Evacuation vs Shelter in Place
Making the Critical Decision:
An Examination of Evacuation Critical Decision Making
during Catastrophic Disasters

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Executive Summary

This project researched current recommendations and related tools used by seven United State hospitals to help decide whether to evacuate versus shelter in place in the case of an Emergency. The Alaska Regional Hospital Emergency Preparedness Committee assistance of the Capstone student, revised the existing emergency preparedness evacuation/shelter in place plan for Alaska Regional Hospital. The intent of the revised evacuation/shelter in place section of the overarching Hospital Emergency Operations Plan is to provide the incident command team with improved criteria for internal and external assessments and tailored evacuation tools.

The inclusion of improved decision making tools are intended to support hospital administrators with a structural framework for identifying critical information and organizing a strategic response for evolving threats to the hospital.\(^1\) This projects tools and recommendations were included in a full scale hospital disaster exercise on the 50\(^{th}\) anniversary of the 1964 earthquake. During the post exercise incident review, the exercise participants and those on the emergency preparedness committee found the tools be helpful in overcoming challenges experienced in the 2013 hospital disaster exercise. The tools and recommendation have been incorporated into Alaska Regions Hospital Emergency Operations Plan.

\(^1\) (Agency for Healthcare Research and Quality, May 2010)
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Introduction

Purpose:

The purpose of this University of Alaska Anchorage Public Administration Capstone report was to provide research and assistance to the Emergency Preparedness Committee to revise the shelter in place/evacuation section of the Emergency Operations Plan for Alaska Regional Hospital. The project was designed to offer relevant information and tools targeted to address gaps identified from the Anchorage hospital community wide disaster exercise on August 6, 2013. The project is meant to complement and integrate tools into the Emergency Operations Plan, and not replace, duplicate, or conflict with any of the structures, roles or guidance offered by the Alaska Regional Hospital Comprehensive Emergency Operations Plan or the Hospital Incident Command System.

The project provides tools and recommendations to be included in the March 2014 Alaska Shield Exercise. Observations during the exercise and post exercise interviews with members of the Alaska Shield March 2014 incident team indicated that the capstone tools and recommendation were generally helpful and assisted team members to overcome many of the challenges associated with previous disaster exercise.

Current Scope:

The project tools, analysis, and recommendations drew from a focused literature search in the fields of emergency preparedness; including case studies, hospital incident command training documents and critical decision making tools for emergency management. The search targeted literature in these fields that relate to hospital shelter in place/evacuation emergency operations plans. The literature search findings were then reviewed by the Alaska Regional Emergency
Preparedness Committee for issues and areas of importance to the committees based on their experience, insights and mission.

**Assumptions:**

It is the intent that the systems, structures and tools within this report will be used after the hospital’s Emergency Operations Plan has been activated. For the purposes of this project that would be in the context of the Alaska Shield 2014 disaster exercise. It is therefore also assumed that the Hospital Incident Command System (HICS) will be used throughout the duration of a hospital’s emergency response. This report does not replace or alter the institution’s fundamental HICS structure, but rather proposes to add additional specific functional components that may be activated during a hospital evacuation when needed. This report will offer suggested critical decision making tools and guidance for the revised shelter in place evacuation section of the emergency operations plan. This report is only one element of the comprehensive emergency operations plan.

**Problem Statement**

In the last Anchorage community wide disaster exercise on August 6, 2013 involving all the major healthcare facilities, Alaska Regional Hospital evaluated their Emergency Operations Plan and the disaster response during that exercise.² A review of the after action reports from the 2013 exercise exposed a gap within the existing evacuation/shelter-in-place plan. The gap involved communication problems, lack of organizational structure, insufficient protocols and the absence of critical decision making tools. The after action report also highlighted a general lack of situational awareness and continuity with the outside community. The gaps are key to

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² (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
understanding the baseline for this project. To address these challenges this report explores tools, protocols and key factors that support good critical decision making in disaster management designed to mitigate common problems associated with the stress and danger of the emergency.

**Alaska Regional Emergency Operation Plan**

The evacuation versus shelter-in-place emergency annex within the overarching Emergency Operations Plan at Alaska Regional Hospital had a lack of sufficient detailed guidance for evacuation or shelter in place activities. After action reports from the August full-scale hospital disaster exercise identified the need for adequate evacuation planning tools for critical decision making and detailed evacuation and shelter in place guidance for hospital leaders who are inexperienced in disaster management. The existing planning document was too basic and broad in scope. It did not provide the detail needed for staff tasked with managing an evacuation. The document also relied heavily on assumptions made before and after the decision to evacuate without providing enough support for administrators tasked with the decision to evacuate. The initial challenge for this project was taking a large sophisticated Emergency Operations Plan and updating it with relevant information and tools targeted to address the gaps identified from the August 2013 exercise.

Alaska Regional Hospital is the second largest health care facility in the state of Alaska and supports a wide variety of acute healthcare services. Alaska Regional is an important piece in the healthcare infrastructure within Alaska. Anchorage hospitals serve as the regional transfer hub for healthcare facilities from across Alaska. As a health care facility, Alaska Regional has a

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3 (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
4 (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
5 (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
6 (Lochner, 2014)
responsibility and obligation to develop and maintain a disaster preparedness plan under guidance from The Joint Commission and the Department of Health and Human Services. The purpose of a disaster preparedness plan is to mitigate, prepare, respond and recover from the effects of a disaster to minimize loss of life, injury, and damage to property. It is important to consider the aftermath of the event and the ongoing effects of the disaster on the capacity of an organization to maintain essential functions without being overwhelmed by the demands of the event. With the elevated need for emergency preparedness, health administrators should be equipped with the best tools available to handle disasters. This report helps identify assessment tools and simple processes for identifying critical information and organizing a strategic response to evolving threats through critical decision protocols.

**Baseline Challenges**

Alaska is in a unique situation in the context of disaster preparedness because of its isolation. This remoteness presents complex challenges in emergency management because Alaska is not readily connected to other states for support or aid. Alaska is also in a high risk geographic region that has Volcanoes, Earthquakes, Severe weather, and more. Finally, Alaska has fragile infrastructure without an easy way to replace what has been lost to disaster. These challenges make the prospect of shelter-in-place or evacuation decision making for health care facilities complex. While the challenges of Alaska’s isolation are unique, sophisticated critical decision making in complex, evolving, stressful situations are not.

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7 (Centers for Medicare & Medicaid Services, 2013)  
8 (Fink S. , 2014)  
9 (Division of Homeland Security & Emergency Management , 2014)
According to the Emergency Care Research Institute, hospital emergency preparedness before the 2001 attacks on the World Trade Center showed that the level of hospital preparedness varied widely between healthcare facilities, but was generally in the early stages of development. Since then, hospitals in the United States have had to deal with a wide variety of large-scale emergencies and disasters from natural, technological, and terrorist-related causes.¹⁰ In a recent article published by the Anchorage Press, hospital emergency preparedness was highlighted as one of the chief components for stability in a catastrophic event.

**High Profile Disasters**

The US Department of Homeland Security outlines the last 20 years as a time period has seen a significant number of high profile disasters that have affected health care facilities and their surrounding communities. (Northridge earthquake, Hurricane Katrina, Hurricane Rita, Super storm Sandy, The Japanese Tsunami, North Dakota Floods).¹¹ The Department of Health and Human Services has described emergency preparedness as an “urgent public health issue”. Hurricane Katrina proved to be a defining moment for disaster management. As Fink describes in her New York Times article, “plans for nationwide regulations on emergency preparedness for health care institutions date from the Bush administration, after an estimated 215 deaths occurred in hospitals and nursing homes in Louisiana following Hurricane Katrina in 2005.¹² Public administrators and health care facilities have responded to the national focus on emergency management by engaging stakeholders and partnerships in a collaborative process of planning and management.

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¹⁰ (ECRI Institute, 2012)  
¹² (Fink S., 2009)
Coalition of Partners in Healthcare Disaster Management

In 2008 the Alaska Department of Health and Human Services took over direct participation in disaster planning with healthcare facilities.\(^\text{13}\) The Alaska Partnership for Infrastructure Protection has also expanded significantly with Homeland Security involvement. These two entities represent a major coalition of partners in healthcare disaster management. According to the Emergency Preparedness Committee, part of the reason why Alaska Regional Hospital wants to revise their Emergency Operations Plan is to stay ahead of proposed federal regulations and stay compliant with Joint Commission standards.

New Regulations

On December 27\(^{th}\) 2013, the Centers for Medicare and Medicaid services proposed sweeping regulations that “establish national emergency preparedness requirements for Medicare- and Medicaid-participating providers and suppliers to ensure that they adequately plan for both natural and man-made disasters, and coordinate with federal, state, tribal, regional, and local emergency preparedness systems. It would also ensure that these providers and suppliers are adequately prepared to meet the needs of patients, residents, clients, and participants during disasters and emergency situations.”\(^\text{14}\) If this legislation passed, health care facilities, including Alaska Regional Hospital, would be tasked with standardizing their emergency preparedness plans to comply with the new federal regulations.

