabilities are the basis for the Agency for Health Care Administration's Emergency Management Planning Criteria for Nursing Home Facilities. See APPENDIX D: AHCA CHECKLIST.

Emergency management plans for nursing facilities are designed to save lives and protect property during all types of uncertainties (FEMA, 2012). The dataset confirmed that organizational complexity (A) had a weak direct effect (.14, $p<.01$) on plan adequacy (B). Thus the dataset provided empirical evidence to show plan adequacy might be affected by or contingent upon organizational complexity.

The first research question: Does organizational complexity affect plan adequacy? Was answered yes, even though the relationship was weak. The research conclusion is that the direct causal link between organizational complexity and plan adequacy proves dependency theory. To survive, the nursing home relies upon outside sources for disaster assistance. From a contingency perspective, the organization should be strong internally and have adequate resources to implement an adequate disaster management plan. More research needs to be done to identify alternative ways of strengthening the causal relationship of A (organizational complexity) to B (plan adequacy) and to C (outcomes for resiliency).

The next section provides evidence that plan adequacy (B) strongly influences resiliency outcomes (C). Thus, the answer to the second research question (Does disaster plan adequacy effect nursing home resiliency?) is affirmative.

H2. There is a positive causal path from NH plan adequacy to NH resiliency.

The plan adequacy with a regression coefficient of .81 is considered to be a strong and significant effect on nursing home resiliency (or 16 times more effective than the organizational structure effect, .05). In this study, plan design elements were used that are the most commonly accepted performance measures in social science research and are included in most disaster plan templates (Ashby, 2007; Blake, et. al., 2012). These included items important to the NH staff working through a disaster situation. The most significant plan elements were: availability of an alternate facility, primary communications, a transportation agreement, additional staff, back-up power and enough medications for 72 hour patient care.

Empirical evidence demonstrated the significance of these elements in emergency management plans that were specifically designed to meet NH staff requirements. For example, staff communications was the strongest indicator for plan adequacy with a correlation coefficient of .885 at a confidence level of .95, $p < .01$. The majority of the NH administrators surveyed (.92 +/- .27) required staff to use text messages through cell phones during disasters. Other plan elements displayed significance relevance to association with the common construct as follows: Transportation agreement (.499), Additional staff (.573), back-up power (.322) and medications (.485).

A strong positive regression coefficient of plan adequacy (.81, $p<.01$) on NH resiliency confirmed Hypothesis 2: There is a strong causal path from the NH disaster plan to NH resiliency.

When considering that the disaster plan is designed to compensate for organizational shortfalls during the time of crisis, one can further conclude that NH resiliency is sixteen (16) times more dependent upon plan adequacy (.81) than organizational complexity (.05). On the other hand, plan adequacy (or effectiveness) remains vulnerable to unpredictable changes in human behavior during disasters and even though organizational complexity is less significant than plan adequacy to resiliency, there remains a direct correlation.

H3. There is a positive direct causal path from nursing home organizational complexity to NH resiliency.

The data set did not confirm a significant relationship between organizational complexity and resiliency at .05 with confidence level of .95 and $p<.01$. Therefore, the third hypothesis was rejected. This study imparts the necessity for evaluating the facility's implementation policies apart from the plan design. Only staff knowledge, skills and attitudes regarding their facility's particular disaster plan design were evaluated and not the organization's implementation of resiliency strategies apart from a plan. Never the less, it was demonstrated that without a plan the organization has a direct influence on resiliency outcomes.

Research data were not available for measuring the flexibility and accountability aspects of staff implementation practices during disasters. However, after action reports from emergency managers do provide community response information and this after action report concept should also be adopted by NH administrators.

Therefore, more empirical data are needed that are specific to nursing home response implementation. This knowledge limitation will be further discussed in the next section about implications for disaster decisions.

H4. There is a cumulative effect of NH complexity and NH plan adequacy on NH resiliency.

No, was the answer to research question 4: Do organizational complexity and plan adequacy collectively influence resiliency? The hierarchal r-square regression analysis for joint influence or a cumulative effect demonstrated no change from the effect of plan adequacy alone (.673). Thus, plan adequacy accounts for the most influence on NH resiliency.

This was a surprise finding. However the significance of the independent effect of organizational complexity (.05, $p<.01$) was not acceptable as an indication of a direct influence on resiliency. One might conclude that the frailty of patients and the complexity within the context of a nursing home environment lends itself to a weaker contribution toward resiliency. Thus an emphasis remains for the necessity of an adequate disaster plan.

There were other, unforeseen surprises among study indicators previously thought to measure NH resiliency. Previous studies theorized that economic resources and cultural beliefs influence human behaviors, especially during emergencies. Therefore, cultural affiliation and socioeconomic status were thought to influence levels of organizational resiliency.

However in this study, the diversity of patients did not significantly correlate to other variables in this study. Some scholars believe the small representation of diverse populations within the nursing home environment is due to socioeconomic constraints and/or cultural preference (DHFS, 2005; Chisholm, et.al., 2013; Eiring, Blake, & Howard, 2012; FL ODH, 2010; Rivera, 2012; Rivera & Settembrino, 2012). Patients tend to choose facilities within the geographic location of their community.

This study proved these earlier findings. Emergency management plans are written to meet all possible disaster contingencies for an entire community, without discrimination among populations. Therefore, cultural and functional access needs are mandatory plan design considerations, especially in diverse states, such as Florida. However, some analysts consider the nursing home population in Florida is less diverse because patients choose facilities within their cultural community or remain with family members (Elder Affairs, 2009). Therefore, cultural diversity and the number of non-English speaking patients were not significant to the findings.

It was concluded that all ethnicities have access to disaster assistance through specific legislation and this encompasses cultural affiliations as well. This research concluded that other affiliations are more significant to improving resiliency outcomes, such as emergency support networks.

An additional and unexpected conclusion from the dataset was the demonstration that transportation agreements and disaster network affiliations through plan design were more significant indicators of organizational resiliency, than socioeconomic and cultural affiliation. This surprising discovery may be due to effective legislation that promotes equitable access to disaster assistance, particularly during evacuations (Drabek & McEntire, 2002). In other words, resiliency is measured by the number of lives saved and the resources used to transport and shelter those lives.

Therefore, other resiliency indicators, besides cultural and socioeconomic factors are included as policy considerations within the context of network affiliations and transportation agreements. For example, translators are pre-identified to work as travel caregivers during evacuations.

So, the study data revealed other factors that answered the research question: Q3. What other factors affect nursing home resiliency? The availability of enough travel caregivers to accompany patients to an alternate facility during evacuations was highly significant. The correlation regression coefficient for alternate facility agreements (ALTFACILITY) was .83 with a .95 confidence level.

Interviews with three facility administrators identified local community affiliations with other skilled nursing facilities and emergency management partners as important contingency factors for resiliency.

This research proves the contingency theory that plan adequacy has a greater causal effect upon resiliency than organizational complexity. Therefore, it follows that resiliency can best be strengthened through an adequate disaster plan.

However, more research is needed to fully understand three additional research implications found during this study. Additional disaster planning considerations identified were: 1) evacuee transportation, 2) disaster plan templates (a.k.a. checklists), and 3) plan implementation.

6.2. Implications for Disaster Decisions

The finding that plan adequacy is significant to resiliency also implies that decisions are based upon efficiency in plan implementation and therefore, are also significant to resiliency outcomes. The keywords are adequacy and efficiency.

There remains a need for additional contingency theory research that is specific to resiliency predictions based upon plan implementation that includes measurements of flexibility and accountability as indicators of plan adequacy.

6.2.1. Evacuee Transportation

More needs to be understood about transportation decisions as a factor of resiliency. The decision when and where to evacuate patients remains contingent upon many other factors beyond the control of the NH organization and its respective disaster plan. Three conclusions regarding the decision to evacuate are:

1) Enforceability of written transportation agreement

2) Availability of specialized medical transport equipment and

3) Sufficient decision timeline.

Even though the AHCA Checklist (See Appendix D) recommends a transportation agreement, 19.6% of the facilities surveyed felt transportation agreements were not enough to extend Health Related Quality of Life (HRQDL) for evacuees (CDC and PHPR, 2011). The remaining 80.4% professing confidence in transportation agreements, may have been reacting to the social desirability bias of providing the best care for their patients.

Repeated concern with patient transportation plans appeared over and over again in the after action reports, personal interviews, and site visits. There is no substantial evidence in the literature confirming that pre-disaster written agreements are practical and enforceable during disasters. Implementation of the plan was not the focus of this study, the adequacy of the plan as understood by the staff through their knowledge, skills and attitudes was the measurement.

For example, decisions to take action are encumbered by the logistical procedures for acquisition of “specialized” transportation equipment. Locating enough trained personnel to evacuate patients to a safe place is another hindrance. Because the transportation agreement is recognized as unenforceable, one administrator said, “they [pre-disaster agreements] have no teeth” (Reynolds S. , 2014).

So, one concludes that the transportation agreement must define clear lines of authorization with enough flexibility to allow adaptations contingent upon available resources during a disaster. Thus, more research is recommended to evaluate transportation elements related to NHs as HRQOL outcomes.

6.2.2. Disaster Plan Templates

There are inconsistencies in writing disaster plans and in reviewing the plan design for most organizations. First, disaster plans are designed internally within organization-centric silos of information. Second, emergency management professionals are not trained across multiple disciplines, specifically public healthcare competencies or other specialized services required during a disaster. However, they are responsible for the one basic commonality in plan design that directs the review process. That is the vulnerability assessment.

Vulnerability assessments are required by local fire inspectors, insurance agents, and the local emergency management agency. After the vulnerability assessment is completed, then planned actions are expected to be written. Therefore, the final design variations are based upon who and how the vulnerability analysis was conducted.

Various methodologies for conducting vulnerability assessments are also known as risk assessments, risk analysis, vulnerability analysis, and cost-benefit analysis. These terms are also mixed in among acronyms such as strengths, weaknesses, opportunities, and threats (SWOT) analysis. A group of professionals in the Florida Health Care Association are attempting to gather everyone onto the same page with one uniformed disaster template that begins with a standardized method for assessing a healthcare facility's disaster vulnerabilities.

