

THE SIMULTANEOUS EVACUATION OF A MIDWESTERN COMMUNITY'S MULTIPLE  
HEALTHCARE FACILITIES DURING A MAJOR FLOOD EVENT:  
A STUDY IN DECISION-MAKING AND IMPLEMENTATION

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Title

SIMULTANEOUS EVACUATION OF A MIDWESTERN COMMUNITY'S  
MULTIPLE HEALTHCARE FACILITIES DURING A MAJOR FLOOD EVENT:  
A STUDY IN DECISION-MAKING AND IMPLEMENTATION

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**DOCTOR OF PHILOSOPHY**

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## **ABSTRACT**

Natural disasters are a part of the ecological system, so they are beyond human control. To reduce devastating effects, researchers in Emergency Management seek to understand the causes and cycles of natural disasters so that warning systems may be improved and better advice may be given to the general public about protecting themselves and their property. Emergency management is a relatively new discipline, so much research is still needed to understand the complex interaction of human activity and the natural environment. Therefore, this study was designed to explore the impact of the 2009 flood on the healthcare system in Fargo, North Dakota, and Moorhead, Minnesota, when many health facilities were evacuated. This research is unique because it examined the simultaneous evacuation of multiple healthcare facilities: two Fargo hospitals, all Fargo nursing homes, and the largest Moorhead nursing home. A qualitative approach was used: 27 in-depth interviews were conducted with leaders of the healthcare facilities and other involved parties (e.g., community officials, ambulance providers, public health personnel) to understand their decisions and actions as a record flood triggered evacuations. The researcher found that (1) the healthcare facilities had done minimal pre-planning and preparation for the flood, even though the area had been threatened by previous flooding, and (2) each facility wasted time and resources by working independently to arrange transportation and to locate alternative healthcare facilities to house their patients. The recommendation is made that healthcare facilities coordinate their efforts during natural disasters.

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Finally, I must thank those who participated in my research, especially the representatives of Success Ambulance Service and Fargo Cass Public Health who spent valuable time recalling events from 2009.

## **DEDICATION**

I dedicate this work to my daughter,

Rojin Berwari,

whom I love more than anyone on earth.

I owe her a lot for spending much time on this dissertation,

when I should have spent more time with her instead.

I hope this will motivate her to become a great scholar,

and I wish her the best of luck.

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## CHAPTER ONE. INTRODUCTION

The winter of 2008-09 was one of the most severe winters in the history of the North Dakota/Minnesota Red River Basin. Massive snowfall caused record spring flooding that warranted a presidential disaster declaration (FEMA, 2009). As the flood worsened, local authorities discussed completely evacuating the largest U.S. metropolitan community in the basin, Fargo, North Dakota, which included three hospitals and numerous nursing homes. Initially, two health institutions, Hospital A and Hospital B, closed their doors and all of their local clinics, and each one opened an emergency care center. Eventually, Hospital A and Hospital C evacuated all of their residents (Minda, 2009), and Hospital B decided to shelter-in-place (Fink, 2009). In addition, all of the nursing homes in Fargo (Bursack, 2009) and the largest nursing home in Moorhead (Shah, 2009) were evacuated.

The evacuations occurred in the midst of a severe winter storm and rising water levels, as multiple healthcare facilities simultaneously relocated their patients and residents to facilities outside the community. The unique situation provided a rare opportunity to study healthcare facility evacuations. To the author's knowledge, no other study has been done of multiple healthcare facilities facing such dire circumstances: the need to make simultaneous decisions to evacuate when they had no prior evacuation experience, when their entire community was threatened, and when nearby communities did not exist to accommodate evacuees. In addition, both hospitals and all the nursing homes had to use the same, limited transportation services to move their residents. Thus, the present study examines the evacuation decision-making and the experiences of multiple healthcare facilities in a unique flood event and setting.

The remainder of this introductory chapter provides a day-by-day chronology of events leading up to the evacuations so that readers may understand the socio-historical context and



what the Fargo-Moorhead community and its healthcare facilities faced from the beginning to the end of the 2009 flood.

### **February 6**

The earliest flood warning was given on February 6, 2009, in the article, “Major Flood Risks Rises: Cities ready,” published in *The Forum of Fargo-Moorhead*, the largest newspaper in the in area. Springer (2009a) stated, “The city of Fargo is cranking its flood protection machine as the risk of a major spring flood on the Red River now stands 50 to 75 percent.” The National Weather Service began to alert officials in the Fargo-Moorhead area to be vigilant and to begin flood preparations.

### **February 10**

The National Weather Service in Grand Forks issued a winter weather advisory (Nowatzki, & Polacca, 2009). The forecast predicted rain that would turn to snow for an accumulation of up to three inches in the Fargo-Moorhead area, which would make travel difficult through parts of North Dakota and Minnesota.

### **February 11**

The likelihood of spring flooding increased because the combination of rain and warm temperatures accelerated the snowmelt and moved water to the river. Nowatzki (2009a) indicated, “The runoff is evident in the Red River at Fargo, which rose 3 inches from Sunday to Tuesday afternoon – a sizable jump” (p. A10).

### **February 28**

Nowatzki (2009b) reported that the National Weather Service predicted a 90 percent possibility that the river would rise higher than 32.3 feet and that Fargo City officials had decided to build a dike if the river level rose to 31 feet. The Fargo mayor stated that the city

would build the dike unless a dramatic change happened, and he warned that the “outlook predicts March and April may be wetter and colder than normal – with the threat of ‘significant’ rainfall near the time of spring melt – because of continuing La Nina conditions.” The mayor also added that those conditions were similar to conditions in spring 2006 that led to a river crest of 37.13 feet.

### **March 3**

Polacca (2009a) reported in *The Forum* that Cass County Commissioners on March 2 voted 4-0 for a countywide disaster declaration that would allow departments and employees to devote time to prepare for the coming flood. The commissioners also provided \$400,000 from the county emergency fund for flood preparations. A city engineer said that the emergency declaration created the opportunity to build levees as needed when the water levels rose.

### **March 4**

Nowatzki (2009c) wrote that, by the end of February, “the number of flood insurance policies in effect in Fargo was 586, or 27 more than at the end of November, according to the most recent FEMA figures available” (p. C1).

The meteorological winter season in Fargo-Moorhead area started on December 1 and extended through February 28. The winter of 2009 brought 48.9 inches of snow, which was the fourth snowiest winter on record, according to meteorologists. The 2009 winter was also the third wettest winter on record with 3.64 inches of liquid precipitation (Nowatzki, 2009d).

### **March 5**

The National Weather Service announced a 60 percent chance that the Red River would rise above 35.1 feet in Fargo and a 10 percent chance that it could rise above 38.5. Officials encouraged residents to buy flood insurance; however, a flood insurance specialist explained that

residents would have to wait 30 days after the purchase date in order for the policy to go in effect (Polacca, 2009b).

### **March 9**

*The Forum* announced that the Weather Service predicted a blizzard for Fargo that would bring 8-10 inches of new snow, dangerous wind chills of -35 degrees Fahrenheit, and wind gusts up to 40 mph. Blizzards lead to a falling and/or blowing snow accompanied by strong winds and poor visibility (“Blizzard Could Bring,” 2009, March 9).

### **March 10**

*The Forum* article, “Blizzard Boosts Worries in F-M,” reported that the blizzard would add 6-10 inches of new snow in much of eastern North Dakota and western Minnesota (Nowatzki, 2009e). Schmidt (2009a) reported a 50/50 chance for a major flood of 35 to 36 feet in Fargo and commented that the “National Weather Forecast Service flood forecasts are worrisome” (p. C1). He quoted an official who believed that the flood crest would be even higher.

### **March 11**

Lamb (2009a) reported that the March 10th blizzard slowed traffic in the Red River Valley and closed schools, businesses, and government offices. After 1:00 pm, the police department and sheriff announced a no travel advisory for as long as the storm continued. The blizzard was accompanied by cold weather and wind gusts up to 23 mph.

### **March 12**

Experts from the city of Fargo and Houston Engineering recommended building a floodwall that would cost \$37 million to protect property along the river. Smith (2009b)

explained that the height of the wall would reach the level of “a 100-year flood plus three feet” (p. C1).

### **March 14**

News reports continued to warn of impending disaster. Schmidt (2009c) reported that he prediction of a Fargo flood crest jumped three feet in only one week and that the National Weather Service predicted a 50 percent possibility that the river would hit 38 feet by the middle of April. The situation prompted Tim Bertschi from the U.S. Army Corps of Engineers to state, “If that happens, it would become the third-highest flood on record” (qtd. in Schmidt, 2009c). A level of 30 feet is the major flood stage for the Red River at Fargo. Before 2009, the highest recorded level in Fargo was 39.5 feet in 1997 (Schmidt, 2009c).

### **March 15**

North Dakota Senator Byron Dorgan and North Dakota Governor John Hoeven assured Fargo officials that funds would be available not only to prepare for the 2009 flood but also to permanently protect the communities from flooding. Senator Dorgan said that they had to steer the river through North Dakota communities safely by using federal, state, and local resources. The National Weather Service (NWS) predicted a 50 percent chance that the Red River would reach 38 feet in Fargo and a 90 percent chance for major flooding. The Fargo mayor stated, “After six months of higher than normal prediction and lower than normal temperature, more rain or snow would be bad news” (as cited in Schmidt, 2009d, p. C1).

### **March 17**

Another major storm was predicted to bring more moisture to the North Dakota plains, so authorities warned residents well in advance. The National Weather Forecast announced, “The

storm is still several days away, and it is too early to tell exactly where it will go or how much rain or snow it may dump on the valley” (Nowatzki, 2009f).

In both Fargo and Moorhead, flood fighters started building levees to protect at-risk neighborhoods. Moorhead residents were encouraged to buy sand and sandbags. Fargo county officials closely watched weather forecasts and began building levees that extended almost two and half miles (Olson and Springer, 2009).

### **March 18**

Water levels were rising and causing roads to flood as a result of a quick snowmelt *The Forum* announced that the Clay County Commission had declared a state of emergency on Tuesday, March 17, which meant that the county would provide resources for local government officials to fight the flood (Olson, 2009a).

### **March 20**

On Friday, March 20, Nowatzki (2009g) reported that Fargo leaders were scrambling for resources and announced that the city needed volunteers to prepare for a Red River crest of 37-40 feet between March 28 and April 1. Forecasters predicted a rain storm on Sunday night that could “dump 0.75 to 1.5 inches of rain on large areas, with localized areas of up to 2 to 3 inches possible” (Nowatzki, 2009, p. A1). The rain would speed up the snow-melting process that would be in full swing by the weekend when the temperature would reach the low 50s. On Friday, March 20, volunteers would begin filling sandbags in Fargo. The mayor of Fargo was quoted as saying, “To say that we are inadequate, I think it is a misnomer... We’ve done what we can” (p. A6). After the prediction of rain, the Moorhead mayor called for sandbag efforts to start, as well, because it would be wrong to wait at that point (Nowatzki, 2009g).

Both Fargo and Moorhead started massive efforts to protect their cities. Fargo city leaders announced the need to create one million sandbags before March 28, and the mayor stated that they hoped to fill a total of 1.5 million sandbags. Nowatzki (2009h) reported that volunteers were needed between 8:00 a.m. and 8:00 p.m. each day to fill enough bags to protect the city up to a river level of 40 feet. Moorhead city officials announced that the city would provide sand and sandbags for Moorhead residents to protect their property.

### **March 22**

Gunderson (2009) from Minnesota Public Radio stated, “It appears the flood will strike Fargo-Moorhead the hardest of any community when it reaches its expected crest on Friday. Forecasters say the Red River could reach 41 feet—the highest river level ever recorded in Fargo-Moorhead.” The Moorhead mayor said that flooding in Fargo-Moorhead is generally a slow process and that the community usually has two to three weeks to prepare for flooding, but only one week was available in 2009 to make preparations before the river would overflow its banks. Fargo officials estimated that they needed to fill 400,000 sandbags per day to meet the challenge. The Corps of Engineers had to build a number of new earthen levees and to raise a number of existing dikes by adding sandbags. A representative from the U.S. Army Corps of Engineers explained, “The Corps is working on hiring additional contractors. We're working on getting more trucks into town. We anticipate we are three to four days to get to the levels to protect us to 42 feet.” City officials asked businesses in the area to allow their employees to volunteer to fill and stack sandbags.

As the powerful storm threatened the area, sandbagging efforts were intensified (Springer, 2009b). In a flood information meeting, the Fargo mayor expressed satisfaction over what had been done so far, but he also urged more residents to volunteer to fill and stack

sandbags. In Fargo, dike builders were trying to get as much work done as they could before the storm. According to a forecaster, rain would begin on Sunday evening, March 22, and continue until it turned to snow and ended on Wednesday.

The news media reported that people in Fargo-Moorhead area were comparing the flood situation to the 1997 flood. Fargo officials said that they had used 3.5 million sandbags to fight the 1997 flood, and Moorhead officials said that they had used one million. Water levels had reached 39.57 feet in 1997 and 40.1 feet in 1897 (Olson, 2009b).

### **March 23**

On Monday, residents of Fargo-Moorhead increased their efforts to fight the flood because Sunday's prediction indicated that the river could crest one day earlier and could reach 39-41 feet, which was one foot higher than earlier predictions. The mayor of Fargo called for more volunteers (Springer 2009c).

Olson (2009c) reported that Moorhead officials issued urgent requests for volunteers to fight the worst flood in Clay County's history. The City of Moorhead asked employers to allow their employees to volunteer to fill sandbags if employees chose to do so. The Clay County Sheriff's office explained that 30 roads were under water, and residents were advised not to drive on flooded roads.

### **March 24: Red River Level at 32.4 Ft.**

Fargo-Moorhead officials estimated that more than ten thousand people had volunteered to help the city on Monday, March 23—the number did not include those who had helped individual friends and neighbors. Barely enough buses were available to move volunteers to and from the sandbagging and diking sites, yet officials continued to express the need for more

volunteers by putting a notice in *The Forum*. Many volunteers came from outside the Fargo-Moorhead area (Dalrymple, 2009).

On Monday, March 23, volunteers to strengthen levees and fill more sandbags included students, soldiers, neighbors, and members of the general public. Officials continued to warn residents that the area would receive more moisture, and the National Weather Service continued to predict that the river would rise to 39-41 feet (Nowatzki, 2009i).

### **March 25: Red River Level at 36.6 Ft.**

On Wednesday, March 25, the Fargo mayor called for another major volunteer effort to provide dike builders with sandbags. The weather was cold, and more rain and snow was expected to fall overnight. Fargo officials wanted to protect all city areas up to a 42 foot flood stage (Nowatzki, 2009j).

Fargo officials started asking residents to prepare for possible evacuation in case the levees failed to protect the city from the continuously rising water. Officials had not yet completed contingency and evacuation plans, but the Fargo Police Chief said that half of the Fargo population could fit into the Fargodome. Fargo officials divided the city into 6-10 sections in order to handle the needs by area. On the Moorhead side, a team from Minneapolis/St. Paul had arrived to help design evacuation plans (Lawonn, 2009a).

Fargo officials believed they had successfully completed a sandbag wall that was high enough to protect the city from the quickly rising river water until the National Weather Service announced that “the river was rising higher than predicted, possibly to its highest point ever recorded.” The Fargo mayor asked volunteers to continue filling sandbags through the night. Flood fighters needed hundreds of thousands of additional sandbags because the 12 mile long levee protecting the city needed to be raised one foot higher. Snowing began falling heavily, and



snowplows did their best to clear roads. Officials were concerned that the sandbag piles would not hold back the river water when the bags froze. Political leaders held an emergency meeting in the late afternoon to finalize their evacuation plans so that they could announce the details on the following day. The mayor said that no one had ever before tried to evacuate the 90,000 people in Fargo—North Dakota’s largest city (Davey, 2009).

**March 26: Red River Level at 39.6 Ft.**

According to Olson (2009d), the Fargo Police Department created the “Fargo Plan” by dividing the city to seven sectors. If dikes broke in any of the sectors, several “Code Red” systems would be used to notify residents, including an automated telephone system, warning sirens, and television and radio announcements through the Emergency Broadcast System (p. A1). Residents would be advised to move to higher ground and directed to shelters, if needed. Olson (2009d) explained that the Fargo Police Department was working with the Fargo School District and the American Red Cross to “identify shelters in areas above a 42-foot flood stage” (p. A1).