\(^{13}\) (Division of Homeland Security & Emergency Management , 2014)
\(^{14}\) (Centers for Medicare & Medicaid Services, 2013)
**Heighten Awareness of Public**

The Centers for Disease Control have championed efforts to heighten awareness of public health threats and disasters that affect millions of people each year. These threats can include natural disasters, chemical or radiological releases, explosions, and biological disease outbreaks. The ability of the public health system, community, and individuals to protect, prevent, respond to, and recover from public health emergencies is paramount to the welfare of the public. 15 “Public health professionals work around the clock to safeguard communities from these threats and to ensure that the scale, timing, or unpredictability of a threat or incident does not overwhelm routine capabilities.” 16

**Methodology**

The challenge for this project was taking the existing Emergency Operations Plan annex for Evacuation, and updating it with relevant information and tools targeted to address gaps identified from the August 2013 full scale exercise. The purpose and core of this public administration capstone is to provide research for the improvement of the emergency preparedness plan at Alaska Regional Hospital. This project includes a national search of best practices to identify useful tools, protocols, and recommendations that will support the existing Alaska Regional Hospital evacuation and shelter in place plan within the overarching Emergency Operations Planning document. The literature search was performed on a wide range of knowledge built over years of focus on emergency preparedness. The information included event

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15 (Centers for Disease Control and Prevention, 2012)
16 (Centers for Disease Control and Prevention, 2012)
case studies and tools developed from the Assistant Secretary for Preparedness and Response (ASPR) Hospital Preparedness Program (HPP) funding.  

This project had three fundamental tasks identified for the research study. The first task was to work with the client hospital to identify the scope and specific needs of the client. The second aspect of this research would gather the critical decision making and evacuation/shelter-in-place protocols while developing an accurate “snapshot” of the critical infrastructure responsible for the sustainability of life saving services. The third task is information synthesis to apply the research and tailor the evacuation/shelter-in-place plan to the targeted vulnerabilities identified through the snapshot analysis of local and state infrastructure and the gap analysis from the august 2013 after action improvement plan.

**Emergency Planning in Alaska: Establishing a Framework**

The initial step was to interview Emergency Preparedness Committee members and focus on establishing the scope of the client’s needs. The Committee wanted to close the gaps identified in the previous earthquake exercise of August 2013 and create a draft plan in time for testing in the Alaska Shield 2014 statewide exercise. After action reports from the August full-scale hospital disaster exercise identified the need for adequate evacuation planning tools for critical decision making and detailed evacuation and shelter in place guidance for hospital leaders who are inexperienced in disaster management.

On August 6th, 2013 Alaska Regional Hospital conducted an evacuation exercise with the Medical patient care unit. The medical unit staff successfully used available evacuation

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17 (California Hospital Association, 2011)
equipment to vertically evacuate “volunteer patients.” However, the chief problems identified by that evacuation exercise were:

- poor coordination and communication between Command staff and the patient care unit staff during the evacuation
- need for revised job action checklists for key staff regarding their roles in an evacuation and follow through to the staging areas and forward movement of patients
- need for more detail in the “how to” part of the evacuation/shelter in place plan for clinical departments
- Need for improved tools for regular status updates to Command staff to be used in highly stressful situations to assist them in organizing key information needed for decisions regarding evacuation or shelter in place disaster events. ¹⁸

Using the August 2013 exercise after action recommendations, a baseline understanding of the needs for the client were established. Alaska Regional wanted to revise their Shelter-in-place/ evacuation plan based on the identified weaknesses from the last exercise. The preliminary literature search explored corporate emergency preparedness documents as well as local emergency planning from the state and municipality. Initially the search revealed a structural inconsistency between what was expected from different agencies and what each entity expected to provide with respect to resources and manpower. This exploration lead to assumptions about the nature of the difficulties and challenges Alaska Regional had experienced in the August 2013 exercise. These assumptions about communication and an incomplete emergency plan guided the preliminary literature search.

¹⁸ (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
Preliminary literature

Originally the client directed the research toward finding information detailing how to effectively evacuate the hospital. The project aimed to create an All Hazards evacuation/shelter in place plan that was adaptable to any of the potential threats on the identified Hazard Vulnerability Analysis. The research focused on information from a diverse group of emergency preparedness planners and the experiences of healthcare facilities similar to Alaska Regional. After-action reports and corrective action plans developed as a response to disasters were especially constructive. During this preliminary search of literature I explored many sources related to emergency preparedness and hospital evacuation. This initially led me to an exploration of natural disasters like Hurricane Katrina, Hurricane Sandy, the North Ridge Earthquake in California, and others. The information gleaned from this review explored the consequences of poor planning and the changes each of these events had on the larger culture of emergency planning. Reviewing the broader reports and FEMA documents for each disaster lead to specific case studies of hospitals that had success and catastrophic failures like that of Ana Pou and her team in New Orleans.

The last wave of this review focused on evacuation guides and the basic components of a comprehensive evacuation or shelter-in-place emergency plan. Two significant components were identified in the literature. All of the evacuation planning guides from 2010 or later clearly identified the critical decision making component as the first key step to a comprehensive evacuation plan. The second component is the evacuation “toolkit” of checklists, guides, and job descriptions essential for a successful emergency response. Critical decision making in this structural format was lacking from the existing planning document at Alaska Regional.

Committee Review
Data from the original literature search was reviewed during a brainstorming session with the emergency preparedness committee. In that meeting the emergency preparedness committee embraced critical decision making as an important component needed for the Alaska Regional Hospital emergency plan. Till this point, all efforts to improve the existing plan focused on the structural planning perspective and the practical evacuation process. The new point of emphasis represented a paradigm shift in the actions of the committee and the efforts of the capstone project. As a result, the research pivoted to explore the decision making process behind evacuations and sheltering.

**Targeted Research**

Research and information collection became more effective focusing on critical decision making, while the subject matter experts on the Emergency Preparedness Committee started to develop the actual department specific evacuation guides including tools from the California and Minnesota planning guides. With a new focus, the research used relevant materials for emergency planning written by other hospitals, federal agencies, research institutions, and universities. Several evacuation plan templates intended for modification from cities and counties across the United States were presented to the Emergency Preparedness Committee. The most relevant resources were developed through funding by the Assistant Secretary for Preparedness and Response (ASPR) federal grant funds. The committee chose to modify the template provided by the LA County, California workgroup, nationally known for expertise in disaster planning.

The Minnesota plan and California plans were operationally very similar and contained the same basic concepts and principles. Additionally, both were sponsored by ASPR federal grant funding. However, the Emergency Preparedness Committee favored the California plan for
various reasons. The California plan has the most recent date. The California plan appeared to have borrowed concepts from the Minnesota plan and expanded on them. It simplified the flow charts and added additional patient care material for addressing specific needs of complex patients. In the opinion of the Emergency Preparedness Committee the California plan was more oriented toward earthquake hazards and therefore more relevant to Alaska. Finally, the California plan contained more templates for use by clinical departments as well as non-clinical departments and was specific to differences in how those departments would evacuate.

**Review Outcomes**

Useful elements of other evacuation planning documents identified through the research review process were used to revise the Alaska Regional Hospital shelter-in-place evacuation plan. In a close collaboration with the Emergency Preparedness Committee the overarching emergency plan and supplemental tools were modified. This included an incident assessment worksheet and Command Center checklist for planning and assigning key tasks. The Incident Command checklists incorporated the five key decision points related to critical decision making that were commonly referenced in the most current planning guides and literature, including the California evacuation plan. They are: patients/staffing, hospital infrastructure, supplies, community environment, and event characteristics.

In addition to revising the plan and job action checklists, elevation maps and staging area maps were created. The job action checklists outline roles and responsibilities as well as direct the efforts of specific positions during a disaster event. Vertical and horizontal evacuation routes were listed for all departments on a comprehensive spreadsheet. These evacuation routes are

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19 (Emergency Preparedness Committee, 2014)
more sophisticated than the general fire evacuation routes already in place. A revised HICS 251 infrastructure status report was created by Paul Mitchell - Facilities Director to fit Alaska Regional Hospital.\textsuperscript{20} Using the HICS 251 document, a large spreadsheet was created of all infrastructure utilities and key assets within the hospital to enable the Command Center to keep visual track of quickly changing infrastructure conditions.