The Florida Health Care Association wrote a guidebook (FHCA, 2009) based upon the AHCA Checklist and the National Criteria for Decision to Evacuate. This book is distributed to the membership and is available for purchase as a cd and in print. The guidebook provides a step by step template for conducting a vulnerability assessment using historical disaster information. But only 8 of the 102 facilities completing the survey said they used the Association guidebook as a plan template. Local emergency management agencies can provide assistance with a vulnerability analysis, but more research needs to be done to evaluate this aspect of network collaboration.

Emergency managers recommend to NH administrators to conduct locally focused assessments because the first response is local. Emergency management agencies recommend the following principles in conducting a local vulnerability assessment:

- Review local weather history (i.e. frequency and severity of thunderstorms),
- Evaluate the physical location of their buildings (i.e. near clogged storm drains)
- Notate infrastructure changes that may alter their evacuation route (i.e. new bridge construction or new train tracks).
- Include staff in identifying local barriers.

Those most familiar with the facility and its community may have knowledge that is unavailable to outside agencies. Therefore, it was disappointing to find that among 102 FL NHs, 45.1% of the participants did not include NH staff in designing the disaster plan. The majority (81.4%) of facilities in the sample were provided standardized plans from corporate administrations or healthcare systems. This may appear beneficial at first consideration, however treating each unit (a.k.a. skilled nursing facility) as having the same vulnerabilities may not be adequate or cost effective during an actual disaster.

Preferred steps toward plan adequacy are written solutions intended to mitigate anticipated damages (i.e. back-up generator, installation of storm windows, purchase a transportation vehicle that accommodates patients, and pre-identify alternate shelter). These written solutions are also constrained by legislation from other sectors.

For example, schools have disaster plans based upon public, private, or charter guidelines that include Life Safety Codes (LSC), International Building Construction Codes (IBCC), Red Cross Shelter Code 4496, ADA Compliance and any other local ordinance related items (FEMA, 2012). Health facilities follow the same urban planning codes as school systems, plus specific patient guided checklists such as AHCA and HHS Office of Inspector General (OIG). Emergency management disaster plans are based upon national incident management system (NIMS) terminology and resource types (Type I, II, III, & etc.). Therefore, plan designs are as unique as the composing agencies.

NH facility disaster planners can choose from a variety of emergency management plan templates (i.e. local county, state health department, corporate headquarters, professional association, and national checklist). To minimize some of the chaos, legislation was created to include public safety plan reviewers as “collaborators” in the four phases (preparedness, mitigation, response and recovery) of the healthcare emergency management cycle (ACHE, 2013; F.S. 252, 2012).

There are other plan inconsistencies besides internal proprietary designs and untrained plan reviewers. Even though, NHs are encouraged to analyze historical data to calculate the probabilities and frequencies of disasters, there remain suspicions that the plan implementation procedures remain inadequate and possibly outdated (Bea, et al., 2007). The more details a plan contains then the better probability of coping and responding to a disaster. It is also important that staff are familiar with protocols and timelines as written into the facility's emergency plan.

Network theory grounded in contingency theory was proven by this study, however, it remains unclear how NH administrators structure their vulnerability analysis and thus design adequate strategies for disaster response and recovery, without training with network partners. Therefore, additional research is needed regarding the weak significance of organizational complexity (A) in designing plan adequacy (B).

This is especially needed as the organization's implementation of the plan becomes more significant to plan adequacy as a function of resiliency; starting with the choice of design templates, through the plan review process and into the disaster implementation phase or resiliency outcomes.

6.2.3. Disaster Plan Implementation

Not all facilities surveyed used the AHCA checklist to design a plan. As pointed out earlier, inconsistent plan designs can become the first hindrance to successful implementation. Only 30% used the AHCA checklist, yet the Florida emergency management community uses the AHCA criteria to review the plans!

Interdisciplinary implementation was initially intended, by the spirit of the law, to be a collaboration that included emergency management (EM) into the local urban planning decisions and local evacuation exercises related to health care core competencies during disasters (ICMA, 2007; Mileti, 2009).

Over time, this collaborated implementation of the health disaster plan has been interpreted by some professionals as only a fee based review process toward obtaining health facility license approval. In other words, NH disaster plans are bureaucratic paperwork, handled through corporate headquarters (29.4%) or designed by NH staff (54.9%). In addition, there are two other rationalizations for diluted confidence in the NH disaster plan design template. First, corporate headquarters may be physically located out of the area and unfamiliar with the probabilities and/or the frequency of local disaster Threats to the NH facility. Second, the high turn-over of staff creates the possibility that people unfamiliar with the plan will be responsible for its implementation (HHS OIG, 2012). On the other hand, when a facility's staff has a long employment history and they are included in the plan design, then there is an increased likelihood that the NH will be more resilient (Comfort, 2012). See Table 23 for NH Plan Design Templates.

Table 22: NH Plan Design Templates (n=102)

	Percentage of users
AHCA Checklist	7
NH Staff Design	54.9
Corporate Design	29.4
Health Association	29.4
Include NIMS	22.5
Annual Exercise	100

This study touched lightly upon the problem that emergency management professionals are distanced from the plan review process due to lack of training in identifying gaps in disaster patient care. There needs to be more research and perhaps training redesigned to enhance individual resiliency among staff that will strengthen the overall resiliency of the organization.

6.3. Alternative Explanations of Findings

The significance of an adequate disaster plan for effective resiliency may be further explained within the context of the external community and the internal culture. Some counties may have the same vendor agreeing to transport all the skilled nursing facility patients, thus creating an overwhelming expectation for assistance from the disaster community. NH staff may ignore the plan and continue to behave as they did before the disaster, without anticipating cascading events (Ashby, 2007; Laditka, Laditka, Cornman, Davis, & Richter, 2009). Staff need to be aware of the additional amount of time required for health facilities to pack up and deliver evacuated patients to a safer location. Decisions to activate a disaster plan are also dependent upon the reliability of emergency warning systems (i.e. employee Hotline and primary communications).

The plan's effect on NH resiliency shows a substantially positive influence, because some emergent decisions may be derived from transformed policies, as interpreted by boots on the ground responders. The likelihood exists that nursing home administrators' and staff members will base disaster decisions contingent upon their own understanding of a disaster plan that has unclear objectives.

Staff disaster actions may be contingent upon misdirected incentives, inadequate disaster reserves, no clear lines of authority and the assumptions that previous disaster successes will work again (Ashby, 2007; Bascetta, 2006). Thus, creating the likelihood, that with or without a plan, some facilities might choose to shelter-in-place in lieu of evacuating their "highest-risk patients," even though circumstances predict less favorable outcomes (Mileti, 2009; Morse, Struyk, Pinegrina, Romanik, & Shapiro, 2006).

Practicing the plan annually, minimizes the risk of inadequate plan implementation and poor resiliency decisions. As part of the AHCA checklist, disaster exercises are required annually to familiarize the NH staff with their facility's disaster strategy. Even though an annual exercise was conducted by all 102 participants in the survey (as required by the HHS OIG), the design of the exercise may not be uniform across the state and therefore inadequate to reduce strategy shortcomings in the disaster plan. Just as there are a variety of design templates, there are a variety of plan exercises: drill, tabletop, group discussion, virtual simulation or any combination of the four types.

As pointed out earlier, not all facilities use the same checklists, templates, or type of exercise (i.e. tabletop, full scale, or timed drill). Therefore, perhaps explaining why one facility decides to float patients through flooded windows while another facility arranges helicopter evacuations (Fink, 2013).

Any staff member expected to make decisions during a disaster, as responsibilities may increase or shift away from daily routines, will be more resilient when they exercise an adequate plan. Staff participating in an exercise are more aware of planned disaster timelines required in packing up and evacuating patients, along with medical charts and additional supplies. For example, practicing patient transport procedures and timing the transport route in anticipation of the need can help staff calmly think through alternative courses of action. Thus, proving the need for a written decisions (disaster plan) based upon pertinent evacuation details acquired during the exercise.

6.4. Recommendations for Plan Adequacy Improvements

Some organization analysts believe there should be a differentiation among three types of disaster plan strategies: intent, emergent, and realized (Ashby, 2007). Theoretical contribution from this research was in the area of narrowing the gaps between the intent of the emergency management plan to establish a solid foundation for emergent collaboration between public health planners and emergency management plan reviewers. Therefore, more stringent and expansive research needs to be done to confirm the dynamic moments between the parameter effects of plan adequacy and organizational resiliency. One place to start is by narrowing the gaps between public health planning and emergency management response technologies.

This study identified alternate facility, disaster supplies, and transportation agreements as the most important elements for measuring plan adequacy. Elements of plan adequacy from this study revealed the need for alternate transportation routes and smarter infrastructure design that evaluates the time need to transport frail patients out of harm's way. Either better construction of nursing facilities and/or urban policies in choosing appropriate locations for facilities.

There are numerous recommendations from this research for improving emergency management's relationship with the healthcare sector. These can be summed up as two recommendations specific to improving plan adequacy:

1) Include transportation authorities in the NH evacuation planning phase and

2) Train emergency managers in the Failure Mode and Effects Analysis (FMEA) already used by healthcare professionals.

There are other agency inputs needed in the planning process to remedy the lack of transportation coordination concerns revealed in this research. Even small facilities not affiliated with a large health system, need to be aware of local evacuation procedures and egress as pre-determined by law enforcement partners and emergency managers. Healthcare administrators need to be in attendance during local evacuation plan reviews. Most importantly, a transportation contact with local authorities should be included in the multidisciplinary team when designing a facility's emergency management plan.

The second recommendation for adapting the emergency management plan review process to include the Failure Mode and Effects Analysis (FMEA). This will align public safety and healthcare objectives into quality of service partnerships. Presently, both emergency management disaster and healthcare analysts rely upon the Root Cause Analysis (RCA). This retrospective analysis of behavioral and anecdotal data is related to a sentinel disaster. During disasters, each sector begins with a shared mission to save lives, however, they each have a different sets of objectives.