On Thursday March 26, Lawonn (2009b) reported that Nursing Home C (the largest nursing home in Moorhead with 400 residents) started evacuating. The president of the nursing home said that they relocated the 400 residents as a pro-active step because they did not want to risk having to move such a large number of residents to safety during a crisis. Lawonn (2009b) stated that Fargo administrators of the three hospitals were “trying to keep patient numbers down and have evacuation plans in place” (p. A4).

According to Smith (2009a), the nation was watching as the Fargo-Moorhead flood intensified: “Barack Obama, moved by news and photos of the Red River Valley flooding, reassured his support on Wednesday” (p. A6). Also on March 25, a delegation including North

Dakota Senator Kent Conrad and Representative Earl Pomeroy met with President Obama. They thanked the President “for immediately issuing a federal disaster declaration ‘in record time’ Tuesday” (p. A 6).

### **March 27: Red River Level at 40.7 Ft.**

On March 27, on the first page of *The Forum*, Nowatzki (2009k) stated, “Residents in Fargo, Moorhead and surrounding area were fleeing their neighborhoods and homes Thursday night, seeking higher ground after learning of the new Red River crest forecast of as high as 43 feet.” Police, firefighters, and members of National Guard evacuated a senior living center and about 40 homes after flood fighters found cracks in an earthen dike. Fargo officials “also banned travel on all major arterial roads throughout the city in an attempt to keep traffic, which clogged roads throughout the day Thursday, to a minimum” (p. A 1). In Moorhead, the situation was slightly different because Minnesota state law does not allow authorities to issue a mandatory evacuation order. The Moorhead city manager strongly urged some neighborhoods in south Moorhead to immediately evacuate their neighborhoods.

Fargo officials announced contingency plans to evacuate the entire city by sectors, if necessary. Leaders planned to send evacuation notification plans to the Code Red phone notification system and the Emergency Broadcast System. Sirens would go off if a dike breached. Contingency evacuation plans explained that evacuees needed to respond immediately if warned and to follow the evacuation routes. They also were told to listen to their car radios for updates. The plans explained the routes for each sector (Springer, Smith, & Lawonn, 2009).

Springer (2009D) reported that Hospital A was staging its inpatients to be evacuated, but it continued to keep its emergency room and a number of clinics open. At 8:30 p.m., Hospital A started evacuating its 180 inpatients from its two campuses on Broadway and South University

Drive. The vice president of Hospital A explained that the evacuation decision was difficult and that they had consulted with local, state, and federal officials before finalizing their decision.

Hospital C had planned to shelter-in-place throughout the flood because they had a power generator, food, and other supplies that could last for many days. The Hospital's plan was to transfer inpatients to upper stories, if needed. However, Minda (2009) reported that hospital administrators changed their plans and sent patients to four hospitals in North Dakota and Minnesota (Minda, 2009).

Within twelve years, the Fargo Moorhead area had endured two record floods at the 100-year level--in 1997 and 2009. In late March, one storm dumped twelve inches of snow in parts of western North Dakota. Morast (2009) wrote, "times are tense right now. So much so that it can be easy to wonder this never-ending winter of agony is a signal of greater doom" (p. B2).

In Minnesota, state leaders applauded President Obama's decision to grant their request for federal disaster assistance for seven counties—including Clay County where Moorhead is located. The declaration was very important because it set the stage for Washington to provide flood-relief resources (Wente, 2009).

### **March 28: Red River Level at 40.8 Ft.**

According to Smith (2009b), the Secretary of U.S. Homeland Security, Janet Napolitano, stated in a conference call that resources would be available to help, if the worst occurred. Describing what the Fargo-Moorhead area might look like if the levees gave way, the secretary reassured the Fargo-Moorhead community that the nation was ready to provide emergency assistance. She said, "We have food and water in place or nearby right now that would support 30,000 people for a week... We will assist in any way that we can" (p. A3).

A “mandatory” evacuation advisory was issued by Cass County Commissioners on Friday (March 27) for nine neighborhoods. The word, “mandatory,” in the evacuation advisory did not mean that people in those areas had to leave or they would be forced to leave. Instead, officials explained that “mandatory” meant the situation was very serious in those areas and that assistance could not be guaranteed if people chose to stay and needed help later on.

The Cass County Sheriff’s office rescued 23 people on Friday, and another evacuation order was issued for two neighborhoods in south Fargo due to a crack in a dike along the Red River. Authorities alerted the residents of the two neighborhoods around 2:00 am. Police officers and fire fighters went door-to-door, informing residents of a levee’s possible compromise. Residents evacuated early Friday morning, and the Fargo Police Chief said that most people in the two neighborhoods were cooperating, and some were even prepared to evacuate (Dalrymple, & Nowatzki, 2009).

A staff member from the North Dakota Governor’s Office said that approximately 2,000 North Dakota National Guard members had been sent to Fargo. The Guard personnel were needed to help in many areas such as traffic control and dike patrol. More than 500 National Guard members were activated to help in Moorhead and Clay County (Dalrymple, & Smith, 2009).

### **March 29**

Olson (2009E) reported that a permanent dike gave way so that water poured into two of the five buildings of the Oak Grove Lutheran School in Fargo. A member of a dike watch team spotted the leakage. Fargo officials issued a press release in which they recommended that residents near the school plug their sewer lines and monitor their basements. The city did not issue an evacuation order.

Schmidt (2009 E) reported that the river crested slightly lower than predicted on Saturday March 27. While people were cautiously optimistic, officials in both Fargo and Moorhead urged people to be vigilant and closely watch the dikes. The National Weather Service was predicting another storm that could bring another six to eight inches of snow.

Roepke (2009) reported that the rising Red River water was exerting pressure on sewer lines in some areas, so homeowners were told to monitor their sump pumps constantly. One resident explained the stress: “These are the long hours when you just wait and see and hope and pray....You’ve got to recharge the battery. If the pump stopped, in five minutes you would be standing in water” (p. C3).

### **March 30**

Lamb (2009b) reported that Fargo officials were calling for volunteers to restart the sandbagging operation after they had ceased the operation for two days. The goal was to fill 500,000 additional sandbags for emergency use. Volunteers started showing up at 8:00 am. By noon, about 2,000 volunteers were at Fargodome, and the number of volunteers grew to 3,500 by 6:30 pm. By 2:00 pm., they had filled 250,000 to 300,000 bags, but city officials announced that they would continue sandbagging through the night until 8:00 am.

Nowatzki (2009l) stated that Fargo leaders refused to evacuate the city even though they were facing a great deal of pressure from the federal government, specifically the Department of Homeland Security. The mayor defended their decision by explaining that they expect some losses, but abandoning the city would be disastrous. They had invested too much in the process of protecting the city to give up the fight.

## **March 31**

Olson (2009 F) reported a National Weather Service prediction that another snowstorm would dump 12 inches of snow by early April. In Moorhead, a city engineer told people not to take down their dikes because “a second crest was ominous,” and he encouraged them that “there’s time to do extra work between now and the middle of April” (p. A1).

Olson (2009 G) stated that, “Fargo officials and representatives of the city’s medical community talked of taking steps toward normalcy Monday even as the area braced for a blizzard and mulled news of a second Red River flood crest in April” (p. C3). The executive vice president of clinical services at Hospital A explained that Hospital A had started admitting patients via its emergency room on Monday morning. The chief administrator of Hospital B relayed that Hospital B had started providing both urgent care and primary care at three sites on Monday and was going to reopen all other medical facilities on Tuesday. The CEO of Hospital C said that his hospital was planning to reopen on Tuesday. Fargo Cass Public Health officials were working with the hospitals, nursing homes, and other healthcare facilities to develop a plan to return more than 2,000 evacuees back home.

## CHAPTER TWO. LITERATURE REVIEW

Disasters can be divided into natural and human-made. Human-made disasters are the direct result of human actions. Even natural disasters occur partially as a result of humans interacting with nature. While we cannot always prevent a disaster from occurring, humans can take steps to minimize the impact—steps such as mitigation, preparedness planning, effective response, and recovery. Major disasters clearly reveal how much human work remains to be done to understand how best to address each of these phases.

One such disaster, Hurricane Katrina, made the need to effectively plan evacuations particularly salient in [what year?]. More effective evacuation procedures during that disaster might have saved many more lives, but, unfortunately, the preparations were extremely inadequate for such an “unusually powerful storm” (Gray and Hebert, 2007). The failure to fully prepare for evacuation before Hurricane Katrina reached the coast led to one of the worst tragedies in the nation’s history—a final death toll of ???.

Two specific examples illustrate the dynamics of evacuation decision-making associated with facilities caring for physically and/or mentally fragile individuals who are dependent on others to make and implement evacuation decisions. In Chalmette, Louisiana, 34 residents in the St. Rita nursing home lost their lives because the owner of the nursing home refused to evacuate (Dosa, Grossman, Wetle, & Mor, 2007). Similarly, much attention was garnered by Charity Hospital and the challenges faced by its staff in attempting to evacuate (Berggren, 2005).

The present study focuses on a Midwestern community, Fargo, North Dakota and sister city Moorhead, Minnesota, where various medical institutions faced the decision of whether to evacuate in 2009 during a major flood event. All of the decisions made were ultimately successful in the sense that patient well-being was preserved (i.e., there were no fatalities

associated with the decisions made and few, if any, injuries), but the decisions were not all the same. Two hospitals and all of the nursing homes in Fargo and the largest nursing home in Moorhead chose to evacuate, while a third hospital did not evacuate. Whether the decisions to evacuate or not were correct in the moment, is outside the scope of the present study. The assumption going into data collection was that significant numbers of staff members at each of these institutions would be likely to view their institutions' overall decisions as successful, at least in the absence of obvious negative outcomes such as injuries or fatalities.

Admittedly, this definition of success is minimal. The possibility certainly exists that at least some staff members viewed the decision to evacuate as a poor one, regardless of the outcome. Thus, medical personnel at these institutions were asked in the present study to identify what they perceived to be responsible for their institution's success or what they perceived to be reasons why a poor decision did not go seriously wrong. The reasons for this focus on "success" or the absence of significant failure will be presented below.

Evacuations of medical facilities make the news as rare and often dramatic events. Unfortunately, the drama may be due to difficulties involved in the evacuation or a decision not to evacuate that went seriously wrong. Thus, the present study, in contrast, focused on several apparently successful evacuation or non-evacuation decisions and asked the involved medical personnel and other involved parties in Fargo-Moorhead area what they perceived to be the reasons for success and/or the absence of significant failure.

This focus makes the present study unique in several additional ways. First, the institutions in question had done, at best, minimal pre-planning and relatively few evacuation exercises, so this study attempts to identify why the outcomes were either positive or not as bad as they could have been. Success or the absence of a major mishap in the face of minimal



preparation raises the question of how success was still achieved. Emergency management research often focuses on what went wrong due to poor preparations, but the present study examined what went right where the response was largely improvised. Specifically, the present study examined the perceptions among health facilities' staff and other parties involved in fighting the 2009 flood about the reasons for positive outcomes and/or the absence of major negative outcomes. Thus, this study attempted to answer a key research question: What factors do medical personnel in these institutions perceive to have played a role in their institution's "success" in evacuating or not evacuating their facility? The intent was to explore medical personnel's definition of the situation with respect to their institution's decision outcomes. Whether the perceptions of the medical personnel were correct or not is not a focus of the study. The perceptions were the focus because the perceptions are likely to play a role in future evaluation-related decision-making. Thus, emergency managers working in or with these medical institutions need to understand such perceptions in order to work effectively in assisting with such decisions.

Second, the present study is unique in its inclusion, in the same study, of several medical facilities responding to the same disaster. The facilities that chose to evacuate included a major hospital that is listed among the 100 top hospitals in the nation and two nursing home facilities ("MeritCare," 2009). This comparative aspect of the present study sets the stage for a second key research question: Among several medical institutions involved in the same threatening situation, to what extent are the "success factors" perceived by each evacuating institution's medical personnel unique or common across cases? In other words, are explanations of "success" robust across institutions?

Third, a smaller hospital in the same threatening event successfully decided not to evacuate. To sit still and face a disaster head on was a difficult decision that leads to a third research question: To what extent are the factors perceived by the medical personnel in the non-evacuating hospital to have led to a successful decision similar or dissimilar to the perceived success factors identified by the evacuating medical institutions?

Finally, the present study is unique among studies of hospital evacuations in its inclusion of participants from the transportation company that implemented the evacuation, a private ambulance company, and other involved parties including Fargo Cass Public Health, Clay County Public Health, and others. Interviewing personnel associated with this company allowed the researcher to cross-validate some of the perceptions of medical personnel with respect to both the perceived success of the evacuation and the factors perceived by medical personnel to be the keys to the apparent success of their institutions' evacuation decisions.

An underlying interest behind the above research questions involves improvisation. The evacuating institutions in the present study had not engaged in an actual evacuation before. Furthermore, these institutions had done few recent drills or exercises related to evacuation. Presumably, this meant that the actual event involved considerable improvisation, at least for those institutions that did evacuate. Explanations of success, therefore, might be expected to focus on factors other than preparedness, planning, and/or prior exercising. The author is unaware of any prior research that has explored how participants explain their success following such improvised efforts.

To address the research questions, the next section reviews the relatively sparse literature on medical evacuation, which generally focuses on perceived barriers to successful evacuations and on case studies of actual evacuations. Finally, this chapter concludes with a review of the

literature on improvisation, which provides a context for understanding what happens during improvised events and provides background for interpreting the perceptions of the medical personnel.

### **Medical Institutions and Disasters: An Overview**

Generally, health systems play an important role during disasters Bagaria, et al. (2009) state that health institutions mirror the nation's well-being and social progress and that the sense of security and social progress plays a significant role in setting the stage for stability and national economic growth. Gray and Hebert (2007) state that hospitals are part of the solution.

In contrast, Schultz, Koenig, Auf der Heide, and Olson (2005) present the concept of "hospital as victim" because hospitals are vulnerable to disasters, just as other institutions and or agencies are. For example, terrorist attacks and earthquakes may force hospitals to evacuate their patients. Chavez and Binder (1996) discussed the concept "hospital as victim" in the 1990's. However, the concept triggered much discussion among disaster scholars in the United States mainly after Hurricane Katrina (Schultz et al., 2005).

In order to ensure that hospitals can play the expected role in dealing with disasters, we have to make sure that our hospitals are well-prepared to respond to disasters. Sternberg, Lee, and Huard (2004) indicate that hospitals are, like police stations and emergency operation centers, considered to be essential facilities that are necessary for a community to respond to a disaster. What makes hospitals and nursing homes relatively unique with respect to evacuation is that their occupants generally need physical assistance to evacuate and the process of evacuation could be injurious to occupants' well-being.

## **Medical Institutions and Evacuations**

In 2004, Sternberg, Lee, and Huard (2004) examined hospital evacuations in the United States from 1971 to 1999. Within this period, there were 275 reported cases of hospital evacuations, of which only 9 led to one or more fatalities. California led the nation with 77 hospital evacuations. Florida was second with 29, followed by Texas with 15, Louisiana with 14, Massachusetts with 12, and Washington State, South Carolina, and New Jersey with 10 each. The main cause for hospital evacuations in California was earthquakes (26 out of 77 incidents), followed by internal and external HazMat incidents (22 out of 77 evacuations). In Florida, the main reasons for evacuations were hurricanes (18 out of 29). Across all evacuations, only three cases involved 1,000 or more evacuees.

In major disasters, evacuation is often the only safe way to ensure the safety of the patients. These evacuations, as the state level data imply, can be triggered by a variety of factors. Nevertheless, Barnett, Dennis-Rouse, and Martinez (2009) point out that the Hospital Incident Command System (HICS) used by hundreds of hospitals in America does not include much information about evacuating hospitals.

## **Evacuation-Triggering Events**

Dealing with disasters generally depends on the scope and intensity of the disaster. In certain disastrous situations, simple procedures may be enough to keep a health facility safe and able to meet the needs of its patients during the disaster. In other situations, a health facility may have to carry out plans such as sheltering in-place and partial evacuation, which could be either vertical or horizontal. In extreme situations, a health facility will have to evacuate the entire facility and possibly move patients out of the town. Thus, evacuations may be caused by either internal or external disasters with respect to the hospital facility's physical structure.