The command center checklists and critical decision making protocols rely on a basic understanding of hospital infrastructure and resources needed to maintain services.\textsuperscript{21} Additional research into the critical resources and infrastructure of the surrounding community were collected to provide a concise situational assessment of the vulnerabilities of the Anchorage area. This information was accessed from the Alaska partnership for infrastructure protection archive documents and the Alaska shield 2014 ground truth document.\textsuperscript{22} This tertiary research developed a working knowledge of how local infrastructure is connected to Alaska Regional Hospital. The interconnectedness of regional assets and resources highlighted the need for cooperative communication between stakeholders and regional partners. Communication protocols with outside entities such as the Municipality of Anchorage and the State of Alaska would be established as normal through the Hospital Incident Command System.\textsuperscript{23}

Literature was also reviewed to expose infrastructure vulnerabilities within the community and highlight local pressure points. This information was accessed through a review of government resources, federal agencies, municipal entities and local partnerships. The Alaska Shield 2014 Ground Truth Document summarizes the key assumptions of the type of

\textsuperscript{20} (Alaska Regional Hospital, 2014)  
\textsuperscript{21} (Alaska Regional Hospital, 2014)  
\textsuperscript{22} (Alaska Partnership for Infrastructure Protection, 2010)  
\textsuperscript{23} (Alaska Partnership for Infrastructure Protection, 2011)
infrastructure damage and casualties that would be realized in the event of a catastrophic disaster affecting Anchorage or south central Alaska. Critical information related to internal infrastructure of the hospital was provided by the facilities management department.\textsuperscript{24} This infrastructure snapshot also organized the known categories for vulnerabilities within the local Alaska infrastructure: Utilities, Communications, and Transportation.\textsuperscript{25} This process included a review of the Hazard Vulnerability Analysis created by the Municipality Office of Emergency Management for major natural threat risks to Anchorage, Alaska with earthquakes being the biggest concern.\textsuperscript{26}

**Support Training**

A “just-in-time” training tool for hospital leadership was created and presented to the Emergency Preparedness Committee. Just in time training refers to a process in which the person receives training ”just-in-time” when it is needed for a particular purpose without the fear of time-lag between training and use. It was initially reviewed by the emergency preparedness committee and then the hospital Administration requested the presentation for the full hospital leadership group. A short tabletop exercise describing the use of the new plan and tools was conducted for management staff to answer questions and suggest revisions where needed. Department specific evacuation tools were also designed to clarify the process for staff and to improve the communication needed between staff and the Hospital Command Center. The tabletop exercise and just in-time-training were used to assess the appropriateness, clarity and validity of the critical decision making tools. Participants agreed the newly developed plans and tools should be incorporated into the full scale Alaska Shield exercise.

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\textsuperscript{24} (Alaska Regional Hospital, 2014)
\textsuperscript{25} (U.S. Department of Homeland Security, 2014)
\textsuperscript{26} (Municipality of Anchorage, 2010)
**Alaska Shield Exercise**

The literature search and the analysis of the available tools with the Emergency Preparedness Committee resulted in the development of the critical decision making tools. To provide the setting for the evaluation of the use of the newly revised plan, the team incorporated the five critical decision making criteria into the design of the full scale hospital exercise. These critical decision criteria were primarily identified from the evacuation guide developed by the Agency for Healthcare Research and Quality.

**Exercise Scenario**

The basic catastrophic earthquake scenario developed for Alaska Shield was the starting point. Collaborating with the exercise planning group, information “injects” specific to Alaska Regional were created to facilitate the evolution of the exercise and provide the type of critical information needed to make decisions. The final decisions or outcome of how to respond to the information was not pre-scripted. The Command team was free to choose how to respond.

Information “injected” into the scenario by the hospital exercise controller created a developing picture of infrastructure failures within the hospital consistent with continuing major aftershocks in a catastrophic disaster. Event characteristics, community situation updates, and casualty reports were provided to the Command Center consistent with the assumptions in the Alaska Shield Ground Truth Document. The complexity of the exercise and the dynamic nature of the incoming disaster information required the Incident Command team to respond to incoming information, manage the disaster, and make decisions.
Exercise Design

The literature search revealed that disaster events can be broken up into two major categories based on the amount of warning a facility has before an event.\textsuperscript{27} Anchorage, Alaska has the highest risk from events that give no warning, such as Earthquakes. Places like New Orleans might have some event warning before a hurricane. Research suggests, that the disaster event is not usually the cause of an evacuation. It is the secondary effects related to the loss of critical functions for hospital operations that will cause a hospital to evacuate. The decision to evacuate is a difficult one for healthcare administrators. Safety of staff and patients is best maintained in the protected environment of the healthcare facility. It is only when that safety can no longer be maintained the decision to evacuate must be considered – the risk of staying outweighs the risk of evacuation.\textsuperscript{28}

Types of Evacuations

Different types of evacuations or the option to shelter in place are addressed within the emergency plan. Catastrophic fire, explosion, or similar disasters that require the immediate response for everyone to leave the building as quickly as possible are considered in the plan but were not part of the Alaska Shield exercise. Evolving situations that occur more slowly over a period of time which require the command team to make the decision to evacuate versus shelter in place are more complex and difficult.

These evolving disaster situations may result in partial evacuations which can be horizontal or vertical depending on the situation. The loss of power in one section might cause a unit to evacuate horizontally to the next powered care unit. The loss of water pressure on the

\textsuperscript{27} (Agency for Healthcare Research and Quality, May 2010)
\textsuperscript{28} (Agency for Healthcare Research and Quality, May 2010)
higher floors might cause the evacuation of those patients down to where they are protected by a functioning sprinkler system.  

A full vertical evacuation might be the ultimate decision in some situations.

*During the 2014 exercise the Incident Command team conducted a simulated horizontal and vertical evacuation with deciding to evacuate the whole facility. The critical decision assessment tool assists the command team in making the decision with this type of evolving disaster situation. These evacuations also allow time for staff to organize and implement plans. This is the situation the team wanted to create for the internal hospital exercise plan.*

**Designated Evaluators**

There were three designated evaluators stationed within the command center including the capstone student. They were tasked with evaluating the incident command teams use of the critical decision protocols, tools and checklists. Evaluators used standard Joint Commission exercise criteria for disaster exercise evaluation including tools from the Homeland Security Exercise and Evaluation Program (HSEEP). It is important to note that evaluators were not responsible for identifying the correctness of a decision, but rather observing how the decision developed from available information using the critical decision making tools. Observers also established whether or not the tools were actively used by the command team. These observations were combined with feedback from the participants to formulate the after action findings and recommendations.

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29 (Los Angeles County Emergency Medical Services Agency, April 17, 2012)
Critical Decision Making Criteria:

The critical decision criteria tools were developed to help keep the incident command team focused on their incident action planning and provide them with organized and systematic guidance on how to consider the many factors that bear on the decision to order an evacuation. During the exercise, the incident command team were deliberately organizing incoming information into each criteria and then applying it to the assessment tools provided in the revised evacuation plan.

Literature Review

September 11th & Homeland Security Emergency Preparedness Expanded Scope

According to the U.S. Department of Homeland Security, emergency preparedness has expanded in importance and scope since September 11th, 2001. It is a field that has evolved in focus and direction after several defining events heavily impacted its presence within the theater of public administration. There are multiple disasters that have shaped the industry including 9/11, the SARS outbreak in 2003, Hurricane Katrina, The Japanese Tsunami in 2011, and Super Storm Sandy.31 “Since the terrorist attacks of September 11, 2001, our sense of safety and security within our nation and communities has been fundamentally altered.

Since 9/11, emergency preparedness has been the prominent policy focus as the nation comes to terms with the uncertainty of how to deal with the new specter of terrorism in the United States.32 If 9/11 can be classified as the beginning of emergency preparedness as a definitive public issue, Hurricane Katrina was the Bellwether moment that continues to impact

32 (Kiltz, 2009)
the industry. Hurricane Katrina was a catastrophic event because it was actually two disasters. Comfort (2005, 5) noted that “the first phase, the hurricane, could legitimately be called a natural disaster, as it was generated by meteorological activity beyond human control. The second phase, the breach of the levees and ensuing flood, can only be acknowledged as a man-made disaster, after years of neglected maintenance of the levee system, inadequate public education regarding the risk and severity of hurricanes in the region, and inadequate planning and preparedness training across jurisdictional levels . . . city, parish state, and federal.”

**The Role of Hospitals in a Disaster**

Hospitals have historically been considered a critical infrastructure component in any major disaster, however there is increasing scrutiny involved in catastrophic events because of their extremely vulnerable service populations. Dr. Sheri Fink explains in her New York Times article that hospitals and healthcare facilities have become a signature concern for the emergency planning of many large cities. “…Health officials are now weighing, with little public discussion and insufficient scientific evidence, protocols for making the kind of agonizing decisions that will, no doubt, arise again.”