Therefore it is recommended that emergency management learn the Failure Mode and Effects Analysis (FMEA) process already used in healthcare. This proactive approach uses a multidisciplinary team that recognizes the predictability of errors during a crisis and designs a process of accountability to intercept missteps. It is akin to the vulnerability analysis already assumed by emergency managers and could provide a framework for an effective plan review process to supplement the AHCA checklist.

Due to the time and legal constraints not all elements of contingency planning and organizational complexity were observed. Staff ratings and patient acuity for this study demonstrated the dependence of organizational activity upon human experience, yet, more extensive, interdisciplinary research is needed to conclude what other human factors effect organizational complexity. More research is needed to understand tipping points for organizational decisions (i.e. evacuations).

During the analysis of data, many measurement models and alternative path analyses revealed some plausible options to illustrate the effect of plan adequacy in strengthening organizational resiliency. These optional measurement models are offered in the following sections for consideration in future research projects.

6.5. Recommendations for Future Research

Three recommendations for future research are: 1) an interdisciplinary research, 2) interdisciplinary operational definition for resiliency, and 3) future research and modeling on the determinants of resiliency.

Comparisons across human and organizational behavior studies are hindered by multiple interpretations of resiliency and not enough evidence has been collected to determine the best methods for implementing disaster plans. Research recommendations in the next three sections and these are based upon identified disaster planning and recovery collaboration gaps from other resiliency and emergency management studies (Agranoff, 2003; Comfort, 2012; CDC and PHPR, 2011; Cutter, et al., 2008).

Design studies for resiliency should use a range of assessment tools that monitor both the physiological and structural characteristics that define resiliency. For example, studies designed to predict outcomes from inputs of behavior changes during moments of stress, such as disaster recovery efforts from an earthquake provide various degrees of resiliency for responders depending upon physical conditions.

Perhaps a virtual experiment designed to predict outcomes from strategic plan inputs designed by interdisciplinary partners (health, emergency management and urban planners). Injects of behavior changes or policy changes can then be graded upon degrees of effectiveness in attaining a degree of resiliency (a.k.a. effectiveness). The physiological and structural basis for resilient behaviors can be explored while research participants virtually exercise strategies for various types of disasters within a finite timeframe.

The research community needs operational definitions for resiliency across disciplines. A definition of resiliency is needed that is based upon common characteristics already identified among the multiple disciplines. Resiliency has been described as inherent within individuals, organizations, and society as a dynamic process of functional and structural changes with degrees of variation. Psychiatric health terms may describe resiliency, however, resiliency is not clinically defined.

Comparisons across studies are hindered by multiple interpretations of resiliency as it is borrowed from one science and imposed onto another. There needs to be increased research and design mechanisms for assessing individual and organizational resiliency behavior. At present most disaster resiliency research uses terminology based upon economic performance.

Health and environment affect resiliency throughout the lifespan of the individual or the organization. Modifiable and non-modifiable influences on resiliency may include ethnicity, culture, and education, previously stress filled experiences, and other behaviors (Blazer, Yaffe, & Liverman, 2015). Resiliency can be learned so comparisons of resiliency performance can be made between moments in time (before disaster and after disaster).

Health and public safety research foundations, as well as, academic research centers should partner with each other in defining resiliency in degrees or some measureable term. Then specific guidelines for resiliency studies can be drafted and approved by an oversight committee of interdisciplinary stakeholders.

6.6. Summary of Conclusions and Recommendations

The main conclusion from this study is that nursing home resiliency (C) is strongly contingent upon plan adequacy (B), especially during situations requiring evacuations. The contingency perspective of the relationship of organizational structure (A, organizational complexity) through processes (B, plan adequacy) slightly influences outcomes (C, resiliency). The contingency theory was proven as demonstrated in the formula: $A \longrightarrow B \longrightarrow C$.

The direct causal path suggested by contingency theory was proven positive, not significant, and is demonstrated in the formula: A $\longrightarrow$ C.

The indirect causal path of joint effects from structure A and process B, was a positively significant change as: AB $\longrightarrow$ C. However, the effect was similar to the independent effect of B upon C. This similarity was accredited to the fact that structure (A) already proved indirectly and weakly significant through the plan process (B). Consequently, the A to B to C aspects of contingency theory was proven by the dataset.

Even though this dataset demonstrated a weak direct causal effect between organizational complexity and resiliency, this research identified opportunities for improving the NH structure and proved the need for emergency management processes to maintain and strengthen future NH resiliency.

This empirical study offered strong proof that NH resiliency is contingent upon and is directly influenced by an adequate emergency plan, and that the plan design is contingent upon the complexity of the organization.

In other words, organizational complexity indirectly influences NH resiliency via the creation and status of the adequacy of the emergency plan design. The implication of this important finding is that a nursing home should internally foster the adequacy or integrity of its emergency management plan.

In addition, empirical confirmation of the significance of having disaster plans reemphasized the need to continue discussions for improving plan implementation by strengthening the infrastructure supporting NH homes.

A summary of recommendations from this study to practitioners includes the following:

1) Identify an interdisciplinary definition for resiliency.

2) Use a standardized plan template.

3) Write clear lines of authority with allowances for adaptations (flexibility).

4) Train health care plan reviewers in healthcare strategic planning.

5) Include healthcare administrators in local emergency management evacuation plans.

6) Conduct more interdisciplinary research in disaster organizational behavior.

See Table 23: List of Conclusions and Recommendations for a more detailed list.

Table 23: List of Conclusions and Recommendations

Main conclusions	Recommendations
Definition and measurements for resiliency differ across disciplines.	• Define resiliency in measureable terms • Use consistent definition of resiliency across disciplines. • Conduct interdisciplinary research (health, public affairs, emergency management, and public safety). • Use consistent indicators in interdisciplinary research.
Plan adequacy strongly improves resiliency.	• Include all stakeholders in plan design. • Train stakeholders and outside agencies that will be implementing the plan. • Practice the plan within the organization.

APPENDIX A: KSA SURVEY INSTRUMENT

Qualtrics Survey Questions

UNIVERSITY OF CENTRAL FLORIDA

English

2014 Skilled Nursing Facility Administration Survey

What is your current job title (or the best description of your position)?

- ○ Administrator
- ○ Assistant Administrator
- ○ Director of Nursing
- ○ Facilities Manager
- ○ Other (Please specify): ______

Length of time you have been employed with this facility?

- ○ Less than six months
- ○ Between six months and to twelve months
- ○ Over twelve months and less than three years
- ○ Over three years and less than five years
- ○ Over five years

What is the current status of your facility's Comprehensive Emergency Management Plan (a.k.a. disaster plan)?

- ○ Under review
- ○ Approved
- ○ Do not know

How is your facility's Comprehensive Emergency Management Plan developed (choose any that apply)?

- ☐ From scratch
- ☐ With staff input
- ☐ Without staff
- ☐ Corporate Template
- ☐ Health Department Template
- ☐ Nursing Association Template
- ☐ Do Not Know

In the past five years, has your facility experienced any emergency event requiring evacuation or sheltering in place in response to a disaster (i.e. power outage, smoke damage, water damage or wind damage)? Circle best choice

Yes No Do Not Know

How many times per year does your facility conduct disaster drill/exercises (other than fire alarm tests)?

- None
- Once every twelve months
- Twice a year
- Three or more times a year

Employee Disaster Planning:
Does your facility's Comprehensive Emergency Management Plan (CEMP) provide employees the following?

	Yes	No	Do Not Know
Emergency Hotline for disaster information	○	○	○
Shelter for staff family members	○	○	○
National Incident Management System (NIMS) training for staff	○	○	○

Disaster Resources Management:
Does your Comprehensive Emergency Management Plan provide Medical Supplies for seventy-two hours?

- I do not know
- Enough for 72 hours
- More than enough
- Less than enough
- None provided

Disaster Resources Management:
Does your Comprehensive Emergency Management Plan provide Dietary Supplies for seventy-two hours?

- I do not know
- Enough for 72 hours
- More than enough
- Less than enough
- None provided

Disaster Resources Management:
Does your Comprehensive Emergency Management Plan provide Back-Up Power for seventy-two hours?

- I do not know
- Enough for 72 hours
- More than enough
- Less than enough
- None provided

Disaster Resources Management:
Does your Comprehensive Emergency Management Plan provide Additional Staff during a disaster?

- I do not know
- Enough for 72 hours
- More than enough for three days
- Less than enough for three days
- No additional staff provided

Disaster Resources Management:
Prior to a disaster what agreements are written into your Comprehensive Emergency Management Plan to provide additional or replacement service items needed for your patients for seventy-four hours?

- I do not know
- Corporate Headquarters
- Both Headquarters and Commercial contracts
- Local Vendor Contracts
- No additional help needed

EVACUATION PLAN:
How adequate is the CEMP transportation of patients to another facility when sheltering in place is not an option?

	Less than enough	**Enough**	**More than enough**	**Do Not Know**
Vehicles and drivers	○	○	○	○
Staff to accompany patients	⊙	○	○	○
Estimate of Travel Time	○	○	○	○

What percentage of your revenue is set aside annually for capital improvements?

- 0 - 10%
- 11 - 15%
- More than 16%
- Do not know

What percentage of your annual revenue purchases insurance?

- Less than 10%
- Between 11 to 15%
- Over 16%
- Do not know

How long will budget reserves last?

- Enough to operate for three days
- Not enough to operate for three days
- No reserves at this time
- Do not know

What percentage of annual revenue is paid to investors?

- 1 - 5%
- 6 - 10%
- 11 - 25%
- Over 26%
- Do not know
- Not applicable

Does your facility use Electronic Medical Records (EMRs)? ○ Yes ○ No ○ Do Not Know

What type of health care facility has a written agreement to receive your patients during an evacuation?