## **Internal Events**

Internal events include, but are not limited to, hazardous materials, fire, and improper use of sensitive materials. Most health facility evacuations are triggered by internal events, and most internal events are caused by hazardous materials. According to Sternberg, Lee, and Huard (2004), the most common threat to the functionality of hospitals is severe internal interruption. In a study of 275 hospital evacuations, they found that internal crises were the cause of 162 incidents, which is 56 percent.. Results also indicated that “[f]orty-five percent of cases, not counting incidents of human threats, originated within the hospital facility” (p. 155). Similarly, Burgess (1999) studied 101 hospitals in Washington State and found out that 12 out of 101 hospitals had been partially evacuated due to hazardous materials between 1995 and 1999. Hospitals may face evacuation when they release hazardous materials or when they treat contaminated patients because health facilities are often not well-prepared to deal with such issues without adequate warning. Hospitals might also lack information about the chemical toxicity of some materials.

The term *hazardous materials* represents a broad category. Burgess et al. (2001) define hazardous materials as “chemicals, substances, materials, or waste that may pose an unreasonable risk to life, health, safety, property, or the environment.” According to the U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA), hazardous materials can be found almost anywhere because they are used for many practical purposes such as water purification and disinfection. Improper use, production, storage, transportation, release, or disposal of chemicals can be hazardous to plants, animals, and humans. Hazardous materials are also present in substances that are explosive, flammable, combustible, poisonous, and radioactive. Such materials are commonly used in many medical procedures. Consequently,

medical facilities deal with many crises caused by hazardous materials, such as chemical spills, laboratory explosions, and fire. The levels of toxicity and the risk of morbidity or mortality vary greatly between materials (U.S. Department of Homeland Security (2012a)).

To protect the public, Congress created the Agency for Toxic Substances and Disease Registry (ATSDR) in 1980 to implement laws that regulate hazardous materials (U. S. Department of Health and Human Services, 1997). Although ATSDR provides some guidance to the healthcare system, a lack of information and the variety of hazardous materials still present challenges to hospital preparedness and planning (Burgess et al., 2001). The Center for Disease Control (CDC) established the Chemical Terrorism Preparedness Workgroup to identify chemicals that could potentially be used in terrorist attacks. This group identified and placed approximately 500 chemicals under the Chemical Terrorism Listing. Despite the work of these government agencies, no detailed, user-friendly guide has yet been created. Sternberg, Lee, and Huard (2004) define a hospital internal crisis as, “an event that disrupts or poses the immediate danger of disrupting hospital operations and patient care sufficiently to endanger patients, visitors, or staff.”

### **External Events**

Occasionally, an external crisis, such as a natural disaster or a hazardous material spill, may lead to the disruption of hospital operations. These large-scale events are often very challenging because an external disaster may incapacitate a number of hospitals simultaneously, and hospitals evacuations may coincide with a patient surge caused by external events. Additionally, external disasters may impact health facilities both directly and indirectly. Direct impacts include situations where disasters such as tornadoes, earthquakes, or floods cause major or partial damage to the structure of the facility. External disasters impact health facilities

indirectly when they cause destruction that interrupts hospital services or supplies. For example, an earthquake, tornado, fire, or flood may not affect the hospital structure, but may destroy power lines or highways. Loss of power or lack of transportation or even destruction of communication towers may make it difficult or impossible for a hospital administration and physicians to provide patients with needed care and services.

This present study focused on one type of external disaster: a flood that threatened to damage the structures of several health facilities. As a result, one major hospital, one mental health hospital, all of the nursing homes in Fargo, North Dakota, and the largest nursing home in Moorhead, Minnesota, were totally evacuated, and almost all of the medical clinics in both cities were closed.

### **Medical Institutions' Preparedness for Evacuations**

One of the characteristics of human beings is to believe that (1) disasters probably will not occur, (2) disasters will not strike where they live, and (3) a disaster that strikes nearby will not harm them. This mentality driven by disaster ignorance prevents individuals from making wise decisions (Smithson, 1990). Sternberg, Lee, and Huard (2004) explain that some hospital administrators are not willing to invest their resources in preparing for disasters because they believe that the likelihood of a disaster strike is very low. Thus, administrators may not see preparedness as a cost-effective way to invest their resources.

However, the Pan American Health Organization (2005) notes the importance of preparedness for medical facilities:

Although the financial investment can be high (and it is not always possible to protect an installation against all kinds of disasters), the cost of ignoring the risks can be much higher, not only in terms of money, but more importantly on the loss of human life.

Research has shown the extent of the risk for hospitals. For example, Krauskopf & Saavedra (2003) studied 15,000 hospitals in the Caribbean and South America and determined that over 7,000 hospitals are located in “high-risk” locations. They also found that more than 100 hospitals and 1,000 healthcare centers have been damaged by natural disasters in the past 20 years. To offset the danger, some governing bodies force administrators to take action as part of the accreditation process to reduce the risk of damage from disasters.

### **Role of Hospital Accreditation**

In the United States, accreditation agencies require hospitals to engage in disaster planning. The Joint Commission on Accreditation of Healthcare Organization, now known as The Joint Commission (TJC), requires each hospital to design its own disaster plan (Schultz et al., 2005). According to *Practice Greenhealth* (2005), the TJC establishes standards and accredits hospitals that meet the standards. In addition, the TJC periodically investigates accredited hospitals by conducting surveys to verify that hospitals remain in compliance with the standards.

Steps have been taken to clarify the accreditation process. In 2011, *The R3 Report – Requirement, Rationale, Reference* was published for use by accredited hospitals and hospitals interested in becoming accredited. The R3 Report provides greater detail than the standards manual and enables the TJC to provide “the rationale behind its new standards, National Patient Safety Goals and performance measures” and to document “the supporting research and scientific data behind the development of the requirements” (Zhani, 2011). In addition, the *R3 Report* will be updated “on an as-needed basis when new standards, goals and performance measures are instituted” (Zhani, 2011).



## **Planning Evacuations**

Even though preparedness planning for the evacuation of hospitals and nursing homes is an important step in the disaster-planning process (Bagaria 2009), specific guidance is lacking so that administrators are often confused about what to include in their plans. Schultz et al. (2005) examined the written plans hospitals and found that many of them were not prepared for a full evacuation. Instead, their plans involved only internal measures, such as relocating patients horizontally or vertically within their own facilities. Many hospitals did not have any written mutual aid agreements with other hospitals to receive their patients if an evacuation of an entire hospital might be needed.

Unfortunately, more research is needed before experts can design a workable mechanism to make the evacuation process smoother, safer, and easier. Taaffe, Johnson, and Steinmann (2006) explain that people view hospitals as safe havens and important elements in responding to disasters. People generally do not consider hospitals to be subject to evacuation. However, recent disasters have attracted the attention of the general public to the significance of timely plans for hospital evacuation in disasters.

The use of technology shows promise for researchers to fill the gap in the literature by studying virtual disasters. Taaffe, Johnson, and Steinmann (2006) created a model to simulate natural disasters and evacuation procedures. The purpose of their project was to develop a new tool for gaining a deeper understanding of the process of planning for hospital evacuation so that they can make recommendations for improvement. In the past, hospitals could only conduct expensive “real-time” evacuations to create their plans, so simulations now offer an inexpensive, practical method for testing and evaluating scenarios.

## **Exercising Evacuation**

While beneficial, evacuation planning and even stimulation modeling are not enough to fully prepare for actual emergency evacuations. Exercising is also a key dimension of preparedness, but some hospitals never conduct exercises. Auf der Heide (1989) makes it clear that relying solely on planning reflects the “paper plan syndrome.” If a disaster plan is not followed up with a training program and exercises, then the plan only provides an illusion of preparedness, not a tested plan. Hospitals face a great deal of uncertainty when they have to evacuate during disasters because staff members are likely to encounter issues that are not addressed in their evacuation plan. Tayfur and Taaffe (2009) explain that South Carolina Department of Health and Environmental Control require that all hospitals in South Carolina have evacuation plans. Other states also require their hospitals to have some type of evacuation plan. However, to ensure the efficiency of such plans, hospitals need to test their plans so their staff members become aware of the sequence of steps that need to be taken in order to successfully evacuate during disasters.

This is easier said than done. Unfortunately, emergency managers in hospitals do not have time to test all possible scenarios. Alternatives (perhaps even preferred alternatives) include standard tabletop exercises and drills, but administrators of some hospitals claim that performing drills is too difficult. Others attempt to meet safety requirements but do not conduct disaster exercises.

On the other hand, some hospitals have successfully implemented practice sessions. Barnett, Dennis-Rouse, and Martinez (2009) found that hospital managers in San Diego, California, complete annual “online disaster training related to incident command post setup and the HICS.” HICS is the Hospital Incident Command System used by approximately 800

hospitals all over the nation during disasters. Pomerado Hospital and other hospitals in San Diego County conduct disaster exercises every six months. All participating hospitals use HICS, which means that all of them use the same organizational structures, terminology, and roles. At the end of every exercise, these hospitals evaluate the exercise and review lessons learned for future application. For example, hospital administrators in San Diego County applied knowledge gained from their exercises to successfully evacuate two healthcare facilities during a wildfire in 2007.

Hospitals that implement full scale exercises do find them challenging, but worthwhile. HCPro (2010) reports one example of a hospital that planned for months and involved city and state agencies in an evacuation exercises. The Director of Emergency Management at the hospital, Femino Meg, said, “We really took on our most vulnerable population. We didn’t make it easy for ourselves just so we would look good.” Clearly, this was a challenging effort.

Another useful example is the way Rush Oak Park Hospital prepared for disaster in Oak Park, Illinois. The hospital administrators arranged a number of training sessions to prepare for an evacuation of the entire building, and then they simulated a power outage to test their evacuation plan over a two-day period in May 2009. In a press release, hospital administrators explained that their purpose in designing disaster plans is to stay open and available when a disaster strikes and the public needs their services because “[i]t’s best to be prepared. To have a plan, learn it and practice it, in case of an event in which sustaining patient care for an extended period of time would be impossible” (“Evacuation Drill,” 2009). Thus, the administration of the hospital devoted two entire days to test their emergency measures and evacuation plans through which they moved their patients to safety as if a storm had caused the power outage.

## **Facing Actual Evacuation**

Only a few research projects have closely studied what a hospital may experience when it needs to fully evacuate its patients. Taffe, Kohl, and Kimbler (2005) found that personal and interpersonal conflicts may arise. The priority of medical professionals is to provide their patients with care, but, when medical personnel have to be involved in the evacuation process, much attention has to be diverted to the mechanism of the evacuation. As a result, providing healthcare and participating in hospital evacuation simultaneously may lead to internal role conflict. Additionally, evacuation plans that are not well explained and clearly defined may cause inter-departmental tensions or even conflicts (Taffe, Kohl, and Kimbler, 2005).

Collander et al. (2008) confirmed earlier findings about the difficulties of providing medical care to patients while coping with evacuation measures. Tasks may include establishing the hospital's incident command, ensuring availability of supplies and resources, and coping with "patient flow." These challenges are enhanced when planning and exercising have not been fully pursued, as is often the case. Collander et al. (2008) note that "many disaster situations are characterized by inadequate medical care, poor communication, chaotic management, and meager patient flow." Only affective improvisation (discussed below) can overcome these problematic outcomes.

Perhaps the most challenging issue in dealing with an actual evacuation is making the decision whether to evacuate or not. The evacuation of hospitals, nursing homes, and other institutes with custodial responsibility is extremely difficult. It is difficult to make the right decision at the right time and right place. Zane et al. (2010) provides some useful insights into the Hospital Evacuation Decision Guide. For example, making the right decision in a hospital evacuation requires the hospital administration to do a great deal of detailed planning. Two

critical steps must be taken. First, an assessment of the hospital's infrastructure must be done before a disaster strikes to enable decision-makers to judge the degree of vulnerability and the potential impact of an impending disaster on the hospital building and surrounding areas. The assessment should address the possibility of ordering a pre-disaster evacuation if decision-makers anticipate that patients and/or staff will be exposed to an unacceptable level of risk or if evacuation after the disaster strikes would be very dangerous or impossible. Second, an assessment of the capability of the hospital administration to evacuate quickly must be done. Administrators and planners should estimate the time needed to take all patients out of the hospital and transfer them to other hospitals. Without these steps, evacuation decision-making will be even more challenging.

### **Issues in Evacuation**

In general, three factors are very important to ensure safe evacuation: (a) dependable transportation, (b) willingness of the staff to leave with evacuees, and (c) other facilities to receive the evacuees and meet their immediate needs (Dosa et al., 2007). In the process of evacuating a hospital, transportation is one of the most important issues. Funding from the Administration on Aging National Family Caregiver Support Program enabled Easter Seals (2011) to produce a manual for volunteer transportation programs. The guidelines provide useful advice and explain sensitive issues regarding transporting patients during disasters. Examples include (a) providing the proper tools to transport patients from their rooms to ambulances or buses, (b) the proper positioning of patients based on health needs, and (c) finding appropriate ways to deal with patients with wheelchairs. Also, the manual provides insight into using volunteer drivers. The authorities must ensure that volunteer drivers are qualified and prepared. For example, authorities have to test, register, train volunteers for the responsibility they have to

insure the safety of evacuees. Without proper procedures, volunteer drivers may become liabilities.

Another very significant issue in evacuation is traffic congestion. The *Federal Highway Administration, Office of Operations* (2012, October 26) explains that approximately 50 percent of congestion is due to temporary problems that block roads; 25 per cent of traffic congestion is caused by “incidents ranging from a flat tire to an overturned hazardous material truck”; 15 percent stems from weather-related issues; and 10 percent are caused by construction work zones. These temporary sources of congestion are likely to greatly increase in frequency during a disaster.

## **Patients**

Patient well-being is another challenge to face during hospital and nursing home evacuations. Dosa et al. (2007) explain that researchers have not studied the “preparedness of communities to handle the evacuation of frail, elderly populations, particularly those in nursing homes.” In order to cover this neglected research area, it is important to study the reasons behind the evacuation of hospitals or nursing homes. Similarly, the emotional and psychological state of patients must be taken into consideration during the evacuation of a hospital in a hazardous situation. Hersche and Wenker (2003) explain that patients will initially react to a disaster evacuation chaotically, so the goal of the operators of the evacuation should be to shorten this initial chaos as much as possible. A hospital with a great number of patients may have even more need to plan an exercise in advance. During the disaster, the hospital may have to practice disaster medicine to best serve its existing patients and incoming patients. If so, the hospital may decrease the quality of medical treatment in order to increase chances of patient survival.

## **Relatives and Friends**

Also, hospitals and nursing homes need to have a mechanism that includes the cooperation of relatives of hospital patients and nursing home residents to deal with disasters and, if needed, with evacuation as well. Dosa et al. (2007) found that, when relatives of elderly residents of nursing homes were available to accompany their relatives, staff members were more willing to stay, help, and accompany the evacuees. Proper communication is necessary to ensure that institutions have the needed information about patients before they receive them.

## **Transportation**

Dosa et al. (2007) explain that an insufficient number or inappropriate type of transportation are factors that can delay an evacuation and result in the dehydration of many patients, especially the elderly. An administrative director of the hospital stated that they had contracted enough buses and ambulances, but, when they needed to evacuate, many of the drivers had panicked and fled. In some cases, state or local officials had control over buses and used the buses for other purposes, such as evacuating prisoners from jails, so buses were not available when nursing homes needed to evacuate. A lesson learned was not to contract with local transportation companies in the future for evacuations.

## **Politics and the Blame Game**

Another issue that makes it hard to decide to evacuate are the politics and fear of reprisal that can result. Decision-makers may be blamed for not evacuating when it was needed or for evacuating when it was not needed. In many disaster situations, decision-makers do not have clearly distinguishable options. They have to deal with a grey area in-between the two options and know where to draw the line.

## **Clarity of Threat**

Gray and Hebert (2007) explain that, before Katrina struck, the path of the storm was not obvious, so the impact on New Orleans could not be predicted. Also, determining whether or not the evacuation of hospitals and nursing homes would be necessary was very difficult. An earlier hurricane, Ivan, illustrates the unpredictable nature of storms. In 2004, when Hurricane Ivan threatened New Orleans, hundreds of thousands of residents attempting to leave the city caused incredible traffic congestion. At that point, Ivan changed its direction—instead of striking New Orleans, the storm turned to Alabama. Had decision-makers decided to evacuate hospitals, and had lives been lost, the decision-makers would have been blamed for the patient deaths.

## **Command System**

While many health institutions have developed an incident command system (ICS), the effectiveness of the ICS has not been studied adequately (Schultz et al., 2005). Resolving these obstacles could help decision-makers make better decisions in the future. Also, the decision-makers may have a greater sense of responsibility if evacuation plans include clear details about who is authorized to make evacuation decisions.