Fink’s argument goes deeper in her expose’ of the tragedy at Memorial Hospital after the events of Katrina. Mortuary workers eventually carried 45 corpses from Memorial, more than from any comparable-size hospital in the drowned city; the consequences of a failure to prepare, the tragic decision making of the Incident Command Team, physician Ann Pou and her staff. Pou argued that “informed consent is impossible during disasters and that doctors need to be able to evacuate the sickest or most severely injured patients last — along with those who have Do

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33 (Comfort, 2005)
34 (Fink S., 2014)
35 (Fink S., 2009)
Not Resuscitate orders — an approach that she and her colleagues used as conditions worsened after Katrina to determine the sequence of patient evacuation.\textsuperscript{36} The existing Memorial Hospital 246-page emergency operations plan offered no guidance for dealing with a complete power failure or for how to evacuate the hospital if the streets were flooded. More importantly hospital administrators were not equipped with specific guidance or effective critical decision making tools to mitigate the effects of the disaster.\textsuperscript{37}

**Emergency Planning In Anchorage**

Planning in Anchorage is similar as hospitals are expected to be self-sufficient and capable of providing shelter or aid to citizens from the community.\textsuperscript{38} As Taaffe, Johnson, and Steinmann note in their work on improving hospital evacuation planning, hospitals are usually considered a safe haven and support system for the people involved in an emergency situation. As the foundation for many emergency response plans, hospitals are rarely considered subjects for evacuation.\textsuperscript{39} However, escalating disaster events have created a new lens through which to view a hospitals role in emergency management. Continuous preparedness, and preparation is no longer optional; it's critical for success in a highly competitive and complex healthcare environment.\textsuperscript{40}

**Themes present within the Literature**

Two key themes were identified in the review of other emergency preparedness planning documents.

\textsuperscript{36} (Fink S., 2009)  
\textsuperscript{37} (Fink S., 2009)  
\textsuperscript{38} (Joint Medical Emergency Preparedness Group, 2013)  
\textsuperscript{39} (Taaffe, Johnson, & Steinmann, 2006)  
\textsuperscript{40} (Coyle, Sapnas, & Ward-Presson, 2007)
1. Tools and checklists for hospitals and other healthcare facilities to provide the detailed plans needed to guide staff on how to accomplish a safe, organized evacuation.

2. The process of how to make critical decisions for shelter in place or evacuation.

These resources included the *Hospital Evacuation Decision Guide* developed by the Agency for Healthcare Research and Quality; the *Evacuation and Shelter in Place Guidance for Healthcare Facilities* developed by the Los Angeles County Emergency Medical Services Agency; the *New Jersey Hospital Association’s Hurricane Planning, Response and Recovery Toolkit* developed by the New Jersey Hospital Association; the *MDPH Hospital Evacuation Toolkit* developed by the Harvard School of Public Health; and others which identified two consistent themes for Hospital Emergency Preparedness.

**Structural Planning**

1. How health care facilities responded to disaster and their emergency preparedness from a structural planning perspective.\(^{41}\)

   a. How do medical providers sustain critical care in a disaster?

   b. How do health care providers manage the loss of supplies?

   c. How do care providers organize an evacuation due to the effects of the disaster?

   d. How do health care facilities hunker down and shelter in place?

\(^{41}\) (Centers for Disease Control and Prevention, 2012)
Critical Decision Making

2. Critical decision making is a sophisticated process that is stressful, challenging, and ripe with consequences leading to failure. However, there are common sense tools and protocols that can help prevent these challenges.

   a. How do health care administrators made the decision to continue services?
   b. How do health care administrators make decision on how to manage their resources?
   c. How do administrators make the decision to shelter-in-place or evacuate?
   d. What were the reasons that triggered that response?42

During disasters, administrators of health care facilities are faced with decisions about how to operate and care for patients, including when and how to evacuate patients if the facility becomes unable to support adequate care, treatment, or services.43 Hospitals and nursing homes are required to have plans in place that describe how they will operate during emergencies.44 The strict structural evacuation process is slightly outside the scope of this report because it is thoroughly defined within available literature including the existing emergency operations plan at Alaska Regional.45

Critical Thinking and Structural Planning

The challenge for Hospital administrators is twofold. There is a critical thinking aspect of emergency preparedness that starts long before a disaster happens and then there is the immediate response to a crisis. The first issue is far more academic and open to debate, while the

42 (Agency for Healthcare Research and Quality, May 2010)
43 (Minnesota Department of Health, 2010)
44 (United States Government Accountability Office, 2006)
45 (Agency for Healthcare Research and Quality, May 2010)
latter is more visceral and reliant on cogent protocols with clearly understood methods and procedures. Engaging stakeholders in discussions such as emergency planning sessions may enable and encourage local emergency managers to challenge their own assumptions. This could help them gain a new understanding of an issue or aid in the development of a new and unique perspective.

The critical decision making process for crisis response explores a different approach than the simple nuts and bolts of evacuation. Documents like the Hospital Evacuation Decision Guides used for this report and developed through ASPR funding, are particularly impactful when paired with the information provided from research on emergency operations planning. No single formula or algorithm could possibly capture all of the nuances involved in the decision or the myriad different disaster scenarios that may lead to a hospital evacuation, and this Guide does not offer a formulaic approach to evacuation decision making. Instead, the Guide is intended to supplement hospital emergency plans, which frequently lack specific guidance on how to make that critical decision, including what factors to consider and for how long the decision may be safely deferred.46

Critical decision making is the process by which an administrator selects a plan of action or agenda in response to information and alternatives present within a situation. The plan of action is commonly based on the values and mission of the decision maker and their organization.47 The inherent nature of the disaster conditions mandates that providers are critical thinkers who remain calm, rapidly assess situations, consider options, and enact the emergency

46 (Agency for Healthcare Research and Quality, May 2010)
47 (American Association of Critical-Care Nurses [AACN], 2007)
response plan. An ability to triage situations, as well as patients, and prioritize and delegate limited resources are also key components of the role.

 Critical thinking requires risk taking, not formulaic response. Emergency managers must have strong critical thinking skills to identify and anticipate situations, solve problems, and make decisions both effectively and efficiently. As Collins explains in *Cultivating the Habit of Critical Thinking*, (Collins, 2012) when thinking critically, individuals often alternate between recognizing assumptions and evaluating arguments. An individual who is able to recognize faulty assumptions and/or weak arguments is more likely to arrive at appropriate conclusions. Research suggests that the incorporation of critical decision making into the emergency operations plan will significantly impact the overall use and effectiveness of emergency protocols and planning.

 Local emergency managers may improve critical thinking by identifying scenarios and associated underlying assumptions. While ranking the likeliness of each assumption related to the situation is important, it is also essential to consider the implications and the consequences if a major decision is made on the basis of an erroneous assumption. In the Congressional Report, *A Failure of Initiative*, the Select Committee identified significant institutional and individual failures at all levels of government and that Katrina “was primarily a failure of initiative.” The report said the single biggest federal failure was not anticipating the consequences of the storm even though disaster planners had rated the flooding of New Orleans as the nation’s most feared

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48 (Veenema, 2007)  
49 (Collins, 2012)  
50 (Collins, 2012)  
51 (Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, 2006)  
52 (Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, 2006)
scenario, testing it under a disaster preparedness program in 2004.\textsuperscript{53} In addition, as Linda Kiltz explains, out-of-court settlements for deaths and injuries at hospitals during Hurricane Katrina make clear that failure to properly prepare for and respond to an emergency not only has a horrible human toll but can have disastrous financial consequences for a hospital.\textsuperscript{54}

However, critical decision making during a disaster is a categorically different experience. In disaster events, people may be without power, shelter, communication, food, and water. Emergency response capabilities can quickly become overwhelmed due to the magnitude of the damage. Injured members of the community may be unable to find transportation to healthcare facilities. In addition, the local emergency medical services (EMS) may not be able to gain access to those victims or may be overwhelmed by the sheer mass of those in need.\textsuperscript{55} There is an incredible amount of stress and pressure that can negatively impact the way people respond to a disaster.

\textbf{Incident Commander and Command Team}

In the event of a disaster, the primary critical decision maker is defined as the Incident Commander (IC) by the Hospital Incident Command System.\textsuperscript{56} The Incident Commander is responsible for directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. The IC is responsible for all aspects of the response, including developing incident objectives and managing all incident operations. The IC sets priorities and defines the ICS (Incident Command System) organization for the particular response. In \textit{Agility and Discipline: Critical Success Factors for Disaster Response} John Harrald explains that there have

\begin{footnotesize}
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\item \textsuperscript{53} (Kiltz, 2009)
\item \textsuperscript{54} (Powers, 2009)
\item \textsuperscript{55} (Powers, 2009)
\item \textsuperscript{56} (HICSCenter.org, 2006)
\end{itemize}
\end{footnotesize}
been concerns that ICS was a relatively closed system that would not foster adaptability and creativity. (Cohn, Wallace, and Harrald 1991). However, Mendonça (2005) noted that ICS is more than organizational structure; it is a decision making protocol for emergency response organizations that places a coordinator in the central role of facilitating team decision making.\(^{57}\)

This is important because it frames the Incident command system itself as a critical decision making protocol, the facilitation of which can heavily impact the outcome of an emergency. All of these responsibilities require that the Incident commander possess tremendous critical decision making skills. Even if other positions are not assigned, the IC will always be designated.\(^{58}\)

**Attributes of an Effective Critical Decision-Maker**

According to the US Department of Labor, research has shown that effective decision-makers share several attributes.\(^{59}\) Among these are the following:

*Knowledge*: The most important requirement for making sound decisions is a deep understanding of all factors. The soundness of the decision depends on how informed the decision-maker is.