- ○ Skilled Nursing Facility within same health system
- ○ Alternate SNF in another health system
- ○ Assisted Living Facility
- ○ Independent Living Facility
- ○ Community Center / Faith Based / School Building
- ○ No written agreement in CEMP
- ○ Other option __________

What is **primary mode** of communication with your staff during a disaster? (Only one choice)

- ○ HAM Radio
- ○ FRS Radio
- ○ Telephone landline
- ○ Cellular or Mobile Phone
- ○ Satellite Phone
- ○ Text messages or Email
- ○ Other __________

What is **BACK UP** communication for staff during a disaster when the primary mode is unavailable? (Choose one)

- ○ HAM Radio
- ○ FRS Radio
- ○ Telephone landline
- ○ Cellular or Mobile Phone
- ○ Satellite Phone
- ○ Text messages or Email
- ○ Other __________

APPENDIX B: DISABILITY STATUS OVERVIEW

Disability Status Overview

Dual Area Profile

Introduction

In **2012**, **22.2**% of adults in **Florida** reported having a disability, compared with **21.4**% in **United States & Territories**. The tables in this profile provide information on the percentage of adults with and without disability for two selected areas by age, sex, race/ethnicity, and veteran status. All data are from **2012**.

Age

Table 1. Disability status among age groups

This table shows the percentage of adults in different age groups with and without a disability in **Florida** and **United States & Territories**. For example, in **2012**, **13.7**% of adults 18-44 years of age in **Florida** and **13.1**% of adults 18-44 years of age in **United States & Territories** had a disability.

		Florida	United States & Territories
Disability	18-44 year olds	13.7%	13.1%
	45-64 year olds	30.8%	27.9%
	65+ year olds	33.9%	35.6%
No Disability	18-44 year olds	86.3%	86.9%
	45-64 year olds	69.2%	72.1%
	65+ year olds	66.1%	64.4%

Sex

Table 2. Disability status among males and females

This table shows the percentage of men and women with and without a disability in **Florida** and **United States & Territories**. For example, in **2012**, **21.5**% of men in **Florida** and **20.7**% of men in **United States & Territories** had a disability.

		Florida	United States & Territories
Disability	Men	21.5%	20.7%
	Women	22.9%	22.0%
No Disability	Men	78.5%	79.3%
	Women	77.1%	78.0%

Source: Centers for Disease Control and Prevention, 2014

APPENDIX C: UCF IRB APPROVAL LETTER

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Cherie Boyce** and Co-PI: **Thomas Wan**

Date: **October 21, 2014**

Dear Researcher:

On 10/21/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	A Contingency Model of the Relationship Between Florida Nursing Home Structural Complexity and Emergency Management Plan Adequacy in Developing Nursing Home Resiliency
Investigator:	Cherie Boyce
IRB Number:	SBE-14-10671
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 10/21/2014 05:02:01 PM EDT

IRB Coordinator

APPENDIX D: AHCA CHECKLIST

Emergency Management Planning Criteria for Nursing Home Facilities

The following minimum criteria are to be used when developing Comprehensive Emergency Management Plans (CEMP) for all Nursing Homes. The criteria serve as the required plan format for the CEMP, and will also serve as the compliance review document for county emergency management agencies upon submission for review and approval pursuant to Chapter 252, Florida Statutes (F.S.). These minimum criteria satisfy the basic emergency management requirements of 400, Part II, Florida Statutes, but are not designed to provide specific emergency medical planning guidance. Although such planning is required under 400, Part II, Florida Statutes, and this rule and may be included in this plan, those items will not be subject to review or approval by county emergency management agencies.

These criteria are also not intended to limit nor exclude additional materials facilities may decide to include to satisfy other relevant rules, requirements, or any special issues facility administrators deem appropriate for inclusion. As before, such voluntary inclusions will not be subject to the specific review by county emergency management personnel, but only those items identified in these criteria.

I. INTRODUCTION

A. Provide basic information concerning the facility to include:

1. Name of the facility, address, telephone number, emergency contact telephone number and fax number;
2. Owner of facility, address, telephone number;
3. Year facility was built;
4. Name of administrator, address, and work/home telephone number;
5. Name, address, work/home telephone number of person implementing the provisions of this plan, if different from the administrator;
6. Name and work/home telephone number of person(s) who developed this plan;
7. Provide an organizational chart with key emergency positions identified.

B. Provide an introduction to the Plan, which describes its purpose, time of implementation, and the desired outcome that will be achieved through the planning process. Also provide any other information concerning the facility that has bearing on the implementation of this plan.

II. AUTHORITIES AND REFERENCES

A. Identify the legal basis for the plan development and implementation of local ordinances and apply 400-23, F.S., and 59A-4.126, Florida Administrative Code (F.A.C.).

B. Identify reference materials used in the development of the Plan.

C. Identify the hierarchy of authority in place during emergencies. Provide an organizational chart, if different from the previous chart required.

III. HAZARD ANALYSIS

A. Describe the potential hazards that the facility is vulnerable to such as hurricanes, tornadoes, flooding, fires, hazardous materials incidents from fixed facilitates or transportation accidents, proximity to a nuclear power plant, power outages during severe cold or hot weather, etc. Indicate past history and lessons learned.

B. Provide site specific information concerning the facility to include:

1. Number of facility beds, maximum number of clients on site, average number of clients on site;
2. Type of residents served by the facility to include, but not limited to:
    a. Patients with Alzheimer's disease.
    b. Patients requiring special equipment or other special care, such as oxygen or dialysis
    c. Number of patients who are self-sufficient
3. Identification of hurricane evacuation zone facility is in;
4. Identification of which flood zone facility is in as identified on a Flood Insurance Rate Map;
5. Proximity of facility to a railroad or major transportation artery (per hazardous materials incidents);
6. Identify if facility is located within 10-mile or 50-mile emergency planning zone of a nuclear power plant.

IV. POLICIES

This section of the plan defines the policies, procedures, responsibilities and actions that the facility will take before, during and after any emergency situation. At a minimum, the facility plan needs to address: direction and control; notification; and sheltering.

A. Direction and Control

Define the management function for emergency operations. Direction and control provides a basis for decision-making and identify who has the authority to make decisions for the facility.

1. Identify by name and title, who is in charge during an emergency, and one alternate, should that person be unable to serve in that capacity.
2. Identify the chain of command to ensure continuous leadership and authority in key position.
3. State the procedures to ensure timely activation and staffing of the facility in emergency functions. Are there provisions for emergency workers' families?
4. State the operational and support roles for all facility staff. (This will be accomplished through the development of Standard Operating Procedures, which must be attached to this plan).
5. State the procedures to ensure the following needs are supplied:
    a. Food, water and sleeping arrangements.
    b. Emergency power, natural gas or diesel. If natural gas, identify alternate means should loss of power occur which would affect the natural gas system. What is the capacity of emergency fuel system?
    c. Transportation (may be covered in the evacuation section).
    d. 72-hour supply of all essential supplies.
6. Provisions for 24-hour staffing on a continuous basis until the emergency has abated.

B. Notification

Procedures must be in place for the facility to receive timely information on impending threats and the alerting of facility decision makers, staff and residents of potential emergency conditions.

1. Define how the facility will receive warnings, to include off hours and weekends/holidays.
2. Identify the facility 24-hour contact number, if different than number listed in introduction.
3. Define how key staff will be alerted.
4. Define the procedures and policy for reporting to work for key workers.
5. Define how residents/patients will be alerted and the precautionary measures that will be taken.
6. Identify alternative means of notification should the primary system fail.
7. Identify procedures for notifying those facilities to which facility residents will be evacuated.
8. Identify procedures for notifying families of residents that facility is being evacuated.

C. Evacuation

Describe the policies, role responsibilities and procedures for the evacuation of residents from the facility.

1. Identify the individual responsible for implementing facility evacuation procedures.
2. Identify transportation arrangements made through mutual aid agreements or understandings that will be used to evacuate residents (Copies of the agreements must be attached as annexes).
3. Describe transportation arrangements for logistical support to include moving records, medications, food, water, and other necessities.
4. Identify the pre-determined locations where residents will be evacuated.
5. Provide a copy of the mutual aid agreement that has been entered into with a facility to receive residents/patients.
6. Identify evacuation routes that will be used and secondary routes should the primary route be impassable.
7. Specify the amount of time it will take to successfully evacuate all patients/residents to the receiving facility. Keep in mind that in hurricane evacuations, all movement should be completed before the arrival of tropical storm winds (40 mph winds).
8. Specify the procedures that ensure facility staff will accompany evacuating residents/patients.
9. Identify procedures that will be used to keep track of residents once they have been evacuated to include a log system.
10. Determine what and how much each resident should take. Provide for a minimum of 72-hour stay, with provisions to extend this period of time if the disaster is of catastrophic magnitude.

11. Establish procedures for responding to family inquiries about residents who have been evacuated.

12. Establish procedures for ensuring all residents are accounted for and are out of the facility.

13. Determine at what point to begin the pre-positioning of necessary medical supplies and provisions.

14. Specify at what point the mutual aid agreements for transportation and the notification of alternative facilities will begin.

D. Re-entry

Once a facility has been evacuated, procedures need to be in place for allowing residents or patients to re-enter the facility.

1. Identify who is the responsible person(s) for authorizing re-entry to occur.

2. Identify procedures for inspecting the facility to ensure it is structurally sound.

3. Identify how residents will be transported from the host facility back to their home facility and identify how you will receive accurate and timely data on re-entry operations.

E. Sheltering

If the facility is to be used as a shelter for an evacuating facility, the plan must describe the sheltering/hosting procedures that will be used once the evacuating facility residents arrive.

1. Describe the receiving procedures for arriving residents/patients from evacuating facility.

2. Identify where additional residents will be housed. Provide a floor plan, which identifies the space allocated for additional residents or patients.

3. Identify provision of additional food, water, medical needs of those residents/patients being hosted at receiving facility for a minimum of 72 hours.

4. Describe the procedures for ensuring 24-hour operations.

5. Describe procedures for providing sheltering for family members of critical workers.

6. Identify when the facility will seek a waiver from the Agency for Health Care Administration to allow for the sheltering of evacuees if this creates a situation, which exceeds the operating capacity of the host facility.