## **Selection of Alternative Site**

The selection of an evacuation destination involves the consideration of a wide variety of factors. First, administrators must identify a hospital that is willing to receive the patients and to meet their medical needs. The hospital must be located within a reasonable distance so that patients in poor health may survive the evacuation process. Traffic congestion is also a factor that affects the time needed to reach a remote facility in a large city. The hospital must be prepared to treat critically ill patients, and a landing pad should be accessible for helicopter transport. The hospital should be located in an area with cooperative police, an ambulance



service, and other cooperative support agencies. Finally, financial considerations and political factors should influence the selection of alternative sites.

Thus, a variety of difficult issues must be considered in planning for hospital evacuation. These issues are likely to be reviewed at the moment of decision, as well. In addition, the actual moment of decision adds other situation-specific issues to consider, such as the overall risk of evacuating versus the risk of not evacuating. These issues are discussed in the next section.

### **Evacuation Decision**

One of the most challenging issues in dealing with disasters is making the decision to evacuate or to remain in place. The evacuation of hospitals, nursing homes, and other institutions with custodial responsibility is extremely difficult because fragile lives may be lost in either case. This section discusses the immediate issues of authority, timing, and risk evaluation.

#### **Authority**

The evacuation of hospitals in disasters is a difficult and complicated process. Taffe, Kohl, and Kimbler (2005) point out that, in some disaster situations, hospital administrators make the decision, but, in other cases, the hospital evacuation decision comes from the local or state government. An evacuation decision that is not made by hospital administrators adds another layer of complexity to the already complicated situation.

After the tragic events in New Orleans, the U.S. Government Accountability Office (2006) studied issues related to the evacuation of hospitals and nursing homes as an outcome of hurricanes. The report found that the responsibility frequently belongs to hospital or nursing home administrators to decide whether or not to evacuate their facilities because of natural disasters. The government at the local or state level can issue evacuation orders for segments of a

community or for the entire population, but such orders typically do not pinpoint hospitals and nursing homes because evacuation is the very last resort for healthcare facilities.

The Pan American Health Organization (PAHO) meeting in 2003 led to a recommendation regarding who should make hospital evacuation decision in disastrous situations (“Should a Hospital” 2003). The report recommends that the final decision of hospital evacuation should be made by either the hospital director or the director’s authorized delegate. After the decision has been finalized, the hospital evacuation decision should be shared with the authorities in the area.

### **Timing**

An evacuation decision involves two aspects of timing. First, authorities must decide when to evacuate. They have three choices: before a disaster, during the early stages, or after a disaster event has ended. Waiting to the last minute may make the process harder or even impossible, but evacuating before it is necessary may put the decision-maker in a difficult position. Evacuating before a disaster may seem the best choice, but Zane et al. (2010) points out that a pre-event evacuation may put patients or staff at unacceptable level of risk, but the evacuation can also be risky. If the team decides to shelter-in-place during the disaster, the hospital may still have to order post-evacuation, especially if significant damage has been done. Post evacuation may even be more challenging, depending on the situation on the ground.

The second aspect of timing is the length of time needed to complete the process of evacuation. According to Zane et al. (2010), accurately calculating the evacuation time is one of the most important tasks of the decision-making team, and it is also very complex. For example, the team needs to estimate the time needed to empty the hospital building, which includes the time needed to move all patients out of their rooms to a “staging area” where patients can be

loaded into buses or ambulances for transport to other hospitals. A staging area may be a location inside or outside the hospital where staff can gather patients temporarily to be transported to other hospitals. One logical choice for a staging area is an emergency department. Finally, the team must estimate the time needed to transport all patients from the staging area to other hospitals. These timing issues are intricately related to assessing the risks.

### **Risks of Evacuation**

Hospital evacuation can lead to fatalities if the process is not planned well and executed properly. Dosa, et al. (2007) interviewed representatives of 20 nursing homes affected by Hurricane Katrina. Of the 20 homes, 9 evacuated before the storm reached land, and 6 evacuated after the disaster hit. In all, 24 fatalities were recorded. The results of the study indicated that the most common problems experienced by the nursing homes were morbidity and fatalities, transportation problems, inadequate staffing, and lack of sheltering in the hospitals that received their patients.

Gray and Hebert (2007) also identified a variety of specific problems that are likely to emerge during evacuation. They found that evacuating hospitals lacked an adequate health facility to receive patients, and they faced difficulties associated with external coordination across involved agencies and organizations with respect to resources that are in high demand in disastrous situations. Their study also revealed that patient needs were not met, especially the needs of critically ill patients, that problems occurred in the transfer of medical records to the destination hospital and in the tracking of hospital supplies, and that a mechanism was needed to connect patients with family members. In addition, hospital staff struggled to deal with uncooperative patients and family members, to handle people seeking admission during the evacuation process, to establish priorities for who should be evacuated first, and to insure staff,

patient, and family safety. In sum, the risks and complexities of actual evacuations are extensive.

### **Risks of Not Evacuating**

Dosa, et al (2007) found that the most common problem associated with sheltering in place was the shortage of supplies. Other issues included minor damage to facilities, power shortages, staff shortages, and difficulty in receiving fuel to run generators. Also, some nursing homes had difficulty in meeting the needs of residents during the power outage.

Gray and Hebert (2007) have documented additional problems, including long shifts for staff members, communication failures, and difficulty carrying out medical procedures without staff and/or power. For example, a surgeon in a hospital without power during Katrina had to perform surgery by flashlight with very little anesthesia. Moving patients within the hospital presented another difficulty when the power outage disabled the elevators. Other problems included unusable toilets, loss of ventilation, and handling the deceased. Thus, a variety of major and minor problems can arise when sheltering-in-place and when evacuating.

Dosa, et al. (2007) quoted an administrative director saying that evacuation might result in the loss of some lives, but not evacuating might result in the loss of all lives. When hurricane Rita was striking, the owner of a nursing home in Louisiana refused to evacuate; that decision led to the death of 34 residents, and the owner of the nursing home was blamed for negligent homicide. During Hurricane Katrina, the staff of Lafon Nursing Home decided not to evacuate, and their decision cost 24 resident lives. One way to avoid the risks of evacuation is to protect the hospital from the unnecessary outcomes of hazardous events. The Pan American Health Organization (2005) claims that protecting health institutions, especially hospitals, from

preventable outcomes of disasters is “a social and political necessity in its own right....the vulnerability of a hospital is more than a medical issue.”

### **Improvising Evacuation**

The present study examined the decision-making process and actions of medical institutions facing the same disaster. Some institutions evacuated and others did not. In addition to analyzing the experiences of medical personnel in these institutions, the present study investigated how medical personnel construct their explanations of their respective institutions' outcomes as more or less successful.

Preparedness is a major aspect of emergency management because greater preparedness should lead to a greater probability of success. However, preparedness is multidimensional, varying in depth, breadth, character (planning versus training), and timing (recent or long ago). Presumably as depth, breadth, and recency of preparedness all decrease, improvisation must fill the resulting gaps in preparedness, and success will decrease. In this context, improvisation would appear to be an obstacle to success. In reality, though, the opposite has occurred. During the flood of 2009, hospital and nursing home administrators with only modest levels of preparedness made decisions that resulted in positive outcomes. Consequently, the assumption can be made that the administrators improvised considerably and that the improvisation seemingly contributed to the success of their decisions. Thus, the present study was designed to provide insight into the improvisation associated with hospital evacuations.

Weick (1998) notes that the root of the word *improvisation* comes from the Latin word *proviso* meaning “to make a stipulation beforehand.” The prefix *im-* denotes the opposite meaning, so the verb *improvise* means “to perform simultaneously.” Keeney (1991) expresses his view that “[i]mprovise (in pro-videre), the un-for-seen and unprovided-for is the negation of

foresight, of planned-for, of doing provided for by knowing, and of the control of the past over the present and future.” In both cases, the authors underscore planning and acting without much preparation or closely following what previously had been planned.

Research suggests that improvisation can be a successful way to deal with issues that require immediate response, but planning remains the key to success when there is time to plan. Moorman and Miner (1998) note that planning plays a significant role in managing markets and in the process of making decisions, but they found that improvisation can be effective in two marketing situations: (a) when a company experiences unstable conditions that necessitate immediate decision-making and (b) when plans cannot be executed because details and/or strategies are lacking. In both cases, improvisation may be the only available option.

### **Improvisational Approach to Disaster Management**

The literature supports the notion that improvisation could be useful in emergency management, but studies are needed to verify the assumption. Improvisation has been successfully used in several fields: Jazz music (Berliner, 1994; Lewin, 1998), marketing (Moorman & Miner, 1998), and theater (Crossan, 1998). Ciborra (1998) suggests that improvisation can be helpful in various fields, including emergency management, and Lewin (1998) argues that “improvisation is an art form that needs to become the hallmark of all levels of management.” In fact, Tierney, Lindell, & Perry (2001) claim that an incident that does not somehow necessitate improvisation is not a real disaster (as cited in Kendra & Wachtendorf, 2006).

The need to improvise can be triggered by a wide-variety of gaps between what is expected to happen and what is actually happening. When disaster strikes without warning, people must act immediately, without any forethought or plan. At times, even when a plan has

been created in advance, people may not know that a plan exists, or they might not know enough detail to execute the plan. Even if they know enough about the plan, often plans do not give enough details on how to carry out the plan. Some disasters are simply outside anything that might reasonably have been planned for. However, this does not mean that improvising may replace planning. Planning for disasters remains the key element for success in managing disasters. Kendra and Wachtendorf (2006) note that even researchers who emphasize the significance of improvisation in managing disasters have a tendency to subordinate improvisation to planning.

Kendra and Wachtendorf (2006) explain improvisation in simple but also practical terms. They view improvisation as a form of organizing when a disaster has already struck, but preparedness should be the method of organizing before a disaster occurs. Kendra and Wachtendorf (2006) state that “improvisation is a distinct capacity that individuals and groups employ, and that while planning encompasses the normative ‘what ought to be done,’ improvisation encompasses the emergent and actual ‘what needs to be done.’” The authors explain that the combination of planning and improvisation is the foundation of managing disasters. Mendonca and Fiedrich (2006) also support this view: “Improvisation – serially-executed creative thinking, often done under conditions of risk and time constraint – can be effectively employed in such situations.”

### **How to Improvise Successfully**

The literature on improvisation in a variety of fields outside emergency management (e.g., Jazz music) and inside emergency management clearly documents the presence and importance of improvisation, even in the context of pre-planning. What is less clear is when improvisation is likely to lead to success or more minimally to avoid interference with success.

There are some suggested answers in the literature generally focusing on individual characteristics of those doing the improvising.

Berliner (1994) explains “improvisation involves reworking recomposed material and designs in relation to unanticipated ideas conceived, shaped, and transformed under special conditions of performance, thereby adding unique features to every creation” (p. 241). This means that improvisation requires the person to have a great deal of knowledge about the field in which he or she would like to improvise. Weick (1998) suggests that “To improvise memory is to gain retrospective access to a greater range of resources.” According to ter Mors, Valk, and Witteveen (2005), many scholars have found that responders do not pursue the specific details of the disaster plan that they were carrying out. These authors suggest that such improvisation is fairly common even when institutions are present, but successful improvisation does require skill. Also, people have to have great skills in order to execute the plan successfully without following the instructions.

Finally, Mendonca, Beroggi, and Wallace (2001) explain that disaster plans often are not carried out as anticipated. In order to avoid mistakes that may make disaster impact even worse, emergency managers need to approach situations with flexibility. This flexibility will enable emergency managers to improvise when the disaster plan is not executable or not effective in responding to the disaster. The approach, operational risk management (ORM), explains the “uncertainty nature of response activities.” For example, weather changes or lack of needed equipment may make a disaster plan irrelevant. Consequently, such a change may lead to changes of the risks the disaster poses. Then, disaster plan needs to be reviewed. Also, because of the multi-faceted nature of disasters, emergency response teams may have to combine various plans in unanticipated ways. Mendonca, Beroggi, and Wallace (2001) argue that response teams



have to improvise when facing a disaster with changing conditions. Otherwise, emergency management may lose flexibility.

Thus, knowledge, skill, and flexibility may contribute to improvisational success. In contrast, a counter-argument may be made that improvisation is simply a chance phenomenon and success is a product of good luck. More research clearly is needed to better understand improvisation.

The present study explored the perceptions of medical personnel and other involved parties, such as Fargo Cass Public Health officials, Clay County Public Health officials, and Success Ambulance Service, about factors they believe explain successful aspects of the hospital evacuation decisions. The settings that were studied had general plans, at best, for evacuation and had concluded relatively few exercises using any existing plans. Presumably, considerable improvisation occurred during decision-making process. As part of the present study's examination of how medical personnel constructed explanations for their evacuation decisions, it was anticipated that insights would be gained about processes of improvisation, as well.

## **CHAPTER THREE. METHODS**

### **Overview**

Snow storms and heavy rains during the 2008-2009 winter season led to the highest flood crest in the history of the Fargo-Moorhead area. The rising Red River triggered concerns about evacuating Fargo and led to the evacuation of multiple healthcare facilities, including both hospitals and nursing homes. Ultimately, community officials decided not to pursue a city-wide evacuation, although some neighborhoods were evacuated. It was within this context that I conducted a qualitative study of medical personnel at several of the institutions that faced the decision to shelter-in-place or to evacuate. To understand the context, I interviewed leaders in both communities who were directly or indirectly involved in the evacuation of vulnerable populations in the 2009 flood. The interviews complemented my main focus on healthcare facilities for which I interviewed multiple personnel at each of several hospitals and nursing homes to understand the evacuation decision-making and the views of the evacuation event.

### **Sample**

The goal of my research project was to interview members of multiple healthcare facilities about their decisions to shelter-in-place or evacuate during the threatening flood of 2009 in the community of Fargo, North Dakota, and Moorhead, Minnesota. In addition, I wanted to learn about the community context of these facilities by interviewing members of multiple city and county agencies, first-responder departments, and private ambulance companies. Specifically, I sought to interview a minimum of two officials from each of the following community agencies and departments: Fargo mayor's office and the Fargo city planning department, Fargo and Moorhead Police Departments, the Fargo Fire Department and the public health agencies in both Cass County, ND and Clay County, MN. In addition, I

interviewed two to four officials from each of the following community healthcare facilities and organizations directly involved in evacuation decision-making and/or implementation: three Fargo hospitals (two evacuated and one sheltered-in-place), two major nursing homes in Fargo (both evacuated), and two private ambulance services. Only one individual in Fargo and one nursing home facility in Moorhead declined to participate. Thus, 26 interviews were conducted with 27 interviewees (two individuals participated in one interview).

My selection of interviewees was purposeful. The two primary criteria were to select individuals who were present in the agencies or healthcare facilities during the 2009 flood event and who were directly or indirectly involved in the decision-making and/or implementation of the evacuation decisions. I sought to reach as high into the various organizations as reasonably possible and concluded each interview with a request for the names of others that I should contact. In nearly every interview, I used snowball sampling to gain additional names by asking interviewees whether they could think of any other parties that I should interview who played a role in the evacuation of healthcare facilities. I learned of new names and privately learned that the people already included on my list were among those being recommended for interviewing. Overall, interviewees included one mayor and multiple lawyers, safety officers, physicians, and city/hospital/nursing home administrators. Eventually, the 26 individual interviews generated 785 minutes of digital recordings for an average of 30.2 minutes per interview.

## **Procedures**

My focus in data collection was in-depth individual and face-to-face interviews. The general procedure was to start by sending a copy of my research proposal to the above-mentioned agencies and organizations. In my letters and e-mail messages, I explained that I am a doctoral student conducting a research project for my dissertation. A brief explanation of my

project and the main questions were attached to my request. I asked them whether or not they would be willing to participate in my research project, and all but one organization responded positively to my requests. I wrote back and asked to set up appointments to conduct individual, in-depth, face-to-face interviews on site. When I visited each participant for the interview, I provided a copy of the written approval from the Institutional Review Board (IRB) and two copies of my research protocol explaining the rights of research participants. After the individual read the protocol, I asked for a signature to confirm that he or she understood the rights of research participants and voluntarily agreed to participate in my research project. I kept a signed copy of the research protocol, and let the participant keep the second copy.