*Initiative*: Effective decision-makers assume responsibility for beginning the decision-making process and seeing it through. They take an active part in making things better.

*Advice-seeking*: Good decision-makers know that they need help from others. They identify people who can make specific contributions to the decision-making process and ask them for their advice and counsel.

\(^{57}\) (Harrald, 2011)  
\(^{58}\) (United States Department of Labor, 2013)  
\(^{59}\) (United States Department of Labor, 2013)
Selectivity: Effective decision-makers seek pertinent data. They avoid getting bogged down by extraneous facts and figures.

Comprehensiveness: On the other hand, they look at all available options and consider every possible alternative so as to make the best choice.

Currency: Good decision-makers consider current conditions and take advantage of opportunities that exist at the time.

Flexibility: Effective decision-makers remain open-minded about new concepts and ideas. They are willing to change course or try a different approach if better results seem likely.

Good Judgment: Sound decisions will not always result from merely following procedures. Decision-makers must exercise their best judgment in considering factors particular to the situation.

Calculated risk-taking: The risks and results of various alternatives must be weighed and the consequences accepted, whether positive or negative.

Self-knowledge: Good decision-makers know their own abilities, biases, and limitations.\(^6\)

A review of the information at hand: Additionally, effective decision-makers should begin each decision process with a review of the information at hand (e.g., the Emergency Operations Plan, Situational Operations Plans, etc.) If the planning process is complete as outlined, many common situations will have been anticipated, and procedures for what to do in those situations will be in place.\(^6\) The problem explored in this report is when the complexity of the emergency stresses the critical decision making skills of the incident commander and the incident command team.

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\(^6\) (United States Department of Labor, 2013)
\(^6\) (Janet Torma-Krajewski, March 2, 2010)
**Incident Command**

In the Hospital Incident Command System, the Incident Commander and the incident command team are responsible for evaluating incoming information and then developing an incident action plan. This plan must consider the five critical decision criteria used in the evaluation of a disaster as identified by the Agency for Healthcare Research and Quality, a division of the U.S. Department of Health and Human Services.\(^\text{62}\) A centralized, coordinated incident action plan should guide all response activities. The Incident Action Plan (IAP) provides a concise, coherent means of capturing and communicating the overall incident priorities, objectives, strategies and tactics in the context of both operational and support activities. Every incident must have an action plan.\(^\text{63}\)

**Critical Decision Making Challenges**

The 2013 disaster exercise at Alaska Regional Hospital and an examination of the literature identify two broad problems with critical decision making that apply to emergency management. Both problems revolved around failures of communication. Based on interview with the Alaska Regional Hospital Emergency Preparedness Committee, these are gaps in communication that develop from a lack of information and information overload.\(^\text{64}\)

**Information Overload**

In the August 2013 scenario, the incident command team was flooded with information, but at the same time lacked access to relevant critical information required for effective decision making. This resulted in a gap that restricted access to important information needed to identify evolving “big picture” problems while the incident command team was being flooded with less important data. As noted in a

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\(^{62}\) (Agency for Healthcare Research and Quality, May 2010)

\(^{63}\) (Florida Commission on Oil Spill Response Coordination, 2012)

\(^{64}\) (Alaska Regional Hospital Emergency Preparedness Committee, 2013)
study by Meacham, Sarkis and Dembsey, the inability to filter critical information from the superfluous can severely impact the capability to manage a crisis.  

**Critical Decision-making Criteria:** The introduction of critical decision making criteria, as identified within the research, should help mitigate this effect. Critical decision making tools act as an organizational filter, distributing and focusing the attentions of command staff to their zones of control. A critical decision tool/checklist, like the one utilized from the California emergency guide for evacuation versus shelter in place decisions, will help the incident command team approach information gathering in an organized consistent way that can be applied to disaster crisis.

**Checklist or Decision Tree:** By utilizing a checklist or decision tree, in a stressful disaster situation, key information will not be overlooked in the flood of data coming into the command center. These written checklists will help keep a less experienced incident commander focused on the task of gathering key information, while filtering the rest of the data to build a clear picture of the event. Because of the more structurally organized information, the incident commander should be able to more effectively manage comprehensive decisions necessary to handle the full scope of the emergency.

**Recognition Decision Making**

The second component is approached from two different analytical models. In the recognition-primed decision model written by Gary Klein, he explores the significance of operational settings and the training of those involved in the critical decision making process.

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65 (MEACHAM, SARKIS, & DEMBSEY, 2008)  
66 (Agency for Healthcare Research and Quality, May 2010)  
67 (Agency for Healthcare Research and Quality, May 2010)
The second component illustrates the need for the incident command team to effectively manage alternative decisions while adjusting the process for the type of emergency. The Recognition Primed Decision model focuses on situational assessment rather than judging one option to be superior to others.\(^68\) Gary Klein’s model presents a recognition model of decision making that shows how people can use experience to avoid some of the limitations of analytical strategies. It fuses two processes-situational assessment and mental simulation-and asserts that people use situation assessment to generate a plausible course of action and use mental simulation to evaluate that course of action.\(^69\) With a highly trained staff and the proper tools at hand, Gary Klein believes that recognition decision making is more common and useful in stressful operational settings where full analytical decision making is not appropriate.

**Analysis Paralysis**

“Analysis Paralysis” is also a term used to describe a concept in which the incident command team does not effectively manage alternative decisions. Thus the incident command team cannot decide on a course of action resulting in little or no activity being taken to resolve a crisis.\(^70\) Factors for this scenario include: information availability, poor communication, and the application of the decision-making process.

> “Effective management tools allow for adaption based on available information. The more credible the information, the more informed the decision can be. However, the goodness of the decision will also depend on who the decision-makers are, what processes they use, and what alternatives are available. Various issues need to be considered, including how much information is enough or too much (information overload), and what boundaries around the decision-making process can help in assessing the situation and taking appropriate action, without being overloaded with alternatives (analysis paralysis).”\(^71\)

\(^{68}\) (Klein, 1993)  
\(^{69}\) (Klein, 1993)  
\(^{70}\) (MEACHAM, SARKIS, & DEMBESEY, 2008)  
\(^{71}\) (MEACHAM, SARKIS, & DEMBESEY, 2008)
The critical decision making tools introduced into the Alaska regional emergency evacuation plan help mitigate this effect by providing the incident command team with a way to categorize information into critical and non-critical data.

**Groupthink**

While critical decision making in the hospital incident command system is a tightly controlled process due to its rigid structure, it is still vulnerable to internal and external threats. According to the Hospital incident command center guide, hospital leadership must be trained effectively so that anyone in a leadership position has the necessary competencies to step into the incident commander position and effectively manage the crisis.\(^{72}\) A comprehensive search of the available literature on critical decision making in emergency preparedness highlighted another key issue not specifically addressed within the August 2013 after action report. “Groupthink has been identified as a key factor in the failure of disaster response in high profile events such as Hurricane Katrina, Hurricane Sandy and the Deepwater Horizon Accident.”\(^{73}\)

Groupthink is identified as the practice of thinking or making decisions as a group in a way that discourages creativity or individual responsibility.\(^{74}\) In a crisis, Groupthink can be dangerous, because decision makers do not effectively entertain alternative options when considering a course of action. Dr. Torma-Krajewski states, “Groupthink occurs when members of group let their need to agree with other members interfere with their ability to think critically about the decision.”\(^{75}\) She goes on to explain, in emergency preparedness groupthink stifles the ability to respond to a crisis and causes a failure of initiative. To be successful, group decision-

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\(^{72}\) (HICSCenter.org, 2006)  
\(^{73}\) (Florida Commission on Oil Spill Response Coordination, 2012)  
\(^{74}\) (dictionaries, 2014)  
\(^{75}\) (Janet Torma-Krajewski, March 2, 2010)
making requires good leadership.\textsuperscript{76} Dr. Torma-Krajewski explains that multiple factors that can contribute to group think.

\textit{Time pressure} often requires quick decisions; and personnel responding to disasters typically have to have a high degree of cohesion. Time pressure refers to the lack of time and the need for quick decisive critical thinking. The second reason is the personnel in these situations are typically close colleagues who have a high degree of cohesion and do not tend to question or second guess each other.

\textit{High Degree of Cohesion} supported by the following conditions

1. Overestimation of the group’s ability and power:
   - Allows members to ignore warning signals.
   - Allows members to feel complacent.
   - Could result from an overreaction to low self-esteem resulting from recent failures or a difficult task.