7. Describe procedures for tracking additional residents or patients sheltered within the facility.

V. INFORMATION, TRAINING AND EXERCISE

This section shall identify the procedures for increasing employee and patient/residents awareness of possible emergency situations and provide training on their emergency roles before, during and after a disaster.

A. Identify how key workers will be instructed in their emergency roles during non-emergency times.

B. Identify a training schedule for all employees and identify the provider of the training.

C. Identify the provisions for training new employees regarding their disaster related role(s).

D. Identify a schedule for exercising all or portions of the disaster plan on an annual basis.

E. Establish procedures for correcting deficiencies noted during training exercises.

APPENDIX

The following information is required, yet placement in an appendix is optional if the material is included in the body of the plan.

A. Roster of employees and Companies with key disaster related roles.

1. List the names, addresses, and telephone number of all staff with disaster related roles.

2. List the name of the company, contact person, telephone number and address of emergency service providers such as transportation, emergency power, fuel, food, water, police, fire, Red Cross, etc.

B. Agreements and Understandings

Provide copies of any mutual aid agreement entered into pursuant to the fulfillment of this plan. This is to include reciprocal host facility agreements, transportation agreements, current vendor agreements or any agreement needed to ensure the operational integrity of this plan.

C. Evacuation Route Map

A map of the evacuation routes and description of how to get to a receiving facility for drivers.

D. Support Material

1. Any additional material needed to support the information provided in the plan.

2. Copy of the facility's fire safety plan that is approved by the local fire department.

AHCA 3110-6006, March, 1994

APPENDIX E: DESCRIPTIVE STATISTICS

Table 24: Acuity Index Descriptive Analysis

		Value
Standard Attributes	Position	3
	Label	ACUINDEX
	Type	Numeric
	Format	F12
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	10.77
	Standard Deviation	1.794
	Percentile 25	10.10
	Percentile 50	10.72
	Percentile 75	11.65

Table 25: Assistance with Daily Living Index Analysis

		Value
Standard Attributes	Position	4
	Label	ADLINDEX
	Type	Numeric
	Format	F12
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	10.47
	Standard Deviation	1.630
	Percentile 25	9.89
	Percentile 50	10.45
	Percentile 75	11.43

Table 26: Assistance with Daily Living Score Analysis

		Value
Standard Attributes	Position	5
	Label	ADLSCORE
	Type	Numeric
	Format	F12
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	4.12
	Standard Deviation	.571
	Percentile 25	3.89
	Percentile 50	4.16
	Percentile 75	4.43

Table 27: Certified Nurse Hours

CERTIFIED NURSE HOURS PER PATIENT PER DAY

		Value
Standard Attributes	Position	13
	Label	CNAHRD
	Type	Numeric
	Format	F12.2
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	2.7149
	Standard Deviation	.64050
	Percentile 25	2.5459
	Percentile 50	2.7211
	Percentile 75	2.9626

Table 28: LPN Hours

LICENSED PRACTCAL NURSE HOURS PER PATIENT PER DAY

		Value
Standard Attributes	Position	29
	Label	LPNhrd
	Type	Numeric
	Format	F12.2
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	.9447
	Standard Deviation	.28128
	Percentile 25	.8441
	Percentile 50	.9613
	Percentile 75	1.1132

Table 29: RN Hours

REGISTERED NURSE HOURS PER PATIENT PER DAY		
		Value
Standard Attributes	Position	42
	Label	RNHRD
	Type	Numeric
	Format	F12.2
	Measurement	Scale
	Role	Input
N	Valid	102
	Missing	0
Central Tendency and Dispersion	Mean	.6678
	Standard Deviation	.26035
	Percentile 25	.5058
	Percentile 50	.6526
	Percentile 75	.7818

Table 30: Profit or Non-Profit Status

PROFIT STATUS				
		Value	Count	Percent
Standard Attributes	Position	38		
	Label	Profit Status		
	Type	Numeric		
	Format	F40		
	Measurement	Scale		
	Role	Input		
N	Valid	102		
	Missing	0		
Central Tendency and Dispersion	Mean	.65		
	Standard Deviation	.480		
	Percentile 25	.00		
	Percentile 50	1.00		
	Percentile 75	1.00		
Labeled Values	0	Not-for-Profit	36	35.3%
	1	For-Profit	66	64.7%

Table 31: RN Rating Analysis

RN RATING (FIVE IS HIGHEST)

		Value	Count	Percent
Standard Attributes	CASPER Position	43		
	Label	RNRATING		
	Type	Numeric		
	Format	F12		
	Measurement	Scale		
	Role	Input		
N	Valid	102		
	Missing	0		
Central Tendency and Dispersion	Mean	2.96		
	Standard Deviation	1.116		
	Percentile 25	2.00		
	Percentile 50	3.00		
	Percentile 75	4.00		
Labeled Values	1 Less than adequate	1	12	11.8%
	2 Somewhat adequate	2	21	20.6%
	3 Adequate	3	36	35.3%
	4 Better than adequate	4	25	24.5%
	5 Very adequate	5	8	7.8%

Table 32: Staff Rating

STAFFRATING (SCALE OF FIVE)

		Value	Count	Percent
Standard Attributes	Position	49		
	Label	STAFFRATING		
	Type	Numeric		
	Format	F12		
	Measurement	Scale		
	Role	Input		
N	Valid	102		
	Missing	0		
Central Tendency and Dispersion	Mean	3.45		
	Standard Deviation	1.021		
	Percentile 25	3.00		
	Percentile 50	4.00		
	Percentile 75	4.00		
Labeled Values	1 Less than adequate	1	8	7.8%
	2 Somewhat adequate	2	10	9.8%
	3 Adequate	3	18	17.6%
	4 Better than adequate	4	60	58.8%
	5 Very adequate	5	6	5.9%

Table 33 Aggregated Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
# of Fines	0	7	.52	1.069	3.294	.239	14.338	.474
% Elderly	10.50	34.50	18.5990	6.35280	.378	.239	-.617	.474
ACUINDEX	0	19	10.77	1.794	-1.280	.239	16.123	.474
ADLINDEX	0	16	10.47	1.630	-2.452	.239	16.930	.474
ADLSCORE	0	5	4.12	.571	-3.764	.239	26.087	.474
Administrator	0	1	.90	.299	-2.744	.239	5.640	.474
Affiliation	0	1	.81	.391	-1.636	.239	.689	.474
Association Plan	0	1	.08	.270	3.183	.239	8.294	.474
Business Age	1	47	26.04	9.921	-.140	.239	.528	.474
Capital Improvement	0	1	.49	.502	.040	.239	-2.039	.474
Certified Beds	20	300	116.44	44.423	.793	.239	2.783	.474
Changed Owner	1	1	1.00	.000	.	.	.	.
CNAHRD	.00	4.95	2.7149	.64050	-1.793	.239	9.018	.474
Complaints	0	1	.80	.399	-1.554	.239	.423	.474
CCRC	0	1	.11	.312	2.566	.239	4.678	.474
Corp Plan template	0	1	.29	.458	.917	.239	-1.182	.474
Council	0	1	.55	.500	-.200	.239	-2.000	.474
Dialysis Patients	0	15	2.26	2.346	1.993	.239	7.385	.474
EMR	0	1	.53	.502	-.120	.239	-2.026	.474
Evacuation	0	1	.16	.365	1.915	.239	1.702	.474
Health Department	0	1	.29	.458	.917	.239	-1.182	.474
Incidents	0	1	.06	.236	3.806	.239	12.737	.474
Insurance	0	1	.28	.453	.971	.239	-1.079	.474
License Status	0	1	.95	.217	-4.240	.239	16.298	.474
LICENSEDHOURS	.00	3.17	1.6115	.42013	-.464	.239	7.401	.474
LPNHRD	.00	1.67	.9447	.28128	-.765	.239	2.318	.474
Non-English	0	39	4.03	7.126	3.206	.239	11.059	.474
NURSERATIO	0	7	4.29	.981	-2.037	.239	9.607	.474
OCCUPANCY	.02	1.00	.8659	.14811	-3.774	.239	18.571	.474
OSTOMY	0	41	5.15	7.144	3.099	.239	11.045	.474
PCTMCAID	0	1	.95	.217	-4.240	.239	16.298	.474
Penalties	0	1	.32	.470	.766	.239	-1.442	.474
Plan Approval	0	1	.81	.391	-1.636	.239	.689	.474
Plan Exercise	1	1	1.00	.000	.	.	.	.
Profit Status	0	1	.65	.480	-.625	.239	-1.642	.474
PTHRD	.00	.51	.1316	.09143	1.263	.239	2.395	.474

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
QUALITY	1	5	3.91	1.035	-.749	.239	-.099	.474
RATING	1	5	3.50	1.348	-.606	.239	-.820	.474
RNHRD	.00	1.57	.6678	.26035	.613	.239	1.781	.474
RNRATING	1	5	2.96	1.116	-.096	.239	-.636	.474
Rural	0	1	.09	.285	2.947	.239	6.818	.474
Size	20	300	117.53	41.663	.756	.239	3.307	.474
Special Focus Facility	0	0	.00	.000	.	.	.	.
Staff longevity	0	1	.72	.453	-.971	.239	-1.079	.474
Staff Plan	0	1	.55	.500	-.200	.239	-2.000	.474
STAFFRATING	1	5	3.45	1.021	-1.118	.239	.525	.474
Total Residents	2	239	99.90	39.413	.162	.239	1.468	.474
TOTHRD	.00	7.39	4.3254	.97834	-2.029	.239	10.186	.474
ALTFACILITY	0	1	.90	.299	-2.744	.239	5.640	.474
POWER	0	1	.92	.270	-3.183	.239	8.294	.474
FOOD	0	1	.97	.170	-5.654	.239	30.566	.474
HOTLINE	0	1	.61	.491	-.448	.239	-1.835	.474
MEDS	0	1	.98	.139	-7.034	.239	48.419	.474
OPSBUD	0	1	.40	.493	.406	.239	-1.872	.474
BUDRESERVE	0	1	.33	.474	.718	.239	-1.515	.474
NIMS	0	1	.23	.420	1.333	.239	-.227	.474
PRIMCOM	0	1	.92	.270	-3.183	.239	8.294	.474
ESS	0	1	.87	.335	-2.268	.239	3.205	.474
ESSPROC	0	1	.71	.458	-.917	.239	-1.182	.474
TRAVTIME	0	1	.75	.438	-1.142	.239	-.711	.474
TRAVCAREGIVER	0	1	.84	.365	-1.915	.239	1.702	.474
TRANS	0	1	.80	.399	-1.554	.239	.423	.474
ADDSTAFF	0	1	.79	.406	-1.477	.239	.184	.474
EMPSHELT	0	1	.86	.346	-2.140	.239	2.630	.474