The research protocol explained that all identities would be kept confidential. I have omitted personally identifiable information from all quotes and discussions in subsequent chapters. In addition, because I interviewed more than one person at each organization, any reference to any organization does not identify a specific interviewee. I have also renamed all healthcare organizations. The three hospitals are Hospital A, Hospital B, and Hospital C. The two nursing homes are Nursing Home A and Nursing Home B. The two ambulance companies are Success Ambulance and Rural Ambulance. Finally, I have used the pronoun “he” for all of my research participants, regardless of gender.

## **Interviews**

All interviews were conducted face-to-face to enable me to cover all of my key questions, to listen and watch their reactions to the questions, and to probe for further information. This flexibility in data collection was essential to maximize opportunities to uncover patterns not yet identified in the very limited research on hospital and nursing home evacuations (Taylor & Bogdan, 1998).

The questions were worded without reference to any implied success or failure associated with the evacuation decision. The questions were also followed, when needed, with general probes such as “please explain.” Not all of the questions fit every institution, so adjustments were made as needed. For example, one of the facilities ultimately did not evacuate, so the questions about actual evacuation events were not applicable. Nevertheless, the topics of the questions followed the study’s research questions addressing evacuation decision-making, evacuation experiences, and improvisation during the evacuation. The questions are provided below:

1. Tell me about the evacuation decision of your institution.
2. Tell me your views of the decision.
3. How would you evaluate the overall evacuation process?
4. Why do you think the evacuation came out the way it did?
5. Tell me about any aspects of the evacuation that required you to improvise.
6. Are there things that could be improved for the next evacuation?
7. What has your institution learned in general from facing the flood of 2009?
8. Finally, may I contact you later if needed?

### **Data Analysis**

All interviews were recorded with the interviewee’s permission and then transcribed. I created multiple electronic file folders based both on the topics identified in the above research questions and on additional themes that emerged while coding the data (Foss & Waters, 2003). These additional themes included ones that emerged outside the focus of my original research questions. Taylor and Bogdan (1998, p. 150) explain coding as follows, “In qualitative research, coding is a way of developing and refining interpretations of the data. The coding process

involves bringing together and analyzing all the data bearing on major themes, ideas, concepts, interpretations, and propositions.” After a careful reading of data, I divided my data into 22 categories. However, only 18 of the 22 categories directly contributed to the data analysis for the present study. The themes developed as described below:

- Themes emerged from multiple sources—direct responses to my structured questions, deeper responses from unstructured probes, and unsolicited responses in which participants introduced new material in the course of expanding his or her comments.
- Using the electronic versions of the transcripts, I cut and pasted excerpts into lengthy texts that were then assigned to multiple folders identified by theme (e.g., evacuation decision, communications, lessons learned).
- Within themes, I generally followed two organizational procedures: organizing selected responses by institution, and organizing conflicting and comparative comments together on a given theme.
- Originally, many transcript excerpts were assigned to multiple themes, and there are many interdependencies among the themes.

Overall, a variety of response styles ranged from very short, general responses to questions to lengthy responses that did not address the questions despite their length. A great deal of the material generated in the interviewees came from unstructured probes (e.g., “please explain,” “please expand on that,” etc.). In addition, respondents ranged from those who were nervous and controlled in providing information to those who were very open and expansive. All but one contact agreed to participate (27 out of 28), and all were willing to be contacted again, should I need additional information. As previously mentioned, I conducted a total of 26 interviews with a total of 27 participants because the final interview involved two participants.

## **CHAPTER FOUR. RESULTS AND DISCUSSION**

This research focused on several basic questions about the evacuation of healthcare facilities such as hospitals and nursing homes, when facing a potential or actual disaster event. As noted in chapter three on methodology, the questions served as the initial coding scheme for the findings. Therefore, this chapter is structured around these questions, with five major parts to the findings, as summarized below.

Part one focuses on preparedness issues stemming from my exploration of the preparations made by Fargo-Moorhead authorities for the 2009 flood. Were there any evacuation plans before the 2009 flood, or did they have to develop plans during the flood? If there were any evacuation plans, had they exercised such plans? Did they have any mutual aid agreements with health facilities in the neighboring cities or states?

Part two presents data on evacuation. In this part, I studied the major steps in the evacuation such as evacuation orders and the individuals who made the evacuation decisions. Were decisions made at the local, state, or federal level? Whether there was an evacuation order or not, who made the evacuation decision? Was the evacuation decision made by health facilities or by outside authorities? Also, what factors played a role in making the evacuation decision?

Part three covers institutional aspects of the evacuation. In this section, I examined the role of institutions and whether or not the involved institutions were aware of their roles and responsibilities in disaster-evacuations before the 2009 flood. Out of three hospitals in Fargo-Moorhead area, two hospitals evacuated. All nursing homes in Fargo and the largest nursing home in Moorhead evacuated.

Part four examines the evacuation process. In this section, I looked at whether communication worked well internally and/or externally. I also looked at how much improvisation was involved in the evacuation. Did implementing improvisation play a positive or a negative role?

Part five reviews reflections. This part reflects the outcomes of the evacuation. I investigated whether there were injuries and/or fatalities as a result of the evacuation. Another issue is which aspects of the evacuation went smoothly and which ones need to be improved. Finally—and probably the most important issue in this research project—what were the most important lessons learned from the 2009 evacuation?

### **Part One: Preparations**

Preparedness for disasters substantially enhances the likelihood of success in responding to them. Preparedness is defined by the National Incident Management System (U.S. Dept. of Homeland Security, 2012) as “a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response.” Thus, a well-prepared hospital makes it easier for the hospital administration to immediately act and act properly when facing a natural disaster. Therefore, it is critical to understanding the decisions to evacuate or not and to understanding the actual evacuations to first review the nature of the preparations various involved organizations had made. The task of evacuating physically and/or emotionally vulnerable populations increases the preparedness challenge. However, preparedness is not an “all-or-nothing” status. Preparedness varies along multiple dimensions, including the extent to which different tasks have been accomplished such as designing evacuation plans, conducting exercises on such plans, and evaluating those plans. Preparedness also varies according to the threat (e.g., an internal threat



requiring the evacuation of a single building vs. an external threat to multiple buildings requiring a community-wide effort) and according to the threat environment (e.g., good weather vs. poor weather). In the event under study, the preparedness question leads to a focus on preparedness to evacuate multiple facilities and to do so under extreme weather conditions: extreme cold, snow storms, blizzards, and severely frozen road surfaces. Preparedness in this event also involves preparedness to not only evacuate multiple facilities in bad weather but also to evacuate patients to locations outside the threatened community. All of these issues were raised in comments made by respondents and set the stage for the following subsections: evacuation plans, exercises, and mutual aid agreements with health facilities in the neighboring cities or states. Thus, the findings begin with an examination of preparedness along multiple dimensions.

### **Evacuation Plans**

Four issues emerged in respondents' comments about evacuation plans. First, when asked about the existence of evacuation plans, interviewees gave responses that showed variation among and within institutions. In addition, diversity was evident in respondents' perceptions of other institutions. At the very least, few plans seemed to exist that anticipated evacuations, not just from facilities, but to other communities. In fact, the possibility of such a major evacuation to other communities was not "on the radar" for many respondents until well into the 2009 event itself. Second, with or without prior plans, much of the detailed planning for the evacuations was done during the event. Third, expectations of what was needed to complete such a major evacuation of multiple facilities did not often match reality. Requests were made for expected resources during the evacuation that most likely would not have been perceived as reasonable if there had been prior, more relaxed planning. Finally, many respondents indicated that their 2009 experiences triggered the realization that much more planning needed to be made in subsequent

years. Each of these issues will be discussed in detail below. Unfortunately, despite frequent experiences, it often seems that human beings—even highly educated, well-meaning people—sometimes have to face a large-scale disaster before they think seriously about disaster planning. While the Fargo-Moorhead area had been flooded frequently in recent years before the 2009 event, most (if not all) healthcare facilities had to develop evacuation plans during the 2009 flood. One of the officials of the City of Fargo indicated that he had participated in fighting twelve floods. He said in the interview, “We had nine days to get ready for the highest river level we’ve ever had in the community in 104 years.” A key question is why many, if not all, respondents were surprised by the possibility of a city-wide flood affecting healthcare facilities in the face of many prior floods?

Ironically, the answer may be that no one had anticipated the possibility of disaster precisely because so many experiences with flooding had been faced without an actual city-wide flood occurring. Tierney, Lindell, and Perry (2001) suggest that disaster experiences are double-edged and may result in lower levels of preparedness if the experiences did not directly cause harm or damage to the parties involved. What the many prior flood experiences had taught community members is that the water would rise to a certain level like it had done in many other years, and the community would successfully raise the dikes with sandbags, and, after a few days, the water would start receding. The possibility of a mass evacuation was not salient, so nearly all participants involved in the evacuation had to learn how to stage patients, how to handle triage, how to handle evacuees with wheel chairs and/or oxygen during the event. This phenomenon can be identified as the “Readiness Syndrome.” As will be noted below, respondents assumed that they were more prepared than they actually were.

First, there seemed to be some inconsistency in respondents' comments about the prior existence of evacuation plans. When a Fargo Cass Public Health official was asked if health facilities in Fargo had any evacuation plans before the 2009 flood, he responded positively. He explained that all health facilities had their own evacuation plans and that the city, county, and state had both evacuation and sheltering-in-place plans with all of their components in place. However, indicating that evacuation plans exist is not the same as saying that the plans were adequate, exercised, or used. The official indicated that the plans were minimally exercised and, ultimately, not actively implemented. Concerning whether they implemented these plans when dealing with the 2009 flood, the official said, "Well, I think their plans were pretty vague and limited and sitting on the shelf and never been looked at." When a Fargo city official was asked if having an evacuation plan was a requirement from the City of Fargo, he responded, "No, we don't require it. It may be part of their operational plan; it may be part of their insurance; it might be part of their policy." The official said that the city encouraged nursing homes to have an evacuation plan and a sheltering-in-place plan, as well.

When a representative from Hospital B was asked if they had an evacuation plan before the 2009 flood, he said that they had some level of planning—but only on paper—that somehow addressed how to manage evacuation. Schultz et al. (2005) explain that the accreditation process in the United States requires health facilities to have a certain level of pre-disaster preparation in place. However, according to Bagaria (2009), there has not been effective guidance on what components those preparedness plans need to include. As a result, some of the hospitals that were studied by Schultz and his colleagues did not have complete evacuation plans. Many of these hospitals only planned to internally evacuate within their facility (vertically or horizontally) when needed.

Similarly, when a Clay County Public Health official was asked if health facilities were required to have an evacuation plan, he responded, “We can’t require of anybody; we ask, we recommend, we highly encourage and do everything we can to work with them to have an evacuation plan.” He explained that they work with health facilities to plan and improve the planning process continuously. The same question was answered by an officer from the Moorhead Police Department; he explained that the question was brought to discussion in 2008: “They [care facilities] are only required to have a fire plan.” Health facilities with vulnerable adults were not required to have an evacuation plan. The officer also said that, when he had asked health facilities what they would do if they had to evacuate, they answered, “We’ll call the Fire Department.” The officer thinks that authorities should mandate health facilities to have evacuation plans. His response may also reflect the Readiness Syndrome in the sense that it suggests an institution may believe it is ready simply because they can identify a source of help.

One major problem was that health facilities never considered mass evacuation. Many nursing homes had plans to send their residents to another nursing home within Fargo, when needed. Such plans might have worked in cases of fire or tornado, but not flood; in 2009, all nursing homes needed to be evacuated and all residents relocated out of town. Evacuation plans needed to be coordinated to maximize the efficient use of available resources.

Second, the apparent absence of evacuation plans for the simultaneous, mass evacuation of healthcare facilities to destinations outside the two cities led to much, on-the-scene planning. Most of the interviewees said that they had a short time to prepare evacuation plans in 2009 and quickly appreciated the complexity of the challenge. An official from the City of Fargo noted that health facilities in Fargo developed their evacuation plans during the 2009 flood. He remembers going to many meetings and telling healthcare representatives, “You gotta have an

evacuation plan.” Part of the frustration this triggered was likely due to the assumptions some healthcare facilities reportedly made about the nature of the task. Some care facilities initially thought that evacuation was just bringing ambulances and buses to their facility and loading the residents into the vehicles. Many facilities thought that, when they needed to evacuate, they could simply call Success Ambulance Service and ask them to evacuate their facility. An official from the Fargo fire department explained the situation with respect to nursing homes:

[Nursing Home D], what is their emergency plan? Well, they’re going to call [Success Ambulance Service]. What’s [Nursing Home E] Broadway’s plan? They’re going to call [Success Ambulance Service]. [Nursing Home E]? They’re going to call [Success Ambulance Service]. Well, there are not enough ambulances around. That’s kind of where we were in 09, and [Success Ambulance Service] said, “Wait here, and you want us to evacuate a hospital too?”

Mass evacuation to somewhere out of town had not been studied before the 2009 flood.

Therefore, healthcare facilities either did not have any evacuation plans or had relatively vague, untested plans. Part of the Readiness Syndrome is the sense that the existence of a plan on paper equals being ready.

A Fargo Cass Public Health official explained that Fargo Cass Public Health had not gotten involved in planning for a flood before the 2009 flood. This role was changed during the 2009 flood. The responsibility of coordinating the possible evacuation of health institutions fell to Fargo Cass Public Health Department. The official said that “a lot that happened in 2009 happened very quickly. It was a lot of decisions being made based on what we knew at the moment. There weren’t a whole lot of written plans; a lot of standard operating procedures.” He said that the staff of Fargo Cass Public Health made the plans based on what they knew at the

moment and taking into account that the river was rising quickly. Zane, et al. (2010) state that the *Hospital Evacuation Decision Guide* connects good, evacuation decision-making with the participation of hospital personnel in detailed, pre-disaster planning. Dosa et al. (2007) explain that hospital evacuation must address three core issues: dependable transportation, reliable staff members who are willing to stay or to go along with patients, and a proper facility to receive the evacuees and meet their needs.

In the midst of the planning, decisions had to be made. An official from the City of Fargo said that he was asked to decide whether or not the hospitals should evacuate: “We were asked to make that decision for them. We decided it was not in our best interests to do that.” Meanwhile, the city leaders faced their own dilemma. The quickly-rising river level led FEMA to advise the evacuation for the entire city, but city leaders pushed back. Thousands of volunteer flood fighters had fought hard, using millions of sandbags over miles of dikes to protect the city leading city leaders to assert that “evacuation is not an option.” T-shirts were printed with this message. However, while the assertion was meant to inspire the community, it sent a mixed message to healthcare facilities.

Third, much of the planning was done on-the-scene, so it was difficult to fully assess what could and could not be done. As a result, the expectations of different stakeholders did not always match the realities of what could be done. For example, a representative from Hospital C explained that sheltering-in-place was brought up as an option in the 2009 flood, but it was quickly dismissed as unrealistic, so their hospital was evacuated. Furthermore, they learned that they had to find an alternative place in town where they could take their patients when needed. Therefore, they signed a contract with a health institution in town to use a few of its large suites for their patients when needed. Similarly, a representative from Hospital A explained that some

physicians were asking the evacuation planners unrealistic requests: “I need the best possible quality ambulance to move them [patients].” Planners would respond by saying, “Well that’s good you want that. But, I don’t have enough of them, so you need to re-categorize your patients.” A representative from Hospital A said that experiencing the 2009 flood convinced him that one should be prepared for unexpected disasters. One never knows what surprises might be in the next disaster. Thus, not only health institutions, but also other organizations should be prepared and have disaster plans. They should also exercise such disaster plans. He explained that his facility had some tabletop exercises before the 2009 flood, but that was far from being enough. Often, hospital evacuation might be the only safe way to ensure patients safety in major disasters. Barnett, Dennis-Rouse, and Martinez (2009) explain that the Hospital Incident Command System (HICS) is used by hundreds of hospitals, but HICS does not give much thought to hospital evacuation.

Finally, many respondents indicated that their 2009 experiences had already led to better planning. For example, an official from the City of Fargo believes that nursing homes have been refining their evacuation plans since 2009. Similarly, a Fargo Cass Public Health official explained that their plans have changed and improved considerably because they learned much about dealing with a flood since the 2009 flood. The official also claims that, whenever there is a flood possibility, they start meeting, usually by December or January. Another Fargo Cass Public Health official said, “Well, after 2009, we have our emergency plans.” Similarly, a representative from Hospital B said that they improved evacuation exercises at the state and county level after the 2009 flood. He indicated that technological advancement has been very helpful in improving the disaster planning process. He also noted, “Unfortunately, because it’s become an annual event for us that we’re dealing with a potential catastrophic flood in this area,

it really is part of our emergency preparedness. We start implementing steps, pre-evacuation steps, now.”