2. A “we” vs. “they” attitude:
   - Leads to stereotypes of outsiders.
   - Encourages rationalization of decisions.

3. Pressure toward conformity:
   - Results from direct pressure applied by the group to members who try to disagree.
   - Results in members who agree to remain as part of the group.\textsuperscript{77}

The Association for critical care nursing teaches nurses to minimize groupthink during an emergency by: Encourage dissenting opinions. Discuss the need to remain open to possibilities. Examine patterns of decision-making during previous emergencies, analyze them, and then take corrective measures to prevent future groupthink.\textsuperscript{78}

\textsuperscript{76} (Janet Torma-Krajewski, March 2, 2010)  
\textsuperscript{77} (Janet Torma-Krajewski, March 2, 2010)  
\textsuperscript{78} (American Association of Critical-Care Nurses [AACN], 2007)
situation is recognized as a cognitive barrier to successful decision making. In the Alaska Regional Hospital Emergency Operations Plan it is the responsibility of the incident command team and ultimately the Incident Commander to effectively mitigate the problems associated with groupthink. Through the inclusion of critical decision making tools such as the incident action checklists and the decision tree, problems associated with group think are addressed.

**Critical decision tools & Local infrastructure**

The last stage of this research review focused on gathering critical decision tools and developing a concise picture of local infrastructure that could be used to revise the existing evacuation plan protocols. The critical decision criteria were developed through a synthesis of the Evacuation/Shelter in Place guidelines for Healthcare Facilities from Los Angeles County and the Hospital Evacuation Decision Guide prepared by the Agency for Healthcare Research and Quality. Other resources were gleaned from templates and critical decision tools presented and approved by the Alaska regional hospital emergency preparedness committee. As a result of the tools discovered in the literature search, the existing plan was modified to reflect the new duel aspect evacuation response guidelines.

**Infrastructure Factors:**

A literature search of relevant hospital infrastructure needs and common reasons for hospital evacuations due to infrastructure concerns, identified multiple commonalities between
Alaska Regional and other hospitals. There are three categories identified as critical to the Hospital’s infrastructure support system: Utilities, Transportation and Communications.\textsuperscript{79}

**Utilities**

The Alaska partnership for infrastructure protection explains that the electric and natural gas utilities in Central and South Central Alaska are interconnected and require an exceptional amount of cooperation.\textsuperscript{80} Crisis could cause any number of production and supply issues ranging from local supply shortages to full-scale disruption.\textsuperscript{81} In advance of a potential crisis, the Municipality of Anchorage and all the utilities have signed a “Gas Assurance Agreement” wherein the utilities agree to place the primary importance on maintaining gas supply to ENSTAR. Due to problems associated with turning gas supplies back on (each gas meter must be manually reset), the electrical utilities will absorb the reduction by instituting conservation measures and alternative supplies.

Should a large-scale disaster hit the area, the utilities would not be able to re-establish normal operations without cooperative agreements.\textsuperscript{82} This information is of particular interest because Alaska Regional Hospital relies on power from Municipal Light and Power. ML&P is the only power generating company able to switch off natural gas supplies and go to diesel generation.\textsuperscript{83} This is an important redundancy for the Hospital and other customers served by ML&P because without it the hospital would be forced to rely on its on-site power generation. The problem with natural gas supply for the Anchorage Municipality is the vulnerability in infrastructure corridors. The infrastructure corridors in anchorage support all of the utilities

\textsuperscript{79} (U.S. Department of Homeland Security, 2014)  
\textsuperscript{80} (Alaska Partnership for Infrastructure Protection, 2011)  
\textsuperscript{81} (Alaska Partnership for Infrastructure Protection, 2011)  
\textsuperscript{82} (Alaska Partnership for Infrastructure Protection, 2011)  
\textsuperscript{83} (Municipal Light and Power, 2012)
including natural gas, water, electric, communications and transportation. All of the natural gas pipelines within the municipality are buried; this is good for security but bad for their ease of repair.\textsuperscript{84}

\textit{Prioritization of Natural Gas Restoration:}

1. Power Utilities
2. Schools/shelters/hospitals/churches
3. Residential
4. Commercial Buildings (Downtown)
5. Commercial Groups (Asphalt Plant, Anchorage Sand & Gravel)\textsuperscript{85}

It is an important critical decision factor to consider that the hospital is not a top priority for the restoration of natural gas for heating. The incident commander is tasked with the responsibility of assessing the importance of this information in the context of the emergency situation.

\textbf{Transportation}

The department of homeland security has identified transportation as the most crucial, yet probably most fragile, infrastructure sector in Alaska. While most of the consumable goods needed by 710,000 Alaskans come from points external to the State, Alaska is connected to the lower 48 only by a single road (the Alaska – Canadian Highway (ALCAN)), an aviation corridor, and a single port capable of receiving and distributing large-scale shipments.\textsuperscript{86} Research suggests, that if this infrastructure is disrupted it will severely impact the anchorage municipality and the entire state.

Studies by the Anchorage Office of Emergency Management indicate there are only two to three weeks of food warehoused in Anchorage at any one time.\textsuperscript{87} Additionally, with 82\% of

\textsuperscript{84} (Alaska Partnership for Infrastructure Protection, 2011)
\textsuperscript{85} (Alaska Partnership for Infrastructure Protection, 2011)
\textsuperscript{86} (State of Alaska Department of Labor, 2010)
\textsuperscript{87} (Alaska Partnership for Infrastructure Protection, 2011)
the Alaskan communities not connected to any road or rail system, airfields and ports take on key survival roles. Alaska has only three ice-free ports year round and two each civilian/military large-scale capable airfields.\textsuperscript{88} Many of the base infrastructure pieces in Alaska share infrastructure corridors - for example, most bridges carry cargo and people as well as communications lines, natural gas or/and oil pipelines, and possibly railroad tracks. These interdependencies and critical nodes make great economies of but also create a fragile infrastructure with little redundancy.\textsuperscript{89}

In a disaster, information related to these factors can help Alaska Regional Hospital organize their response to multiple critical decision criteria. Utilizing critical decision making, information on a disaster event’s potential impact on the transportation infrastructure can paint a clear picture of the community environment, the ability to be resupplied, and the availability of staffing resources to reach the hospital. Also, in the event of an evacuation decision, the capability of Alaska Regional to transport people away from the hospital to a new destination is dependent on understanding the stability of this infrastructure.\textsuperscript{90}

\textbf{Communication}

The Telecommunication (telecom) infrastructure within the State of Alaska, due to significant capital investment over the last 10 years, is built to withstand Alaska conditions -- providing a resilient and relatively robust capability.\textsuperscript{91} While cooperative planning and improvements provide some redundancy, the overall system, like its lower 48 counter-parts, remains vulnerable to both man-made and natural disasters. As a result, Alaska relies on a

\textsuperscript{88} (State of Alaska Department of Transportation & Public Facilities, 2010)  
\textsuperscript{89} (Alaska Partnership for Infrastructure Protection, 2011)  
\textsuperscript{90} (Alaska Regional Hospital, 2014)  
\textsuperscript{91} (Alaska Partnership for Infrastructure Protection, 2011)
multitude of methods to ensure reliable communications both internal and external to the State.\textsuperscript{92} The backbone of the telecommunications infrastructure is supplied by traditional commercial telecom carriers providing wireless and land-based services throughout the State. Additional emergency capability is predominately achieved thru the Amateur Radio Emergency Service, the Alaska Land Mobile Radio System, the Anchorage Wide Area Radio Network and Satellite Phones.\textsuperscript{93}

While competitors, these companies are like most of Alaska businesses and recognize that technical vulnerabilities coupled with vast distances and limited access require an even closer relationship than “outside” companies.\textsuperscript{94} Accordingly, the Alaska Broadband telecommunication providers have established a number of operating and cooperation agreements thus optimizing the mutual use and value of infrastructure. The foundation of all external State communication is the shared cables that they all depend upon to provide bandwidth. These cables are each capable of handling almost all of the current band-width requirements for the State and are designed for 99.999\% reliability.\textsuperscript{95}

In addition to advocating “route diversity” for clients, the telecom industry has created redundancy within the networks to enable multiple paths to each node.\textsuperscript{96} Despite close working relationships, logistical re-supply remains an issue for telecom and all other infrastructure sectors. Many of the major telecom equipment pieces/switches are made-to-order and no spares exist in Alaska, possibly not even in the U.S., creating potential for long replacement lead-time.\textsuperscript{97}

\textsuperscript{92} (Alaska Partnership for Infrastructure Protection, 2011) \\
\textsuperscript{93} (Alaska Partnership for Infrastructure Protection, 2011) \\
\textsuperscript{94} (Alaska Broadband Taskforce, 2012) \\
\textsuperscript{95} (Alaska Broadband Taskforce, 2012) \\
\textsuperscript{96} (Alaska Broadband Taskforce, 2012) \\
\textsuperscript{97} (Alaska Partnership for Infrastructure Protection, 2011)
Alaska Regional Hospital relies on the communication infrastructure to establish information and status reports from partner agencies. The current Emergency Operations Plan relies on normal telephone, fax, and email communications. Backups to normal communications links include satellite, HAM radio, and the 800 mhz AWARN (Anchorage Wide Area Radio Network) radio system to communicate with local and state agencies.98

The literature review emphasized the need for attention to detail with respect to the critical factors in decision making. These include the vulnerabilities of local anchorage utilities, fragile infrastructure corridors, and essential telecommunication partnerships. This report explores these critical factors along with the challenges of critical decision making in a highly stressful emergency situation.