Table 34 FL Population Descriptive Statistics

AGGREGATED FL NH POPULATION DESCRIPTIVE STATISTICS in 2012* (N=680)

	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ACUINDEX	6	19	10.70	.050	1.303	1.697	.572	.094	4.387	.187
ADLINDEX	6	16	10.42	.046	1.212	1.469	.010	.094	1.341	.187
ADLSCORE	2	5	4.18	.016	.424	.180	-.498	.094	.919	.187
CERTBEDS	15	462	120.82	1.910	49.794	2479.476	1.309	.094	5.867	.187
CH_OWN	0	10	2.03	.082	2.129	4.532	.930	.094	.232	.187
DIALYSIS	0	13	2.09	.087	2.263	5.119	1.345	.094	2.006	.187
NON_ENGL	0	94	4.81	.386	10.068	101.374	4.753	.094	28.147	.187
OSTOMY	0	52	5.06	.256	6.686	44.703	3.118	.094	13.044	.187
PCTMCAID	0	100	55.70	.817	21.300	453.679	-.858	.094	.519	.187
Total Residents	2	406	106.05	1.726	45.011	2025.996	1.114	.094	4.894	.187

**Source: CASPER 2012 database*

APPENDIX F: CORRELATION TABLES

Table 35: Correlation Matrix for Revised Organizational Complexity (n=102)

		X1	X2	X3	X4	X5	X6	X7	X8
ACUINDEX (X1)	Pearson	1							
	Sig. (2-tailed)								
ADLSCORE (X2)	Pearson	**.618****	1						
	Sig. (2-tailed)	.000							
CNAHRD (X3)	Pearson	.121	**.788**	1					
	Sig. (2-tailed)	.224	.059						
LPNHRD (X4)	Pearson	.196*	.252*	**.615****	1				
	Sig. (2-tailed)	.049	.011	.000					
OCCUPANCY (X5)	Pearson	.216*	.329**	**.501****	.364**	1			
	Sig. (2-tailed)	.029	.001	.000	.000				
STAFFRATING (X6)	Pearson	.085	.096	**.563****	.319**	.154	1		
	Sig. (2-tailed)	.394	.335	.000	.001	.123			
RNRATING (X7)	Pearson	-.001	.086	.328**	.076	.082	**.789****	1	
	Sig. (2-tailed)	.988	.392	.001	.449	.411	.000		
NURSERATIO (X8)	Pearson	.183	.263**	**.895****	.712**	.518**	.588**	.463**	1
	Sig. (2-tailed)	.066	.008	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 36: Correlation Matrix for Revised NH Plan Adequacy (n=102)

		Y1	Y2	Y3	Y4	Y5	Y6
ALTFACILITY (Y1)	Pearson	1					
	Sig. (2-tailed)						
PRIMCOM (Y2)	Pearson	**.885****	1				
	Sig. (2-tailed)	.000					
TRANS (Y3)	Pearson	.418**	**.499****	1			
	Sig. (2-tailed)	.000	.000				
ADDSTAFF (Y4)	Pearson	.484**	**.573****	.298**	1		
	Sig. (2-tailed)	.000	.000	.002			
POWER (Y5)	Pearson	.272**	**.322****	.040	.212*	1	
	Sig. (2-tailed)	.006	.001	.693	.032		
MEDS (Y6)	Pearson	.191	.222*	-.070	.103	**.485****	1
	Sig. (2-tailed)	.054	.025	.485	.304	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 37: Correlation Matrix for Revised NH Resiliency (n=102)

		Y7	Y8	Y9	Y10
TRAVCAREGIVER (Y7)	Pearson	1			
	Sig. (2-tailed)				
TRAVTIME (Y8)	Pearson	**.676****	1		
	Sig. (2-tailed)	.000			
ESSPROC (Y9)	Pearson	**.313****	.215*	1	
	Sig. (2-tailed)	.001	.030		
ESS (Y10)	Pearson	**.482****	.384**	.463**	1
	Sig. (2-tailed)	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

APPENDIX G: ADL CALCULATIONS WORKSHEET

RUG-III Classification Model
Version 5.20, 34-Group
Calculation of ADL Score

Effective for MDS 3.0 Assessments With an ARD Date on or After 10/1/2013

The ADL (Activities of Daily Living) score calculation includes bed mobility, transfer, toilet use and eating. Below is the calculation process:

STEP #1

MDS 3.0 ADL Items	MDS ADL Item Descriptions
G0110A (1 & 2)	Bed mobility
G0110B (1 & 2)	Transfer
G0110I (1 & 2)	Toilet Use
G0110H (1)	Eating

Use the following chart to calculate the ADL score for bed mobility, transfers, and toilet use. Record the associated ADL scores to the right. *The eating ADL score will be calculated in Step #2.*

When *Column 1* =	And	*Column 2* =	Then	*ADL Score* =	(Record below)
0, 1 or 7		any number		1	
2		any number		3	Bed mobility = _____
3 or 4		0, 1, or 2		4	Transfers = _____
3, 4, or 8		3 or 8		5	Toilet use = _____

STEP #2

MDS 3.0 ADL Items	MDS ADL Item Descriptions
K0510A, 1 or 2	Parenteral / IV
K0510B, 1 or 2	Feeding Tube
K0710A3	Total Calories During Entire 7 days
K0710B3	Average Fluid Intake During Entire 7 days

To complete the eating ADL score calculation use the criteria below. Record the associated ADL score to the right.

a. If Parenteral / IV is checked, the eating ADL Score = 3. Proceed to Step #3.
   - *If not checked then;*
b. If Feeding Tube is checked AND total calories is 51% or more calories, the eating ADL Score = 3. Proceed to Step #3.
   - *If not then;*
c. If Feeding Tube is checked AND total calories is 26% to 50% calories AND average fluid intake is 501cc. or more fluid, the eating ADL Score = 3. Proceed to Step #3.
   - *If not then;*
d. When neither Parenteral / IV nor Feeding Tube (with appropriate intake) is checked, evaluate the chart below for eating self-performance. Proceed to Step # 3.

When *Column 1 (Only)* =	Then	*ADL score* =	(Record below)
0, 1 or 7		1	
2		2	
3, 4, or 8		3	Eating = _____

STEP #3

The total combined ADL score for bed mobility, transfer, toilet use and eating ranges between 4 through 18. A score of 4 represents an independent resident while a score of 18 represents a totally dependent resident.

Total RUG-III ADL Score = ______

REFERENCES

Agranoff, R. (2003). *Leveraging Networks: A Guide for Public Managers Working Across Organizations.* Indiana: IBM Endowment for The Business of Government.

Alexander, D., Birkland, T., Boin, A., Comfort, L., De Bruijne, M., Demchak, C., . . . Znati, T. (2010). *Designing Resilience: Preparing for extreme events.* (L. Comfort, A. Boin, & C. Demchak, Eds.) Pittsburgh, PA, USA: University of Pittsburgh Press.

Alonzo-Zaldivar, R. (2012, April 6). Report Finds Big Gaps in Nursing Home Disaster Plans. *Associated Press*, p. 1.

American College of Healthcare Executives. (2013, November 11). *Healthcare Executives' Role in Emergency.* Retrieved February 27, 2014, from www.ache.org: http://www.ache.org/policy/emergency_preparedness.cfm

Ashby, W. R. (2007). Strategy, Structure, and Performance: The Sociology of Organizational Strategy. In W. R. Scott, G. F. Davis, & L. Jewell (Ed.), *Organizations and Organizing Rational, Natural, and Open System Perspectives* (pp. 310-339). Upper Saddle River, New Jersey: Pearson Education, Inc. Retrieved 2012

Bascetta, C. (2006). *Disaster Preparedness Preliminary Observations on the Evacuation of Vulnerable Populations due to Hurricanes and Other Disasters.* Health Care. Washington DC: Untied States Government Accountability Office.

Bea, K., Butler, D., Cutter, S., Gall, M., Harrald, J., Rubin, C., . . . Ward, R. (2007). *Emergency Management: The American Experience 1900-2005* (Vol. 1). (C. B. Rubin, Ed.) Fairfax, VA: Public Entity Risk Institute (PERI).

Bickel, R. (2007). *Multilevel Analysis of Applied Research.* New York, N.Y., USA: Guilford Press.

Blake, S., Howard, D., Eiring, H., & Tarde, S. (2012). Special focus: San Diego's area coordinator system: A disaster preparedness model for US nursing homes. *Disaster Medicine and Public Health Preparedness, 6*(4), 424-427.

Blazer, D. G., Yaffe, K., & Liverman, C. T. (2015). *Cognitive Aging: Progress in Understanding and Opportunities for Action.* Institute of Medicine, Board on Health Sciences Policy. National Academies Press.

Brown, J. L., Bucklin, S. K., Cholewa, J. C., Conlon, C. P., Crane, M. A., Ferraro, E. F., . . . Warwick, R. D. (2009). *ASIS SPC. 1-2009, Organizational Resilience Standard: Security, Preparedness, and Continuity Management Systems-Requirements with Guidance for Use.* Alexandria, Virginia: ASIS International. Retrieved from www.asisonline.org

Brown, L. M., Dosa, D. M., Thomas, K., Hyer, K., Feng, Z., & Mor, V. (2012). The Effects of Evacuation on Nursing Home Residents with Dementia. *NIH Public Access Author Manuscript* (Am J Alzheimers Dis Other Demen. 2012 September; 27(6): 406-412.), 13. doi:10.1177/1533317512454709

Byrne, B. (2010). *Structural Equation Modeling with AMOS* (Second ed.). New York: Routledge Taylor & Francis Group.