In addition, the 2009 event triggered some multi-organizational planning. A representative from Hospital A was asked whether they conducted evacuation exercises before the 2009 flood; he responded by saying, “Never, never.” He said people pay closer attention to that now. They had never tested an evacuation process until 2009. He commented on the evacuation plan that they used in the 2009 flood: “We wrote that plan; there actually had not been a mass evacuation plan written for the hospital until two days before the evacuation occurred.” Since then, they have worked closely with Success Ambulance Service to review their hospital plans, and they have greatly improved their plans since 2009. They also hold classes to educate their staff on the evacuation process.

Similarly, a representative from Hospital C said that they also learned how to prepare for an evacuation from the 2009 flood:

We do have an emergency management plan now and evacuation procedure; those have been done collaboratively with [Success] Ambulance. They have been at our site; we have numbered all of our outside external doors; we mapped a route for where the best exists would be for our patients being picked up by buses, ambulances, etc.

A representative from Success Ambulance Service said, “Each facility that we have—whether it is a nursing home, any healthcare facility, where EMS would be a player—now has a tactical plan.” There were many issues when evacuating Fargo health facilities in the 2009 flood, such as the need to decide which door of the facility would be used for ambulance vehicles. Thus, tactical plans were needed to tell the ambulance staff what to do, as well as why, where, when, and for whom. Every facility needs to have its own tactical plan that outlines procedures for



hazardous situations. The representative clarified that Success Ambulance Service created tentative plans and then gave the plans with maps to the Fargo health facilities to discuss and revise so that a working evacuation plan could be implemented, not only in flood cases, but also in any disaster. The idea was that the Success Ambulance Service staff presented what they thought could help when dealing with disasters and asked the health facilities to respond to and present their views about such plans. The dialogue, hopefully, would produce plans that would adequately prepare health facilities for disasters before disasters occur.

Bagaria et al. (2009) claim that healthcare facilities reflect the well-being and social progress of a nation and that a nation's well-being and social progress are essential for the stability and economic growth of the nation. Gary and Hebert (2007) claim that health institutions are part of the solution. In contrast, Schultz et al. (2005) present the concept of "hospital as victim." Their view is supported by the events of the 2009 flood because two hospitals felt that they had to entirely evacuate to ensure the safety of their patients. In order to ensure that the nation's hospitals are able to play their expected role, hospitals must be well-prepared for future disasters. Sternberg, Lee, and Huard (2004) indicate that hospitals are, like police stations and emergency services, viewed as indispensable facilities. These indispensable facilities are unique in that their occupants need physical assistance when evacuating and that the evacuation process may cause injuries and even fatalities.

### **Plan Exercises**

Plans and exercises are interrelated. Plans need to be tested or exercised to become reliable plans, and good exercises presume the existence of reasonably good plans. If mass evacuation plans are vague or non-existent, the same is likely to be true for exercises. Virtually all respondents discussed the state of exercises or exercises pre- and post-event. Four patterns

emerged when studying the findings. First, pre-event evacuation exercises appeared to be relatively infrequent. No evidence emerged of coordinated, city-wide, mass evacuation exercises among multiple health facilities. Second, the exercises that were conducted were primarily tabletop exercises within specific institutions. Third, exercises were seen to be especially challenging in medical settings. And fourth, much more focus is being put on doing exercises post-event. Data on each of these patterns is provided below.

First, several sources indicated that exercises (a) had not been done, (b) had been done infrequently, or (c) had been done, but not necessarily with respect to evacuation. A Fargo Cass Public Health official explained that all of the health facilities had plans, but they never tested their plans. The official continued explaining, “We had exercised that [the plan] a bit.” Another Fargo Cass Public Health official elucidates that they did exercises for other issues, but not flood-related issues. They did Point of Defense (POD) exercises for threats such as anthrax. Schultz et al. (2005) found many hospitals that did not have a full evacuation plan. Also, those hospitals did not have any written mutual aid agreements with other hospitals to receive their patients if they had to entirely evacuate their hospitals.

A representative from Hospital C said that they did not have exercises about totally evacuating their facility before the 2009 flood. They had vertical and horizontal evacuation exercises, in case they needed to move patients to a safe place within the hospital during a fire. When asked if they do actual exercises, a representative of Hospital B he said that they had tried to do exercises, but they had never actually conducted them. However, they did educate their staff. He also added that Success Ambulance Service walked through their building to ensure that their plan was a working one. He said, “So, we have very defined plans now... we are very prepared as opposed to 2009.”

A central rationale for exercising plans is that plans may contain unexpected problems that are not apparent on paper. For example, respondents indicated that they had learned a great deal about evacuation issues through the actual use of their plans during the 2009 event. First, they learned about the challenges of deciding not to evacuate—to shelter-in-place. A nursing home representative expressed an early sentiment of his organization: “keep us open, keep us viable, let us stay in place.” However, a Fargo Cass Public Health official indicated that the nursing homes had not fully explored what would be needed to shelter-in-place when multiple institutions and city services were simultaneously impacted. In order to be able to shelter-in-place, they needed to be self-sustaining for at least one week; specifically, they needed a seven-day supply of food, clean water, and medical supplies, and they also needed to have a generator in a safe place with enough fuel, as well as the capability to process their sewage for a week. Sheltering-in-place also would mean a thorough knowledge of their geographic location, elevation, relevant infrastructure, and direction from which they could get ambulances, wheelchair vans, and other vehicles if the sheltering-in-place option proved inadvisable.

Second, the experience of the 2009 event taught a number of specific lessons about evacuating multiple institutions at once. For example, a Fargo Cass Public Health official explained that they learned how to prepare to evacuate residents and patients with special needs such as a wheelchair and oxygen. In addition, much was learned about potential miscommunication across institutions when implementing a triage system. A representative of Success Ambulance Service explained that they thought color-coded triage tags—red, yellow, and green—were great communication tools because the tags signaled information about patient health status and special needs. However, the ambulance staff found out that the three triage colors did not mean the same thing to all institutions. The Ambulance representative explained

that hospital personnel interpreted the colors one way: “Green was ambulatory (patients that could go by bus), yellow was basic life support ambulance, and red was advanced life support.”

The nursing home personnel had a different concept: “Green was personal vehicle or bus, the yellow was wheel chair van transportation where they could not walk short distances, and the red was a supine patient or an ambulance patient.”

Nursing homes began by calling Success Ambulance Service to load up the residents and transfer them to a safe location, but, after triaging their residents, only five residents out of 150 needed to be transported by ambulance. According to a representative from Hospital A, the triage done by Hospital A was based on patients’ medical needs, but the triage that the Success Ambulance Service did was based on the available resources. Thus, the staff of the ambulance service had to create their own system by writing what each color meant in the triage process, which served as an inter-institutional bridge to address the planning/exercising gap: “Had we not created our own system with red, yellow, green, we would have wasted much of the available resources.”

Finally, in the absence of multi-institutional evacuation exercises, another issue emerged during the event. One Nursing Home A representative explained that loading up buses with residents from various nursing homes in the 2009 flood made it difficult for their residents to deal with the transfer process. Their residents were comfortable with their own staff, but problems occurred when they were combined with residents from different facilities. Some residents felt uncomfortable and unsafe when they were made to share a bus for a number of hours with unfamiliar residents and staff from other nursing homes.

Second, the most frequently-mentioned exercise type was the tabletop exercise. For example, Fargo Cass Public Health did tabletop exercises. When an official from the City of

Fargo was asked if the city requires health facilities to conduct exercises, he responded that the city cannot require them to exercise because

[o]nce you start dictating that, you take on a certain level of liability. What we can do is strongly encourage. And, that's what we continue to do, to work at that. Exercises are one thing they can do, tabletop exercises.”

Fargo authorities do tabletop exercises at least twice a year for vulnerable populations. One Nursing Home A representative stated that they had conducted tabletop exercises before the 2009 flood:

Table top, we had done. We knew exactly how we would evacuate, or, what our process was, and we followed our process. I mean, we had name bands... It's part of my emergency plan, if we ever had to evacuate.”

In contrast, a police officer from Moorhead Police Department said that health facilities in Moorhead do a type of exercise that is “really more of a functional exercise. Our regional State Homeland Security officials say we need to do this regionally.” It is very important for healthcare facilities to exercise their plans to ensure that staff members are familiar with the plans, step by step. Barnett, Dennis-Rouse, and Martinez (2009) explain that HICS was designed to help medical operations in hazardous situations. About 800 hospitals use HICS all over the nation. These hospitals conduct an exercise every six months, using the same organizational structures, terminology, and roles. At the end of each exercise, participants evaluate the exercise, discuss the steps, and conclude lessons.

Third, respondents clearly saw several significant challenges in doing exercises in healthcare settings, especially exercises that are more involved than tabletop exercises. A representative of Nursing Home B said that it is really hard to have a workable evacuation plan

because there are many things involved, and a representative from Hospital B said that it is very hard to do actual exercises because an actual evacuation exercise would cause a business disruption. Conducting a full-scale evacuation exercise would require a great deal of resources, and the belief was that tabletops and simulation modeling had been effective. A Clay Public Health official explained that some of the nursing homes in Moorhead cannot do exercises with their elderly, but others do tabletop exercises. Sternberg, Lee, and Huard (2004) found that many administrators of health institutions are unwilling to invest in preparations for disasters because the likelihood of disasters is very low. Thus, they may consider that such preparations are not cost-effective. However, the Pan American Health Organization (2005) noted,

Although the financial investment can be high (and it is not always possible to protect an installation against all kinds of disasters), the cost of ignoring the risks can be much higher, not only in terms of money, but more importantly on the loss of human life.

Finally, many respondents indicated that their institution is now putting more emphasis on exercising. A Fargo Cass Public Health official said that the health facilities conduct exercises since the 2009 flood. He said that they start meetings with health facilities every year in January to prepare for flood. Thus, annual flood equals annual exercise. They have learned much about flood preparations from these annual exercises. A representative from Hospital A said that they do exercises on regular basis. Some of them are tabletops, and others are actual exercises such as a fire drill when they actually move some patients who are not in serious condition. He explained, “When we were testing evacuation chairs, we put actual employees into the chairs and had other staff moving them down the stairs.” Hospital C now participates in tabletop exercises arranged by the North Dakota State Department of Health. Another representative of Hospital C reported that they had recent done a post-event tabletop exercise.

The tabletop was about who would coordinate what, who would be where, and other issues. Regarding how often they do such exercises, he said, “Well, Joint Commission, there’s a requirement about how often you go through your emergency preparedness plans if you’re a Joint Commission.” The two other representatives of Hospital C also stated that they do tabletop exercises. A representative of Nursing Home A said that they do tabletop exercises with Success Ambulance Service during which both entities work together to set up a mock evacuation exercise with a staging area. They pretend that they are coordinating assets, and, afterwards, they discuss vulnerabilities with their staff. Also as a part of the exercise, they go through their contracts, people, and trailers, and they check their shelter, as well.

In summary, much exercising is being done post-event, but much less had been done pre-event. The earlier absence of exercises once again raises the question about the role of prior experience on a community’s sense of readiness. In order to plan and exercise, do people need to experience natural disasters directly before they will realize that the likelihood of natural disasters is not as low as they previously thought? Unfortunately, the findings suggest that we do need such direct experience. Representatives of various facilities confirmed that, after experiencing the 2009 flood, they now have evacuation plans, do exercises, and have mutual aid agreements, as explained below.

### **Mutual Aid Agreements**

A mutual aid agreement can generally be defined as an accord between various agencies, companies, organizations, and/or state entities. The purpose is to provide a way by which one or more of the parties within the agreement can get emergency assistance when needed. This assistance could be personnel, equipment, or other disaster-related assistance that can provide disaster victims with needed resources as quickly as possible—before, during, and after disasters.

It is difficult to determine from the interviews exactly what the extent and nature of pre-event mutual aid agreements were. Responses varied on this matter, perhaps because the phrase, “mutual aid agreement,” can cover many different types of aid involving many different sets of partners. It does seem clear that (a) there were few, if any, mutual aid agreements based specifically on the possibility of a mass evacuation of healthcare patients to facilities outside the community and (2) that there has been considerable effort to rectify this situation since the event.

For example, the diversity of perspectives on the extent to which mutual aid agreements were in place pre-event is seen in the following responses. When asked whether or not any pre-event mutual aid agreements were in place before the 2009 flood, a Fargo Cass Public Health official responded, “Yes, the preparation was all there, but it had never been executed before. The State helps coordinate all the mutual aid agreements, so we did have all those mutual aid agreements in place.” In response to the same question, another Fargo Cass Public Health official stated, “If there were any, they were not uniform across the state,” and a third Fargo Cass Public Health official said,

I think, for the transportation piece actually through the State, we had mutual aid agreements in place. Of course, [Success] Ambulance was a partner for ambulances, and they had mutual agreements in place. So some of that was in place, but some of it was kind of scramble-at-the-last-minute.

A City of Fargo official also responded to the question about pre-event mutual aid agreements: “I don’t know. We [the City of Fargo] have mutual aid agreements with Sioux Falls and Grand Forks; some of it was in place before 2009.” A Clay Public Health official responded to the same question by saying, “No, there wasn’t much. The mutual aid agreements that we’ve had for mass dispensing in public health and everything else was made at the time of the incident,



every mutual aid agreement that needed to be signed.” Thus, each official gave a slightly different perspective about the issue, although there seemed to be a shared sense of uncertainty about exactly what did exist.

In contrast, respondents from the healthcare facilities—nursing homes and hospitals—were in agreement generally that pre-event mutual aid agreements for mass evacuation did not exist. One Clay Public Health official mentioned that nursing homes were given waivers, so they could surpass their agreed-upon census. A representative from Nursing Home A said that his facility did not have any mutual aid agreements with any other parties before 2009, but, after the flood of 2009, they signed a mutual aid agreement with their sister facility to help each other in disasters. They also signed a mutual aid agreement with the Long Term Care Association in which all members of the Association would mutually give a hand to one another when needed. A representative of Nursing Home B said that his facility had mutual aid agreements with other care facilities and with a private school in Fargo. However, the agreements with other care facilities in town were useful only in cases of fire or tornado. They did not have any agreements with facilities outside of town because they had thought that the chance of needing to evacuate the whole town was too slim. He also explained that his facility and all the other facilities in town had transportation agreements with the same transportation provider, which was a major problem because one provider cannot simultaneously transport all nursing home residents in the community.

Hospital respondents told a very similar story. When a representative of Hospital A was asked if they had a pre-event mutual aid agreement with another hospital, he said, “Oh, no. It was not an option to evacuate within the city.” He noted that Hospital A administrators selected the hospitals that would meet their patients’ needs. Another Hospital A representative responded

to the same question: “I don’t think so.” He remembered that they learned which hospital could provide which services for them on the night before the evacuation. A third representative of Hospital A stated, “We did not have any mutual agreements,” and the fourth representative of Hospital A answered, “We formed that during that week.” He went on to explain that the state health department and Cass County Health Department had the responsibility to ensure places for Hospital A patients when evacuated, but they could not do so at the time; therefore, Hospital A administrators had to make arrangements by themselves after being told to do so by the County Health Department.

A representative from Hospital C explained that they did not have mutual aid agreements in place before the 2009 flood, so the lack caused a great deal of confusion when the entire hospital had to be evacuated because hospital administrators did not know where to send all of their patients. Another representative of the hospital said, “I think there were some agreements with the School District to shelter-in-place at a school. I think there had been an agreement with a bus company that they would let us use buses.” However, the hospital representative explained that those were old agreements that had not been assessed or revisited for a long time. When a third representative of Hospital C was asked if there were any mutual aid agreements in place before the 2009 flood, he said, “No, not to my knowledge,” but he explained that they did not face much difficulty in finding hospitals that would receive their evacuated patients when they evacuated for the 2009 flood because they had planned ahead in the sense that they knew which hospitals in the area could offer assistance, as well as the kind of help they could provide. The fourth representative of Hospital C responded to the question about mutual aid agreements in place before 2009 by stating, “Not that I am aware of.” He added that, after the 2009 flood, they

established mutual aid agreements with hospitals out of the flood zone for future evacuations. Establishing mutual aid agreements is an advanced part of an evacuation plan.