Alaska Shield 2014: Findings, Exercise Design, and Observations

1. Event characteristics:

In the Alaska Shield Exercise Alaska Regional was presented with the basic facts of the event as a primer for the exercise. Additional information was injected as the Command team requested status updates. It is important to remember that this information is expected to be provided through normal communications channels and protocols established by the hospital incident command system.

98 (Alaska Regional Hospital, 2014)
The event characteristics give the incident command team a wealth of information into the expected impacts of a disaster on the hospital and the community. Major earthquakes and tsunamis can have massive and wide spread damage that affect every facet of regional infrastructure. Tornados might blow the roof off the house next door but leave everything else alone. Understanding how particular events affect the community and the hospital can greatly enhance mitigation and response action planning.

**Event Characteristics Used in the Alaska Shield 2014 Exercise:**

At 10:10 a.m. Alaska Standard Time (AST) on March 27, 2014, an earthquake occurred in Anchorage. Preliminary estimates indicate a 9.2 magnitude (M) earthquake initiates approximately 70 miles east of Anchorage and 50 miles west of Valdez at a depth of 16 miles, rupturing a fault that spans an area from beyond the western edge of Kodiak Island to the eastern side of Prince William Sound and from well offshore inland to upper Cook Inlet. The US Geological Survey (USGS) and Alaska Earthquake Information Center (AEIC) are warning of additional aftershocks that can cause more damage and avalanches.\(^99\)

2. **Community Environment:**

The community environment can heavily affect the security and functionality of hospital operations. In a catastrophic event that has wide ranging effects on the community it is paramount that the hospital incident command team understand the ramifications of local damage, weather, and community members seeking shelter, civil breakdown, stress and overall pressure on the surrounding community.\(^{100}\)

\(^99\) (Division of Homeland Security & Emergency Management, 2014)
\(^{100}\) (Agency for Healthcare Research and Quality, May 2010)
In the case of the flooding following Hurricane Katrina, New Orleans hospitals evacuated when they lost city water, lost all power, or were unable to ensure the safety of patients and staff in the midst of civil unrest. After careful examination, it is clear that it was not the hurricane or the subsequent flood that caused decision teams to order hospital evacuations but the damage to hospitals and critical infrastructure, as well as problems in the surrounding community.\textsuperscript{101}

**Community Environment Situation Used in the Alaska Shield 2014 Exercise:**

- Hilton Hotel collapse – 80 trapped
- Federal Building, City Hall damaged, evacuating
- Widespread damage to homes throughout Anchorage
- Lack of natural gas & power – no heat
- Estimates of 42,620 people require sheltering
- Due to Port damage – 2 day supply of gasoline remaining in city
- National news reports widespread looting in Anchorage
- 50\% of emergency workers, APD, AFD, Muni workers, etc unavailable
- No reports of healthcare facilities evacuating yet but seeing heavy numbers of casualties
- Natural Gas lines disrupted
- Neighborhood at Bragaw and Debarr evacuating due to natural gas line ruptures
- Power is out for 70\% of the city\textsuperscript{102}

3. **Hospital Infrastructure Assessment:**

The ability of a hospital to maintain critical care is dependent upon its ability to manage its own damaged infrastructure during a disaster. The loss of power, water, heat, the ability to create steam are all factors in the evacuation plan. Even if the building is structurally sound, the loss of water pressure above a certain floor may cause the hospital to vertically evacuate.\textsuperscript{103}

\textsuperscript{101} (Agency for Healthcare Research and Quality, May 2010)
\textsuperscript{102} (Division of Homeland Security & Emergency Management, 2014)
\textsuperscript{103} (Harvard School of Public Health, 2012)
In New York after super storm Sandy Langone Medical Center began evacuating about 260 patients because it lost its back up power generation. The hospital didn't anticipate such heavy flooding from Sandy, the superstorm that hit Monday, and chose not to evacuate all its patients before the storm, as it did with Hurricane Irene a year ago. (Cohen, 2012) The hospital's basement flooded and their power generation failed causing the need for a full evacuation. The staff of the hospital were very courageous as they evacuated the babies out of the intensive care unit. Most of the babies needed respirators and relied on hospital staff to provide air as they were evacuated.

**Hospital Infrastructure Injects Used in the Alaska Shield 2014 Exercise:**
- Structural integrity – 30% damage
- Power – on generator backup
- Heat – no natural gas, no backup
- Utility lines to north tower damaged, broken windows and more
- Decreased Water pressure throughout ARH, specifically on the 7th, 6th and 5th floors
- Most cell towers out of service
- Landline service disrupted
- 3 of 4 transoceanic fiber optic cables are severed
- Limited communications, No cell phones, no landlines

4. **Supply Resources**

   The ability to maintain operations may come down to the ability to be resupplied with important resources. The incident command team needs to consider the immediate availability of
medical gases like oxygen; pharmaceutical drugs, blood supply, and dietary supplies to maintain operations until they are resupplied. Alaska Regional is in the unique situation of having an airport runway behind the building for life flight access.

**Supply Chain Impacts Used in the Alaska Shield 2014 Exercise:**

- All roads and bridges sustained major damage
- All roads/bridges to north and south of Anchorage are closed pending inspections taking days to weeks, motorists stranded
- Debris blocking roads, most signal lights are out.
- Port of Anchorage, heavy damage to cranes and terminals,
- Sea floor lifting reduces ability to dock ships
- 85% of all non-petroleum cargo in Alaska handled by the Port of Anchorage
- Only 2-3 weeks of food warehoused in Anchorage at any one time
- Port of Anchorage, heavy damage to cranes and terminals

5. **Patients and Staffing**

Patients and staffing concerns revolve around the available staff to handle the census of patients within the hospital and do so over multiple operational periods. Usually the available staff within the hospital isn’t the issue. It’s more about the availability of staff over the next operational period, or the next 12-24 hours. Can staff members access the hospital through the road system? What percentage of staff are available? What percentage decided to stay with their family because

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104 (Division of Homeland Security & Emergency Management, 2014)
105 (Minnesota Department of Health, 2010)
of the disaster? In past disasters hospitals have had to ask staff to stay home instead of coming in to the hospital because they would be needed for the next shift.

**Patient Census and Staffing Impacts Used in the Alaska Shield 2014 Exercise:**

- Patient census of 80 at time of earthquake
- 30% staff no show
- 50% of emergency workers, APD, AFD, Muni workers, etc. unavailable
- Affects wide geographic area, catastrophic
- All roads/bridges to north and south of Anchorage are closed pending inspections taking days to weeks, motorists stranded

**Utilization of Assessment Tools, job action check lists:**

The purpose of the incident assessment tools and job action check lists are to manage the flow of information. The staff members assigned to each area of responsibility, (Logistics, communications, dietary, etc...) apply the information flowing into the incident command center to their assessment of the sustainability of services in their department. This information is then applied to the incident commander’s overall event assessment, helping him/her create the incident action plan. Based on the incident action plan the hospital may request additional resources from regional stakeholders to bolster the ability to shelter in place or the incident action plan may call for additional evacuation resources such as buses, vans, and ambulances.

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106 (Division of Homeland Security & Emergency Management, 2014)
107 (Agency for Healthcare Research and Quality, May 2010)
108 (Alaska Regional Hospital, 2014)
The other function that the incident action check lists provide, is directional assistance for staff who may not know their roles and may not understand the questions that need to be asked of their information sources. Especially in high stress situations, tools such as this provide focus and help prevent operational “tunnel vision” that keep information from passing between necessary staff and stakeholders.\textsuperscript{109} While these tools can give administrators the right questions, it is important that they have a working knowledge of the critical decision making criteria. When information is examined in the context of the sustainability of the facility, it provides guidance on what factors to consider and for how long the decision to evacuate or Shelter in place may be safely deferred.

Exercise observers were evaluating the command staff use of the assessment tools. Initially, exercise participants needed time to adjust to the new tools and protocols but overall the application of the questions and assessment guidelines was successful. There was emphasis on communication between departments within the hospital for this exercise. However, the job action check lists and decision tools also encouraged staff to seek specific information related to evacuation or shelter in place decision making. One evaluator explained that this meant more purposeful communication between departments and more effective status updates.\textsuperscript{110} Departments were now gathering and relaying relevant information established by the critical decision factors.

**Methodological weakness, reliance on developed tools**

A significant challenge during the different research periods was the reliance on already established tools and evacuation planning. Additionally, my own gaps in knowledge for the

\textsuperscript{109} (HICSCenter.org, 2006)

\textsuperscript{110} (Alaska Regional Hospital, 2014)
specific subject matter hampered the ability to effectively analyze evacuation planning guides and different tools for the evacuation process. I relied heavily on case studies, Joint Commission research and regulatory literature to identify common weaknesses in the emergency management field from a Meta perspective. Specific guidance on which tools to use and how to incorporate them into the evacuation plan were gained through cooperation from the Emergency Preparedness Committee.