CDC and PHPR. (2011). *Public Health Preparedness Capabilties: National Standards for State and Local Planning.* Washington D.C.: U.S. Department of Helath and Human Services.

Centers for Disease Control and Prevention. (2014, November 11). *Disability Status Overview Dual Area Profile*. (CDC, Editor) Retrieved January 20, 2015, from Disability and Health

Data System: http://dhds.cdc.gov/dualareaprofiles/profile?profileId=23&geoTypeId=1&geoIds=12&comps=4|USA

Centers for Medicare & Medicaid Services. (2013, 01 17). *Nursing Homes Survey & Certification*. Retrieved 02 04, 2013, from CMS.gov: http://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/NHs.html

CMS. (2013). *Long Term Care Facility Resident Assessment Instrument User's Manual* (3 ed.). CMS. Retrieved January 2014, from www.cms.org

Comfort, L. (2012). Reflections on the Triple Disasters, the March 11, 2011 Tohoku Disasters from an American Perspective. *Community Resiliency and Sustainability: Current Trends in Public Service* (p. 15). Orlando, FL: School of Public Administration at University of Central Florida.

Committee on National Statistics. (2012). *Nonresponse in Social Science Surveys: A Research Agenda.* National Academy of Sciences.

Committee on Private-Public Sector Collaboration to Enhance Community Disaster Resilience. (2011). *Building Community Disaster Resilience through Private-Public Collaboration* (http://www.nap.edu/openbook.php?record_id=13028&page=1 ed.). (G. S. Committee, Ed.) Washington D.C.: National Research Council of the National Academies.

Council for Excellence in Government. (2006). Understanding Personal Preparedness Barriers and Motivators. *The Public Readiness Index: A Tool for Measuring Preparedness.* Washington D.C.: National Citizen Corps Council.

Council on Linkages Between Academia and Public Health Practice. (2010, May). *Programs for Council on Linkages Between Academia and Public Health Practice.* Retrieved March 14, 2013, from Public Health Foundation: http://www.phf.org/resourcestools/Documents/Core_Competencies_for_Public_Health_Professionals_2010May.pdf

Council on Linkages between Academia and Public Health Practice. (2012). *Ecological Model of Public Health.* Retrieved March 17, 2013, from Public Health Foundation: http://www.phf.org/resourcestools/Documents/Ecological_Model_publichealth.pdf

Cowles Research Group. (2012). *Long Term Care Information: About OSCAR*. (M. Cowles, Editor, & Cowles, Producer) Retrieved 02 11, 2013, from Cowles Research Group: Nursing Home Statistical Yearbook: http://www.longtermcareinfo.com/about_oscar.html

Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008, July 29). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change, 18*, 598-606. Retrieved from www.elsevier.com/locate/gloenvcha

Delaney, T., & McWhorter, P. (2010). *Costs, Complexification, and Crisis: Government's Human Services Contracting 'System' Hurts Everyone.* Washington, D.C.: National Council of Nonprofits.

Department of Health & Family Services. (2005). People with Special Needs Questionnaire. *Special Needs Registration Program*. Orlando, FL.

Dosa, D., Feng, Z., Hyer, K., Brown, L. M., Thomas, K., & Mor, V. (2010). Effects of Hurricane Katrina on Nursing Facility Resident Mortality, Hospitalization, and Functional Decline. *Disaster Medicine and Public Health Preparedness, 4*(Supplement), S28-S31. Retrieved 2014

Drabek, T. E., & McEntire, D. A. (2002). Emergent Phenomena and Multiorganizational Coordination in Disasters: Lessons from the Research Literature. *International Journal of Mass Emergencies and Disasters, 20*(2), 197-224.
Eiring, H., Blake, S., & Howard, D. (2012). Nursing homes' preparedness plans and capabilities. *American Journal of Disaster Medicine, 7*(2), 127-135.
Elder Affairs. (2009). *Florida County Profiles: Orange.*
Federal Emergency Management Agency (FEMA). (2009). *Personal Preparedness in America: Citizen Corps National Survey.* Community Preparedness Division. Washington, D.C.: FEMA. Retrieved June 2012, from http://www.citizencorps.gov
Federal Emergency Management Agency. (2011). *Citizen Preparedness Review.* Washington D.C.: FEMA. Retrieved from http://www.fema.gov/community-emergency-response-teams/about-community-emergency-response-team
FEMA. (2012). *Crisis Response and Disaster Resilience 2030: Forging Strategic Action in an Age of Uncertainty.* Washington D.C.: Strategic Foresight Initiative.
Fink, S. (2013). *Five Days at Memorial.* New York: Crown Publishers.
Florida Agency for Healthcare Administration. (2013, February 26). *Florida Health Finder*. Retrieved February 26, 2013, from Florida Health Finder: http://www.floridahealthfinder.gov/facilitylocator/ListFacilities.aspx
Florida Department of Health. (2007). Special Needs Intake Form. Florida.
Florida Health Care Association. (2009). *Emergency Management Guide for Nursing Homes* (2nd ed.). (FHCA Education & Development Foundation, & John A. Hartford Foundation Grant, Eds.) Tallahassee, Florida: University of South Florida.
Florida Health Care Education and Development Foundation. (2008). *National Criteria for Evacuation Decision-Making in Nursing Homes.* developed through a project funded by the John A. Hartford Foundation: University of South Florida.
Florida Office on Disability and Health University of Florida. (2010). County-Level Demographics, Health Characteristics and Health Behaviors of Florida. Gainesville, FL: Florida Office on Disability and Health. Retrieved December 28, 2014, from http://elderaffairs.state.fl.us/doea/pubs/stats/County_2012Projections/Counties/FL_Older_Adults_County_Profiles_interim_7-5-10.pdf
Florida Senate. (2011). *Title XXIX Public Health Chapter 400 Nursing Homes and Related Health Care Facilities*. Retrieved 02 04, 2013, from 2011 Florida Statutes: http://flsenate.gov/Laws/Statutes/2011/Chapter400/Part_III
Florida Statutes. (2012, December 12). 59A. *Florida Statute 59A-4.133 Plans Submission and Review and Construction Standards*. 2012, Florida, USA: State Legislation. Retrieved from https://www.flrules.org/gateway/ruleNo.asp?id=59A-4.133
Goddard Earth Sciences Data and Information Services Center. (2005). *Hurricane Katrina August 23-30 2005.* Retrieved April 11, 2013, from NASA GES DISC: http://disc.sci.gsfc.nasa.gov/hurricane/additional/science-focus/HurricaneKatrina2005.shtml
Government Accountability Office. (2007). *Disaster Assistance: Better Planning Needed for Housing Victims of Catastrophic Disasters.* Washington, DC: GAO.
Hazards & Vulnerability Research Institute. (2012). *1960-2011 U.S. Hazards Losses.* University of South Carolina, Department of Geography. University of South Carolina.
Health Resources and Services Administration. (2007, August 22). Health Center Emergency Management Program Expectations. *Policy Information Notice 2007-15*, 13. (J. Macrae,

Ed.) Washington, D.C., USA: U.S. Department of Health and Human Services. Retrieved March 3, 2014, from www.hhs.gov/disasters/index.html

HHS OIG. (2006). *Nursing Home Emergency Preparedness and Response during Recent Hurricanes.* HHS, OIG. Washington DC: Department of Health and Human Services. Retrieved November 22, 2012, from https://oig.hhs.gov/oei/reports/oei-06-06-00020.pdf

HHS OIG. (2012). *Gaps Continue to Exist in Nursing Home Emergency Preparedness and Response during Disasters: 2007-2010.* Department of Health and Human Services, Office of Inspector General. Washington DC: HHS. Retrieved 2013

Hox, J., & Bechger, T. (2011). An introduction to structural equation modeling. *Family Science Review*, 354-373.

Humes, K. R., Jones, N. A., & Ramirez, R. R. (2011). *Overview of Race and Hispanic Origin: 2010.* U.S. Department of Commerce. Washington D.C.: U.S. Census Bureau. doi:C2010BR-02

ICMA. (2007). *Emergency Management Principles and Practice for Local Government* (Second ed.). (W. L. Waugh, Jr., & K. Tierney, Eds.) Washington D.C.: International City/County Management Association.

Institute of Medicine. (2009). *Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations: A letter report.* (ISBN 978-309-14430-8 ed.). (B. Altevogt, C. Stroud, S. Hanson, D. Hanfling, & L. Gostin, Eds.) Washington, D.C.: National Academies Press.

Institute of Medicine. (2013). *Crisis Standards of Care: A Toolkit for Indicators and Triggers.* Washington: The National Academies Press.

International Association of Emergency Management. (2012). Resiliency: Building a Better Tomorrow. *60th Annual Conference: Community Strength Collaboration* (p. 25). Orlando, Florida: IAEM. Retrieved October 26, 2012, from www.iaem.org

Kahan, J., Allen, A., George, J., & Thompson, G. (2009). *Concept Development: An Operational Framework for Resilience.* Homeland Security Studies & Analysis Institute. Arlington: Department of Homeland Security Science and Technology Directorate.

Kapucu, N. (2013). Building Disaster Resilience and Sustainability in Central Florida. *Risk, Hazards & Crisis in Public Policy, 4*(4), 215-233.