While the mutual aid agreements appear to have been relatively rare, vague, and/or aging prior to the event, aid did become rapidly and generously available during the event. A representative from Hospital A said that many people stepped in to offer assistance: “That evening, we had outpouring of people asking us if they could help. We received calls from a number of healthcare organizations asking us how they could help.” Similarly, he noted that hospitals in Sioux Falls, South Dakota, and in St. Cloud and Minneapolis, Minnesota, were very agreeable to receiving Hospital A patients in the 2009 evacuation. Luckily, there were health facilities in the neighboring cities that offered help to Fargo evacuees and were very supportive of the Fargo/Moorhead evacuation efforts. However, this easily-available assistance runs the risk of creating a “moral hazard” in the sense that such ready help can reduce the perceived need for pre-disaster mutual aid agreements in the future.

## **Part Two: Evacuation**

Healthcare facility evacuation is a very complicated process, and it is even more challenging when outside third parties are involved by giving external evacuation advice and orders, when decisions to shelter-in-place versus evacuate are complicated by requests from other evacuating facilities for some of the same resources, and when on-the-ground evacuation factors (e.g., rising river levels and very poor weather conditions) complicate implementation. In this section, I examine evacuation advice and orders, the nature of the shelter-in-place versus evacuation decision-making process, and the immediate, on-the-ground factors that impacted final decisions.

## **Evacuation Advice and Orders**

As the predicted river levels increased, leaders from the community, county, state, and federal levels became increasingly focused on evacuation, and the issue quickly became complex. Evacuation could be limited to vulnerable populations and healthcare facilities or could involve the entire community; evacuation could be voluntary or mandatory; a mandatory evacuation order could come from the governor or from the city; a mandatory evacuation order could be issued in only one of the two states involved; healthcare facilities might or might not be reimbursed, depending on whether or not the evacuation was mandatory. In the midst of these complex contingencies, it is not surprising that decision-making was difficult and that post-event comments about the process were not always positive.

The acting FEMA director and the congressional delegation came to Fargo to speak with the mayor, and they recommended that city officials prepare to evacuate all of Fargo, the largest city in the state of North Dakota with roughly 100,000 people in 2009. The mayor and city leaders explained that they were prepared to successfully defend the city, so evacuation was not an option. Another city official recalled that the congressional delegation, North Dakota governor, and the head of the National Guard recommended that the town be completely evacuated, but the Fargo official said that he did not see evacuation as necessary because he did not “think they had a good value on what we had accomplished so far about what was going to happen.” When the state and federal officials asked the city official about vulnerable populations, he told them that the city would recommend that they evacuate but would not force them to do so. It would be up to nursing homes to make their own final decisions about evacuating or not. The official told the hospitals the same answer when they asked city officials

to make the evacuation decision—it was the responsibility of the hospitals to make their own decisions.

The mayor, commissioners, and Fargo Cass Public Health officials recommended that vulnerable populations evacuate, but none of the leaders officially issued a mandatory evacuation order for healthcare facilities. Fargo Cass Public Health officials expressed a great deal of concern over vulnerable populations because it would take a longer time to evacuate them if it came down to an evacuation of the whole town. A Fargo Cass Public Health Official recalled, “We met with the Governor, the head of Emergency Management from Bismarck, the city leaders, of course emergency operation leaders; no one wanted to issue a declaration they had to evacuate.” He said that they had many meetings with flood fighters and health facilities in town and telephone conferences with the governor of North Dakota, and they had involved various North Dakota state departments about responding to the 2009 flood. The governor also supported the approach that vulnerable populations needed to be moved out of the harm’s way. The official noted, “This was not long after the disaster of New Orleans and no one wanted a repeat of that. No one wanted people in water and some terrible mishap, so the decision was made that we should evacuate.” The governor gave the order to evacuate vulnerable populations, so Fargo city officials ordered healthcare facilities to prepare for evacuation. However, officials were not ready to issue an official mandatory evacuation order.

As the Red River rose beyond expectations, Fargo city authorities focused on quickly getting vulnerable populations out of harm’s way. One of the city officials explained that the physician who was head of Fargo Cass Public Health and the Community Health Director worked with their staff members to identify vulnerable adults. They studied nursing homes, group homes, individual citizens and the elderly in their private homes; they asked case workers

and even had a discussion with the Fargo Housing Authority. The city official said that they worked with city engineers to identify the groups that were at risk. Another official from the City of Fargo explained that he did not have much information about healthcare facilities. He asserted that it was a really difficult time, and it was not easy to make the decision whether to stay-in-place or to evacuate. He said, “I do know it was a very trying time, and nobody knew exactly what was going to happen, and our community was at a great risk.”

City leaders met several times to determine who was at risk, when they should be notified, and what actions they should take. Later on, plans were developed after studying evacuation needs such as where to take the evacuees. The official explained that some churches in Casselton, ND, offered to help, and city leaders coordinated at the incident command level to ensure assistance for the vulnerable populations. When the official was asked how he personally viewed the evacuation decision in retrospect, he said that one may suggest that flood fighters probably did more than they should have done, but it was not clear how high the river could rise, and weather service predictions were frightening. Therefore, according to the official, moving vulnerable people out of the risk area was better than rescuing them later, if the flood fighters failed to protect their neighborhoods. He noted,

In my opinion, the right decision was made and the way it was handled was in a very humane way. And, it was done very efficiently. I’m sure now we’ve learned some lessons, but if we had to do it again, we’d probably make the same decision.”

Similarly, a Fargo Cass Public Health official said, “We had been tasked with kind of keeping track of and figuring out the vulnerable population for Fargo - Cass.” It was challenging. The river level and weather predictions indicated that things were not going well. The predictions of river levels were much higher than people had ever seen. In addition, Fargo

Cass Public Health had not been involved in flood fights before the 2009 flood. The official said, “We did not know that there were so many unknowns.” The official said that they did not have enough transportation resources, did not have an evacuation plan in place, and did not have experience with how to evacuate vulnerable people out of harm’s way. The official said that nursing homes had thought they were ready when they were far from being ready. The official added, “Between the governor and the mayor, kind of made a decision that—because those vulnerable populations take longer to get out of harm’s way—that we needed to move sooner to get them out.” While the decision was made to evacuate the vulnerable population, Fargo Cass Public Health never received an official evacuation order. When a Fargo Cass Public Health official was asked if they learned why it was difficult to decide whether to issue a voluntary or mandatory evacuation order in the 2009 flood, he responded, “I don’t know if we specifically learned, but I think it’s a liability issue for some. I know the police are hesitant because mandatory implies that they are going to go door to door and forcibly make people leave.” He added that a mandatory evacuation order might not have even been realistic because the police department probably did not have the manpower to enforce the order.

Nevertheless, several respondents at various healthcare facilities indicated that an evacuation order—or what they apparently viewed as essentially an order—played a key role in their decision-making. For example, a representative of Nursing Home A explained that they did not have any plans to evacuate their facility in the 2009 flood because they had planned to defend their facility. Their CEO understood elevation issues, had looked at the facility’s elevation, and had thoroughly evaluated the situation. He came to the conclusion that it would be safe to stay if they defended the facility. The representative said that the reason they decided to evacuate was that they received a call from Fargo Cass Public Health officials telling them to

prepare to evacuate their entire facility. It was up to the facility to follow the recommendation of Fargo Cass Public Health officials.

However, the officials had told Nursing Home A administrators that, if they did not evacuate then and they needed help later on, there would be no guarantee that officials could provide them with the help and/or the resources they would need. The representative said that they felt they did not have any option but to evacuate, especially because the officials said that the state had decided that vulnerable populations needed to be moved out of the Fargo area. The CEO thought that, if there was an emergency like a dike breach, they would be unable to get their residents out of the facility without city support.

Similarly, a representative of the Nursing Home B noted that they had been monitoring river levels and working closely with Fargo Cass Public Health. The representative asserted that he was called by a Fargo Cass Public Health official at 11:00 p.m. and was advised to proceed with evacuation. He said,

They called and basically made the decision for us. If we pass up with the chance now we might not get the assistance with the resources. So, it wasn't necessarily a mandate at that point of time, but we proceeded as if it was.

He viewed the evacuation decision as the right decision. He said that they did not get wet, but they should not have waited until their facility was under water because not evacuating on time may easily have led to rescue operations. In reality, nobody prefers a rescue operation over the evacuation of a facility. City officials had ordered healthcare facilities to consider an evacuation and strongly pushed for evacuation, but it was up to each institution to decide whether or not to do so. It was risky not to follow the order. If they did not evacuate and the Red River water exceeded the dike levels, lives could be lost and the healthcare facility administrators would be



held liable. City officials told the administrators that assistance and resources could not be guaranteed if they chose to sheltered-in-place and needed help later. Finally, a representative from Hospital C explained the hospital's decision to evacuate:

The decision was not made by our facility or administration. The decision came by an issuance by the governor to have a mandatory evacuation of the facility. At the time, it was after a dike had broken at Oak Grove School.

A dike was breached at Oak Grove Lutheran School in north Fargo. The school was unoccupied at the time, and the water quickly filled the campus. Flood fighters responded by dropping sandbags to seal the hole without any casualties; however, the breach made politicians, administrators, and flood fighters more aware of the threat presented by the rising river. The evacuation order came to Hospital C from the governor. Officially, it was not a mandatory evacuation order, but, in reality, it was. A representative of Hospital C said, "So, it wasn't necessarily a mandated at that point of time, but we proceeded as if it was." He explained that it normally took days to prepare one patient to be discharged, but, in 2009, they only had three hours to evacuate the entire hospital. He added that Hospital C had never been emptied and refilled before the 2009 flood.

An added complexity surrounding the mandatory evacuation order was the need for the order to be issued before healthcare facilities could be reimbursed by their insurance companies for the business-interruption costs associated with an evacuation. A city official explained that nursing homes and hospitals wanted the city to issue an evacuation order because a mandate would help them in the reimbursement process. He stated, "And we would do that, you know, if we felt a liability; if we needed to evacuate an area, we would tell them, 'Yes, we need to evacuate.' "

I asked the representative of the Success Ambulance Service if the health facilities knew that they would have difficulty later on with insurance reimbursements. He responded by saying that it was probably a lesson that health facilities learned:

The state was involved. There was plenty of discussion on that probably the most difficult part was that facilities needed a mandatory order to evacuate in order for their insurance to kick in, and things like that, so, politically, that was not a thing that local leaders wanted to do—to tell people they needed to evacuate.

The representative of the Success Ambulance Service mentions that Fargo Cass Public Health physicians retroactively wrote letters to insurance companies saying, “We needed to, for life and safety, evacuate your facility. And some of that worked and some didn’t.”

An official from the Fargo Fire Department expressed his views about the decision-making process in disaster evacuations. He said, “The actual order for evacuation should have come out as an order. The insurance companies should have been able to pay, or, the insurance companies should have changed that clause, or something.” He stated that something needs to be done to enable the evacuated facilities to be reimbursed when they evacuate in hazardous situations. He noted that there were discussions in the 2010 flood season about what recommendations would be done if they needed to evacuate facilities. He said, “City administrator, the city leaders, said, ‘We’re not going to order an evacuation.’ And the facilities said, ‘Well, we’re not going to evacuate unless we get an order.’ ” The official said that the 2009 flood made city leaders, flood fighters, and even citizens more realistically view flooding as a disaster. A Fargo Cass Public Health official explained that leaders would hesitate to execute an evacuation after the 2009 evacuation if they do not get a mandatory evacuation order. Many agencies faced difficulties when they applied for reimbursement for business interruption and

lost revenue from the 2009 flood. He continued, “However, getting that mandatory evacuation order is not that easy—a lot of politics.” His statement may reflect the challenges faced by city officials when considering the issue of a mandatory evacuation order. When officials issue such an order, their decision has major consequences. In this case, city officials did not order city-wide evacuation but did push for vulnerable populations to be evacuated for public safety, with the final decisions to be made by the facilities.

For example, a representative of Nursing Home A described the situation that they did not have time to think about or to discuss money when they were responding to the 2009 flood and evacuating their residents out of the flood zone. The representative said, “North Dakota would not decide on a rate, where Minnesota decided on a formula and that what you were reimbursed...there was not an official evacuation order in effect.” He explained that, from a financial point of view, Nursing Home A should not have evacuated before they received an official mandatory evacuation order. He confirmed that they learned a lesson for future floods.

A Clay Public Health official clarified that they did not order the administrators of Nursing Home C (the largest nursing home in Moorhead) to evacuate, but they did provide Nursing Home C management with the information about the disastrous situation available at the time. They also presented their recommendations and the potential consequences of not evacuating. Nursing Home C administrators evaluated the situation and decided to follow their recommendations to evacuate. The Clay Public Health official also explained that Minnesota State authorities do not have the power to issue a mandatory evacuation order—that “it is all voluntary.” Authorities cannot tell residents, organizations, or companies to leave. Authorities can present their views and what they predict to occur, but can only recommend that citizens or organizations leave; it is up to them to decide. However, it is clearly explained that authorities

send first responders to help those in need *prior* to the disaster; *after* the disaster has started, responders will not be there to help if the risk is too great. The official noted that the policy in Minnesota makes it quite difficult to be reimbursed by insurance companies. He said, “Still, to this day, Nursing Home C is having some struggles to getting the money that is needed.”

Similarly, an officer from the Moorhead Police Department stated that the Incident Command System has the responsibility to evaluate the situation but cannot order anyone to evacuate. He said that citizens need to be aware of what is predicted to happen. Authorities may recommend an evacuation by saying, “Yes, you need to evacuate because we cannot help you to protect you,” but it would still be up to individuals to decide to evacuate or not. In Minnesota, people are aware that authorities do not have the power to issue a mandatory evacuation order.

### **The Evacuation Decision**

There were many challenges that had to be faced in deciding whether the city and/or healthcare facilities should evacuate. For example, few pre-event evacuation plans had been made, so authorities had no prior experience in conducting a mass evacuation; sufficient transportation resources were lacking; and limited mutual aid agreements had been made. Other challenges included stormy weather, frozen roads, and, of course, a rapidly rising river. By 2009, the Fargo/Moorhead area had survived many large scale floods: 1897 with 39.10 feet, 1969 with 37.34 feet, 1979 with 34.9 feet, 1997 with 39.72 feet, and finally 2009 with 40.84 feet (Schwert, 2011). However, none of the floods had necessitated a mass evacuation. Presumably, an order from the governor to evacuate vulnerable populations and the advice to evacuate coming from the city and from public health authorities would expedite the healthcare facilities decision-making, but that did not appear to be the case. Whether the evacuation order or the advice to evacuate tipped the balance for various institutions is difficult to determine, but it is

clear from respondents that many other issues beyond outside advice were reviewed before final decisions were made to evacuate or to shelter-in-place.

Respondents made a variety of comments when they were asked how they made their decision to evacuate or not. For the city, a Fargo Cass Public Health official explained that the city flood fight campaign used the Incident Command System (ICS) in fighting the flood, while the usual hierarchy structure remained in place. The ultimate decision-making rose to the level of department heads and the city commission. Healthcare facilities had few evacuation plans to provide decision-making guidance, so public health officials used available information to make the best decisions they could in the face of a rapidly rising river. The river rose to a level that people had not seen before, and nobody knew what was coming. A public health official said, “The decisions that were made were based on what we knew and what we were being told could possibly happen.” The official explained that the whole community fought the flood really hard, using millions of sandbags covering miles of dikes to protect the city with the mindset that evacuation was not an option. The city even created t-shirts with the message, “Evacuation is Not an Option,” printed on the back. Nevertheless, healthcare facilities face the real possibility of evacuating and a wide variety of issues in making their decisions.

### **Transportation**

On March 23, Fargo Cass Public Health met with Fargo healthcare facilities and asked them about their evacuation plans. None of the nursing homes had any evacuation plans that included moving their residents out of Fargo. Existing plans focused on the evacuation of individual facilities by moving residents from one nursing home to another nursing home or to other locations in Fargo, in the event of an emergency such as a fire. In 2009, all of nursing homes and a few hospitals needed to be simultaneously evacuated out of town, which required

extensive transportation resources—resources that did not exist locally. Dosa et al. (2007) found dependable transportation to be one of the most important issues in disaster evacuation. Easter Seals (2011) explained how important it is to (a) use the proper tools to transport evacuees from their rooms to an ambulance or bus, (b) find the proper positioning of an evacuee based on his or her needs and health issues, and (c) find appropriate ways to deal with evacuees with wheel chairs. Also noted is that volunteer drivers can present a challenge if they are not properly handled. Volunteer drivers must be tested, registered, and trained to do their jobs well. In the 2009 flood, professional, experienced drivers were needed because of the blizzards, snow storms, and icy roads.