The evacuation tools and critical decision criteria were originally designed for hospitals in different situational circumstances than Alaska Regional. The largest difference was the expectation on advance warning disasters. Namely, hurricane type events where the hospital has time to consider expected effects of the disaster before the event reaches the facility. Because Anchorage has a significantly lower incidence of those types of risks the evacuation planning tools were edited and geared toward an emphasis on post-event assessment critical decision making. The factors in decision making were also appropriately adjusted to address the unique remote nature of Alaska and our reliance on long vulnerable supply chains for resources and communication. This information was easier to handle because it relied less on the nuts and bolts of evacuation planning and more on clearly defined risks and infrastructure vulnerabilities identified by infrastructure protection planning entities.

\[111\] (California Hospital Association, 2010)
Exercise Conclusions and Recommendations

Major Strengths

Positive use of the new evacuation assessment tools.

The Incident Commander in collaboration with the Command Center staff actively used the decision making checklist/tools created for evacuation/shelter in place plan to gather and analyze data from the five key assessment criteria. The decision making tools were open, in front of the command staff during the exercise and were referred to frequently during periodic
briefings. The Incident Commander used them to gather information in a methodical, organized way. The Incident Commander was regularly referring to the evacuation/shelter in place plan to make sure he was capturing all the information needed.

**Positive change in the decision making dynamics**

When the Incident Commander recognized needed assessment information was slow to materialize, he actively sought to fill the gaps in information. This included intelligence from the Municipality about the community environment and internal status updates from damaged departments. Final decisions on evacuation vs shelter in place were not made until the incident commander and staff had a complete a picture of the key decision criteria. The Incident Command Team successfully initiated two horizontal evacuations of patient care units and one final vertical evacuation of all patient care units above the fourth floor. This was all based upon
information gathered and categorized according to the five key decision points. Transfers to decompress the patient census were arranged with area hospitals.\textsuperscript{112}

Feedback from the exercise participants and observations from the assigned command center evaluators discussed in the After Action Debriefing, noted that the new evacuation decision tools enhanced the decision making process and are recommended to be used as a permanent part of the evacuation/shelter in place plan at Alaska Regional Hospital.\textsuperscript{113}

**Organized Situation Report Documentation**

Evaluators in the command center noted that documentation gathered by the “Situation Reporter” during the exercise, was posted around the room on five separate charts. Each chart represented one of the assessment criteria. Staffing and patient bed status, supply resources, event characteristics, hospital infrastructure, and community environment status. This was not just a timeline log of events and information flowing into the Hospital Command Center, information was organized according to the decision making assessment criteria. As noted by exercise evaluators and planners, in past exercises, this documentation process had never taken

\textsuperscript{112} (Alaska Regional Hospital, 2014)  
\textsuperscript{113} (Alaska Regional Hospital, 2014)
this format and was strictly a timeline log of observations. This demonstrated filtering of information to be useful to the decision making process.

**Improved Communications: Hospital Command Center and Hospital Staff**

Evaluators noted that communications were greatly improved over past exercises. Evaluators pointed to the use of more detailed evacuation checklists and tools to guide staff in focusing on what to communicate, how to communicate, and with whom to communicate during the coordination of an evacuation or shelter in place situation.\(^{114}\)

**Primary Areas for Improvement**

Need for ongoing training in hospital incident command protocols and use of the evacuation/shelter in place plan and tools.

The hospital staff and management team will need to continue building familiarity with these new tools to more effectively employ them in the future. While the “just in time” training was effective for the introduction of new evacuation tools into this exercise, ongoing exercise of these tools will help strengthen the ability for any hospital administrator to step into the decision making role. One challenge that was clearly identified during the exercise was the need for cross training of different roles within the incident command system.\(^{115}\) While this is slightly outside the scope of the project, it is critically important that staff are cross trained in different roles within the Hospital Incident Command System to provide more command flexibility in the decision making process.

\(^{114}\) (Alaska Regional Hospital, 2014)

\(^{115}\) (Alaska Regional Hospital, 2014)
Participants and evaluators also recognized the strength of the incident command team run by an experienced incident commander. Evaluators noted that if a less experienced Incident Commander needed to step into the role, decision making and organizational integrity would be less efficient. The planning tools and critical decision making criteria are designed to be effective for anyone who steps into that role. Continued training to the evacuation plan and additional exercise for different administrators in expanded roles will create an adaptive hospital administrative leadership ready to assume any position within the incident command structure. The stronger and more flexible the incident command team, the better equipped they are to handle emergency management in a crisis.

Continued Refinement and Utilization of Job Action Checklists

The job action checklists for the section chiefs were not completely utilized. Each tool was built to help different section chiefs organize incoming information to better disseminate that information to the Incident Commander. They were also designed to help those section chiefs consider alternatives for the situational response and then relay those recommendations to
the Incident Commander. Disaster status information was injected into the exercise using bright orange sheets. On rare occasions command staff simply handed these injects off to the incident commander without applying the information to their planning documents.\textsuperscript{116}

This is most effectively achieved by building familiarity with the tools and additional training in the internal operation of the Hospital Command Center. The content within the evacuation plan tools, checklist, and decision criteria can all be edited.

This research and follow up exercise was a starting point for development and use of the evacuation plan and tools. One recommendation discussed in the After Action Debriefing with participants and evaluators was to conduct a follow up exercise that emphasizes use of the evacuation job action checklists over a longer exercise. This was an exercise compressed into a short period of time. It was suggested that a longer exercise would allow participants to more fully utilize their tools and job action checklists.

\textbf{Utilization of the 96 hour Sustainability Tracking Tool}

This was a new chart created for this exercise, based upon the updated HICS 251 Infrastructure Status reporting form, to provide a quick summary visual on one large spreadsheet format of the changes in infrastructure status as they occur and enable the command team to better predict the sustainability of infrastructure resources. It was not utilized in the drill and as a result it was difficult for the Command team to keep track of the rapidly changing infrastructure status and remaining amount of backup fuel or water or other resource.

The exercise evaluators and participants suggest focusing on the use of this tool in a follow up exercise. It is also recommended that this tool be utilized electronically if possible in a

\textsuperscript{116} (Alaska Regional Hospital, 2014)
disaster in addition to the paper format. Considering this was the first chance for the Incident Command team to use these new tools in a full scale exercise, it is understandable how some of them might be missed or not fully utilized. Additional training, further exercise, and continued application of the tools can help overcome these issues. It is the recommendation of this report that additional training for these issues be conducted both through more exercise and through the refinement of the tools.117

**General Summary**

The Alaska Shield 2014 full scale hospital exercise was a success. The overarching goal of providing Alaska Regional with guidance on a revised evacuation shelter in place plan was achieved. The evacuation plan will continue to need refinement for both content and the user interface. The Emergency Preparedness Committee are the driving force in identifying areas within the evacuation plan that can be improved. This report will be shared in combination with the full Alaska Regional Hospital Exercise After Action Improvement Plan with the State of Alaska DHSS Emergency Preparedness Section as a requirement of participation in annual federal disaster grant funding. Additionally the report and evacuation plan and tools will be shared with Alaska Regional Hospital’s coalition partners in the Joint Medical Emergency Preparedness Group.

The emphasis on any disaster management plan is continuous program improvement through updated planning tools and ongoing training. The content within the emergency plan is constantly evolving as the hospital and the community change. As the hospital infrastructure is updated and redundancies are built into the system additional information will need to be added

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117 (Alaska Regional Hospital, 2014)
into the evacuation plan. Furthermore, as different vulnerabilities are addressed through new
technology and training, the factors associated with the critical decision making criteria change.
In essence the emergency operations plan, the evacuation plan and the new tools within the
overarching Emergency Operations Plan represent a living document that changes and evolves
along with the hospital and community it serves.

References
Agency for Healthcare Research and Quality. (May 2010). Hospital Evacuation Decision Guide. Rockville,
University of Alaska.
Alaska Partnership for Infrastructure Protection. (2010). Natural Hazards Briefing For Alaska. Anchorage:
Partnership for Infrastructure Protection.
Partnership for Infrastructure Protection.
for Infrastructure Protection.
Alaska Regional Hospital. (2013). Our History. Retrieved from Alaska Regional Hospital:
http://alaskaregional.com/about/index.dot
Alaska Regional Hospital. (2014, March 12). 96 hour Infrastructure planning document. Anchorage,
Alaska: Alaska Regional Hospital.
Hospital.
Alaska Regional Hospital Emergency Management Committee. (2014, 03 28). Evacuation Tools and
Alaska Regional Hospital Emergency Preparedness Committee. (2013). ANCHORAGE EARTHQUAKE
HEALTHCARE EXERCISE AFTER ACTION REPORT. Anchorage.
Viejo, CA 92656-4109: American Association of Critical-Care Nurses.


Committee, M. o. (2014, March). Committee meetings. (D. Chadwick, Interviewer)


Trinity University. (n.d.). *Jensen’s Technology Glossary.* Retrieved from Trinity University: http://www.trinity.edu/~rjensen/245glosf.htm#Pointer