Kapucu, N., & Demiroz, F. (2011, June). Measuring Performance: For collaborative public management using network analysis methods and tools. *Public Performance & Management Review, 34*(4), 551-581. doi:10.2753/PMR 1530-9576340405

Kapucu, N., Arslan, T., & Demiroz, F. (2010). Collaborative emergency management and national emergency management network. *Disaster Prevention and Management, 19*(4), 452-468. doi:10.1108/09653561011070376

Kapucu, N., Hawkins, C., & Rivera, F. (Eds.). (2013). *Disaster Resiliency: Interdisciplinary perspectives.* New York, NY: Routledge. Retrieved 11 22, 2013, from http://www.routledge.com/books/details/9780415626897/

Kovner, A., & Knickman, J. (2008). *Health Care Delivery in the United States* (9th ed.). (J. Rosen, Ed.) New York: Springer Publishing Company, LLC.

Kroch, E., Champion, R. W., DeVore, S. D., Kugel, M. R., Lloyd, D. A., & Rothney-Kozlak, L. (2012). *Measuring Progress Toward Accountable Care.* Commonwealth Fund. Washington D.C.: Premier Research Institute.

Lamb, G., Zimring, C., Chuzi, J., & Dutcher, D. (2010, July). Designing better healthcare environments: Interprofessional competencies in healthcare design. *Journal of Interprofessional Care, 24*(4), 422-435.

Louisiana Nursing Home Association. (2013, 02 03). *Emergency Preparedness*. Retrieved from Louisiana Nursing Home Association: http://www.lnha.org/PageDisplay.asp?P1=13355

Mileti, D. (2009). *Disasters by Design: A Reassessment of Natural Hazards in the United States.* Washington, DC: Joseph Henry Press.

Morse, K., Struyk, R., Pinegrina, M., Romanik, C., & Shapiro, M. (2006). *Policy Analysis for Effective Development: Strengthening Transition Economies.* London, Wales: Lynne Rienner Publishers, Inc.

National Council on Disability. (2009). *Effective Emergency Management Making Improvements for Communities and People with Disabilities.* Washington D.C.: National Council on Disability. Retrieved from http://www.ncd.gov/newsrom/publications/2009/NCD_EmergencyManagement_HTML/

National Organization on Disability. (2009). *Functional Needs of People with Disabilities.* Washington D.C.

Nederhof, A. J. (1985). Methods of coping with social desirability bias: a review. *European Journal of Social Psychology, 15*, 263 - 280.

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., & Kennerley, M. (2000). Performance measurement system design: developing and testing a process-based approach. *International Journal of Operations & Production Management, 20*(10), 1119-1145.

Oetjen, R., McSweeney-Feld, M., Welch, D., Warthen, L., & Kopera-Frye, K. (2012). *Dimensions of Long-Term Care Management An Introduction.* (M. McSweeney-Field, & R. Oetjen, Eds.) Chicago, Illinois: Health Administration Press.

Pallant, J. (2007). *SPSS Survival Manual.* Berkshire, MA: Open University Press McGraw Hill.

Pfeffer, J., & Salancik, G. R. (2003). *The external control of organizations : a resource dependence perspective.* Stanford, Calif.: Stanford Business Books.

Public Health Foundation. (2013). *Improving and Measuring the Impact of Training: Selected Resources*. Retrieved 2013, from Public Health Foundation: http://www.phf.org/

RAND Corporation. (2007). Medical Hospital Value-Based Purchasing (Options Paper). *Brandeis University Purchasing Workshop*. Boston, MA: Boston University.

Research Triangle Institute International. (2012). *Nursing Home MDS 3.0 Quality Measures: Final Analytic Report Deliverables 21, 25-27.* Centers for Medicare & Medicaid Services, Division of Ambulatory and Post Acute Care. Waltham, MA: RTI International. Retrieved September 2012

Richardson, G. P. (1991). *Feedback Thought in Social Science and Systems Theory.* Philadelphia, PA, USA: University of Pennsylvania Press.

Rivera, F. (2012). Cultural mechanisms in the exchange of social support among Puerto Ricans after a natural disaster. *Qualitative Health Research, 22*(6), 801-809. Retrieved from http://qhr.sagepub.com/content/22/6/801

Rivera, F., & Settembrino, M. R. (2012). Toward a Sociological Framework of Community Resilience. *Study of community disaster resilience Award No. 2010-67023-21698*, 19. Orlando, FL, U.S.A.: U.S. Department of Agriculture.

Salamon, L. M. (2002). *The Tools of Government: A Guide to the New Governance.* New York: Oxford University Press.

Sanders, A. E., Lim, S., & Sohn, W. (2008, June). Resilience to Urban Poverty: Theoretical and Empirical considerations for Population Health. *American Journal of Public Health, 98*(6), 1101-1106. Retrieved 2012

Sandfort, J., Selden, S., & Sowa, J. (2008). Do government tools influence organizational performance? Examining their implementation in early childhood education. *The American Review of Public Administration, 38*(4), 412-438.

Savigny, D. d., & Adam, T. (2009). *Systems Thinking for Health Systems Strengthening.* (A. f. Research, Ed.) Geneva, Switzerland: World Health Organization Press.

Scire', M. (2009). *FEMA Needs More Detailed Guidance and Performance Measures to Help Ensure Effective Assistance After Major Disasters.* Washington D.C.: Government Accounting Office.

Soper, D. (2013). *Statistics Calculators: A-priori Sample Size Calcuator for Structural Equation Models*. Retrieved from www.danielsoper.com: http://www.danielsoper.com/statcalc3/calc.aspx?id=89

Stevenson, B. W. (2012). Application of systemic and complexity thinking in organizational development. *Emergence: Complexity & Organization, 14*(No. 2), 86-99.

Thomas, K. S., Dosa, D., Hyer, K., Brown, L. M., Swaminathan, S., Feng, Z., & Mor, V. (2012). Effect of Forced Transitions on the Most Functionally Impaired Nursing Home Residents. *Journal of American Geriatrics Society, 60*, 1895-1900. doi:10.1111/j.1532-5415.2012.04146.x

Thomas, K. S., Hyer, K., Castle, N. G., Branch, L. G., Andel, R., & Weech-Maldonado, R. (2012, March). Patient Safety Culture and the Association with Safe Resident Care in Nursing Homes. *The Gerontologist, 52*(6), 802-811. doi:10.1093/geront/gns007

Thomas, K. S., Mor, V., Tyler, D. A., & Hyer, K. (2012, August 30). The Relationships Among Licensed Nurse Turnover, Retention, and Rehospitalization of Nursing Home Residents. (P. Rachel Pruchno, Ed.) *The Gerontologist, 53*(2), 211-221. doi:10.1093/geront/gns082

Tierney, K. J. (2003). Preliminary Paper #329: Conceptualizing and Measuring Organizational and Community Resilience: Lessons Learned from the emergency response following the September 11, 2001 attack on the World Trade Center. *unpublished*, 4. Delaware, USA: University of Delaware. Retrieved February 14, 2014, from http://udspace.udel.edu/bitstream/handle/19716/735/PP329.pdf?sequence=1

United States Census Bureau. (2010). *2010 Census: Florida Profile.* U.S. Department of Commerce Economics and Statistics Administration.

US Census Bureau. (2013). *State and County Quick Facts*. Retrieved January 20, 2015, from U.S. Department of Commerce: http://quickfacts.census.gov/qfd/states/12000.html

Vesterby, V. (2008). Measuring Complexity: Things That Go Wrong and How to Get It Right. *3rd International Workshop on Complexity and Philosophy: Emergence: Complexity and Organization, 2007.* Stellenbosch, South Africa. doi:10:2:90-102

W.L. Waugh, J. (2003). Terrorism, Homeland Security and the National Emergency Management Network. *Public Organization Review, 3*(4), 373-385.

W.L. Waugh, J., & Streib, G. (2006). Collaboration and Leadership for Effective Emergency Management Network. *Public Administration Review, 66*(s1), 131-140.

Wachtendorf, T., & Kendra, J. (2004). Considering Convergence, Coordination and Social Capital in Disasters. Retrieved 2009, from http://dspace.udel.edu:8080/dspace/bitstream/19716/737/1/PP342A.pdf

Wan, T. T. (2002). *Evidence-Based Health Care Management: Multivariate Modeling Approaches.* Norwell, MA: Kluwer Academic Publishers Group.

Wan, T., Breen, G.-M., Zhang, N. J., & Unruh, L. (2010). *Improving the Quality of Care in Nursing Homes.* Baltimore, MD, USA: The John Hopkins University Press.

Waugh, W. (2011). Local Emergency Management in the Post 9/11 World. In W. L. Waugh, & K. Tierney, *Emergency Management: Principles and Practice for Local Government* (2nd ed., pp. 3-23). Washington DC: ICMA. Retrieved 2012

Weech-Maldonado, R., Laberge, A., Pradhan, R., Johnson, C. E., Yang, Z., & Hyer, K. (2012, July-September). Nursing home financial performance: The role of ownership and chain affiliation. *Health Care Management Review, 37*(3), 235-245. doi:10.1097/HMR.0b013e31823dfe13

Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes, 9*(8), 1-18. Retrieved February 2014, from http://www.hqlo.com/content/9/1/8

Wiseman, C., Smith, L., Zheng, N. T., Reilly, K., Kissam, S., Rokoske, F., . . . Manning, J. (2012). *Nursing Home MDS 3.0 Quality Measures: Final Analytic Report.* Centers for Medicare & Medicaid Services, Division of Ambulatory and Post Acute Care. Waltham, MA: Research Triangle Institute International. Retrieved 2014

World Health Organization. (2009). *Systems Thinking for Health Systems Strengthening.* World Health Organization. Albany: Alliance for Health Policy and Systems Research & World Health Organization. Retrieved December 31, 2012, from http://site.ebrary.com/lib/westflorida/Doc?id=10363976&ppg=10

Zeng, Z., Grabowski, D. C., Intrator, O., & Mor, V. (2006, August). Effects of Payment Strategies: The Effect of State Medicaid Case-Mix Payment on Nursing Home Resident Acuity. *HSR: Health Services Research, 41*(4, Part 1), 1317-1336.

Zinn, J., Mor, V., Feng, Z., & Intrator, O. (2009, March). Determinants of performance failure in the nursing home. *Social Science and Medicine, 68*(5), pp. 933-940. doi:DOI: 10.1016/j.socscimed.2008.12.014