The evacuation of facilities started on March 25<sup>th</sup> and continued for two-and-a-half to three days. Approximately 2, 500 evacuees were removed from nursing homes and group assisted-living facilities, but not hospitals. Hospitals somehow were on their own to evacuate, but they updated Fargo Cass Public Health on a regular basis about their situations and coordinated the use of transportation resources.

A Fargo Cass Public Health official explained that the evacuation decision initially identified only four nursing homes deemed vulnerable, but, by the end of the day, the city revised the decision to evacuate all fifteen nursing homes in Fargo. Even with the initial decision to evacuate four nursing homes, officials knew that they did not have enough vehicles to evacuate facilities. In addition, they did not have appropriate vehicles to specifically meet the needs of evacuees. Some evacuees were very sick, while others were in wheelchairs and on oxygen. Thus, the decision to evacuate all nursing homes triggered a major transportation challenge. Dosa et al, (2007) also found that challenges in the evacuation of healthcare facilities include not having enough transportation resources and not having appropriate transportation

resources, both of which often cause delay. Evacuation delay, in turn, can lead to the dehydration of the severely sick and/or elderly evacuees. Some companies had mutual aid agreements with local transportation companies, but the local government took control of those transportation resources to transport prisoners or to carry out other duties. One lesson facilities learned from that experience was not to contract with local transportation services.

In reality, evacuating even one nursing home presented a challenge. For example, residents (evacuees) of a single nursing home would likely be sent to more than one location. Thus, many evacuation buses were needed to drive to multiple locations outside the city, and the distance caused the buses to be gone for some time before returning to be reused. Furthermore, the turnaround time was extended because near-blizzard conditions created dangerous roads that demanded cautious driving. Additionally, drivers could not make more than one trip before resting. One major issue in the 2009 flood was that all of the Fargo nursing homes were contacting Success Ambulance Service to evacuate them, but the ambulance service could not evacuate all of them simultaneously. Luckily, other ambulance services, such as Rural Ambulance Service, came from a number of neighboring states to help evacuate the nursing homes.

A Fargo Cass Public Health official related one story of evacuating nursing home residents in unsafe road conditions. He said that either Delta or Northwest Airlines offered two commercial flights to Bismarck, so the authorities took advantage of the situation by flying evacuees to Bismarck, instead of driving them by bus and ambulance. He stated,

The reality is, a drive from Fargo to western North Dakota is eight hours in good conditions, and it was blizzard and icy the whole way. So, it was easier to, at least, let

them to Bismarck where they had more people who weren't having to fight the flood, fortunately dry at the time.

When they arrived in Bismarck, local and state health departments arranged transportation to take them to their final destinations further west.

Hospitals also faced major transportation issues. Hospital A, the largest hospital in the community with 350 beds, was entirely evacuated, but the emergency room remained open. One Hospital A representative said, "We had weather forecasted of winter storms, severe winter storm was arriving, and the water levels were continuing to rise rapidly on the Red." Hospital A established an Incident Command System in which members unanimously decided to evacuate the entire hospital to ensure the protection and safety of the patients. A representative from Hospital A explained that transportation resources had arrived from a number of neighboring states to participate in the evacuation of the nursing homes other vulnerable populations, so the city and Fargo Cass Public Health used the vehicles until 10:00 or 11:00 pm, at which time they were turned over to Hospital A to begin its evacuation at midnight. Hospital A used the resources until morning and then returned the resources to evacuate nursing homes again.

In addition to arranging for vehicles, officials had to arrange for the receiving of evacuees. Of course, the most desired locations were sites closest to the city. Fargo Cass Public Health officials knew that there had to be a well-coordinated effort to ensure the evacuation of all residents out of harm's way in a timely manner. A Fargo Cass Public Health official stated that the North Dakota State Health Department and the North Dakota Long Term Care Association conducted a major survey in the tri-state area of North Dakota, South Dakota, and Minnesota to determine the bed capacity in potentially available locations. Then, the responsibility went to Fargo Cass Public Health to match residents with the available beds.



Additional complexities and more difficult decisions were triggered by the need to return evacuees to their original nursing homes and hospitals. After patients and residents were initially evacuated, a second crest was predicted that was higher than the first crest, but the evacuees and their families wanted the residents to be back home for Easter. The question was “Should the evacuees be allowed to return when there was the prediction of the second crest?” The Fargo Cass Public Health official said, “We know that the evacuation itself was very, very hard on people, and we don’t want to put them through that stress again.

### **Weather and Time**

The flood was expected to happen, but it was not expected to happen as quickly as it did. When the seriousness of the potential flood had first become evident, the National Weather Service told flood fighters that they had two weeks to build dikes. However, meteorological events transpired too quickly and changed the timeframe to only a few days. A Fargo Cass Public Health official said that, in the 2009 event, they noticed that the flood prediction rose very quickly, so they did not have much time to decide how to deal with the possible results of the flood. Zane et al, (2010) clarified that an emergency team can order a pre-event evacuation if the team can anticipate that patients and/or staff may be exposed to an unacceptable level of risk. Another issue that Zane et al. points out is that the emergency team needs to assess in advance how much time is needed to evacuate a facility and that the calculation should include the time needed to move patients to the staging area and to load them into ambulances and buses under the particular weather conditions.

The time pressure was also felt across the river. A Clay Public Health official said that Moorhead contingency dikes were not designed to protect Moorhead if the Red River were to rise to 42 feet, so neighborhoods within a few blocks from the river needed to be evacuated

quickly. A few facilities were included in the area, and one of them was Nursing Home C with 450 beds, making it the largest nursing home in Moorhead. Staff members attempted to move the residents out of the area with the least stress possible. Because last minute evacuations can cause stress, confusion, and even fatalities, the facilities were evacuated before the river crested. Moorhead Incident Commanders communicated with Nursing Home C and recommended that the facility be evacuated, and the administration of Nursing Home C made the final decision to evacuate. A police officer from Moorhead said that the evacuation included Nursing Home C and other vulnerable adults in the general population.

Flood predictions were changing rapidly, and National Weather Service predicted a crest of roughly 43 feet. The Emergency Operation Center and the U.S. Army Corps of Engineers knew that they would be unable to protect certain neighborhoods at 43 feet. Therefore, the idea was to evacuate vulnerable adults ahead of time. When the vulnerable facilities agreed to evacuate, the city provided needed resources and assistance for the evacuation. The police officer said, “Everybody at that table had a vested interest in that facility. You got county; you got city; you got the federal agencies; you got the public health. They were all at the table when we made the decision.”

### **Facility Location**

A city official said that evacuation decisions were, to some degree, based on the level of Red River and facility elevations. City officials had to evaluate both a facility’s degree of vulnerability and its ability to keep patients for several days. The official noted that the river continued to rise, even as flood fighters were trying to evaluate these risks. When the river reached 39 feet, city officials thought the level was high enough to start discussing the type of evacuation needed.

### **Appropriate Roles**

The demands of making an evacuation decision actually altered the roles of some institutional participants and reinforced the roles of others. A Fargo Cass Public Health official said, “Historically, public health has only done tetanus shots and some environmental stuff after floods until the 2009 flood. We had never been a big player in a flood.” The official added, “Because we are a health department, the responsibility of coordinating potential evacuation of healthcare facilities fell to the health department, which was appropriate. After the 2009 flood, we established a Public Health Emergency Division.”

According to a Fargo police officer, the Fargo Police Department’s role was to support the decisions of the Incident Commander and the Director of Public Health during the 2009 evacuation. The evacuation went smoothly without any need to use police influence to ensure that people followed evacuation instructions. The officer supported the evacuation of vulnerable populations even though the healthcare facilities did not get wet.

### **Proactive Approach**

The effort to evacuate before flooding occurred reflected a widespread approach/philosophy that evacuating is better than rescuing. For example, a Fargo Cass Public Health official noted that water did not get into the evacuated facilities, but added that flood fighters should not wait until facilities are under water. Facilities should be proactive rather than reactive. A representative from Success Ambulance Service added,

In hindsight, we did what we could to protect the folks, even though they did not get water in their facilities. It certainly could have been the other way . . . . We don’t want to do rescue. When you do rescues, people die, and it is too late. So, the decision was certainly the right one.

## **Sheltering-in-Place**

A very difficult issue was to assess whether sheltering-in-place or evacuation would be the best option. The preferred option for patients seemed to be sheltering-in-place, if possible, but the threat of a flooded facility altered the calculation. Nevertheless, some respondents voiced frustration at not being able to shelter-in-place. For example, the representative of Nursing Home A said that keeping the facility open and sheltering-in-place would have been less traumatic to the residents and less costly for the facility. He explained,

We had residents that left us that were doing very well and very stable. They came home, and they were so debilitated and confused. They had gotten things like shingles, which we know is stress, and never came back. If they would not have evacuated, it would have never happened . . . . I know I lost residents to the 2009 flood. You cannot put that on their death certificates, but I know in my heart I did.

A representative of Hospital A clarified that, in general, if hospital administrators can ensure patient safety, it is much better to keep patients where they are, “so sheltering-in-place is the better option as long as you can maintain patient safety.” Similarly, a representative from Nursing Home A said that they told the city to “keep us open, keep us viable, let us stay in place.” However, preparations for sheltering-in-place can be quite elaborate, and it was not always clear in conversations with several respondents that such efforts had been considered prior to the flood. For example, preparations can include protecting buildings, reserving a week’s supply of fuel for a generator, storing enough food, water, and medical supplies for a week, and taking care to avoid sewer backups.

Hospital B with 100 beds is the second largest hospital in the area and is also the competitor of Hospital A. A representative of Hospital B stated that they prepared to be self-

sustained in case they ended up becoming an island during the flood. Preparations included food, potable water for patients, a power generator, and medical supplies for ten days. He continued,

Every day, we would take our patients' names and put them on a triage tag on a chart, so we knew that if we did have to evacuate where they would have to go. We made arrangements everyday about where these people would be going.

Furthermore, he clarified that they consulted with Success Ambulance Service to ensure the appropriateness of their evacuation process. The representative said that a consultant of Success Ambulance Service went through Hospital B's evacuation process with the staff, so the staff would know how to stage patients and how to load them up if patients had to evacuate. When asked if sheltering-in-place was the right decision, the representative said that it was the right decision because "it seemed like the right thing to do, and I certainly supported it."

Hospital B authorities stated that they sheltered-in-place during the 2009 flood because of their geographic location, specifically their elevation and their access to emergency exit corridors such as air evacuation and interstate highways. A representative added, "Certainly, we as an organization had a very well-developed emergency management plan, which included an evacuation plan, the staging, how we identify, how we triage, how we prioritize our patients." He explained that they continuously monitored river levels while preparing in-house capabilities for sheltering-in-place. The representative said that the community needed at least one of two hospitals with a trauma center to remain open. Hospital B administrators revisited their plans on a daily basis with local, state, and even federal emergency management centers by face-to-face, video, or telephone conferences. According to the representative, Hospital B administrators continued to evaluate their preparedness by

. . . looking at our access to core things of core medical supplies, blood, oxygen—those things—how we were handling waste disposal, how we were handling both potable and unpotable water, how we would be handling staffing and ensuring core staffing, so we were dealing with time on, time off, fatigue issues; we were being able to cycle staff.

A Fargo Cass Public Health official mentioned that the governor had ordered Hospital B to evacuate. The official said that Hospital B explained their decision not to evacuate by saying, “They’ve got it covered. You know, they’ve got a generator up there, the water, the bladder of water, and, they had a good plan; they were up higher, and they got lucky.” A representative of Success Ambulance Service noted that sheltering-in-place could have involved complicated access for Hospital B:

The only one [hospital] that did remain open was [Hospital B, and if you look at the flood inundation maps, had we breached the levies at the projection, we would not have been able to get to them. Their facility would have been dry, but there wouldn’t have been access into the facility.

When I asked a representative from Hospital B if the geographic location and the elevation of their facility were the reasons for not evacuating, he explained, “That was one of the things, to feel that we were very safe.” He also noted that the hospital checked their access to interstate highways on a daily basis. He added,

We did stop surgeries; we only did selective surgeries. We had limited clinical services as well . . . . We did try to get the census of our patients out as much as possible, so we didn’t have a whole hospital in case we had to evacuate.

Furthermore, Hospital B had installed portable toilets, had hired engineers to calculate how much water would be needed for staff and patients, and had readied the hospital sewer system.

Another representative from Hospital B also emphasized that the hospital was preparing for both sheltering-in-place and evacuation at the same time. In contrast, a representative from Fargo Cass Public Health stated,

Our recommendation, as a health department, to [Hospital B] was that they evacuate. We did have concerns that [Hospital B] could have lost their infrastructure, if the city had truly started to flood, and then, what do we do with all those patients there?

The official also explained, “We didn’t issue any orders. Obviously, they chose to not follow the governor’s mandatory evacuation order. We never really got into the details of why that all happened.” He states that Hospital B rejected evacuation, and it worked out. It was the hospital’s decision, but Fargo Cass Public Health officials made it clear to the administrators of Hospital B that, if the hospital got water into its facility, it might not be possible to evacuate all of the hospital’s patients at the same time.

When asked his view of the decision to shelter-in-place, a Hospital B representative said that he was comfortable with the sheltering-in-place decision. He asserted that the hospital administration had discussed their options carefully before making their final decision. He said,

The decision to stay open, active, and shelter-in-place, if necessary, was made by our senior leadership team. That includes our senior physicians, vice presidents, and above in the organization. All of those individuals have roles in our Emergency Operations Center, but that was really a key senior decision and fully supported across the spectrum of the leadership.

When a Fargo Cass Public Health official was asked about the decisions of the hospitals, he explained that Hospital A evacuated the entire building but kept their emergency room open. Hospital A only performed emergency surgeries and did not keep patients overnight. In other

words, they provided the community with medical care as needed, but they got patients out of the hospital for safety reasons. Similarly, Fargo Cass Public Health official said that Hospital B provided emergency services but did not do elective surgeries: “They were just doing what needed to be done to keep the hospital functioning.” In addition, the official explained that it was not clear whether Fargo would lose all hospitals in town. Therefore, a local medical team and a federal medical team together prepared to set up a medical center in Casselton to provide care, in case Fargo lost all health services. The fact that a local medical team and a federal medical team established a medical center in Casselton reflected the possibility that hospitals might not survive the event. Also a representative of Hospital B states that they stopped admitting patients when the river level reached 36 feet. On March 25, the Red River rose to 36 feet. Hospital A evacuated on March 27, but kept the emergency room open. According to a Fargo Cass Public Health official, Hospital B did what needed to be done to keep the hospital functioning. Based on what Hospital B did when the Red River rose to 36 feet, it ultimately appeared that there was very little practical difference between the medical service provided by Hospital A or B to the community.

Hospital C was completely evacuated during the 2009 flood. A representative from Hospital C explained the hospital’s decision-making: “The decision was not made by our facility or administration. The decision came by an issuance by the Governor to have a mandatory evacuation of the facility. At the time, it was after a dike had broken.” As noted earlier, the water from the breached dike covered a nearby school campus quite quickly. Flood fighters responded by dropping sandbags to seal the breach without casualties. However, the breach made politicians, administrators, and flood fighters even more serious about dike breaches and the possible impact such a breach might have, specifically on Hospital C.



Hospital C is located next to a major clay dike. Had there been a breach, water would have quickly flooded the first two floors and initiated an immediate rescue operation by city emergency personnel. The rescue would have required transferring patients through the third-floor windows of the hospital. A representative said that Hospital C had initially decided to shelter-in-place because the administration was under the assumption that the hospital was fully prepared to endure the flood.

The reality of the dike breach by the school changed the equation. The Hospital C representative said that the breach raised the question, “Would they [Fargo city emergency workers] have been able to get here and move our people if they needed to?” The potential consequences of the situation led to a change in thinking, and the decision was made to abandon sheltering-in-place. Deciding to evacuate, however, changed plans substantially. The representative said,

So, the first part was, we weren’t organized; we weren’t ready; we weren’t prepared; we didn’t know where our people were going to go. When we were told there was no option—it was a mandatory evacuation—we had three hours or so to get it done.

When the hospital was ordered to evacuate, the sudden change turned things upside down.

A second representative of Hospital C said, “We had not planned on evacuating. We had planned on sheltering-in-place. We didn’t do much to plan for an evacuation because, from our perspective, that wasn’t going to happen . . . We had fully planned to shelter-in-place.” The representative added that the hospital received a call from a Fargo Cass Public Health official telling the hospital administrators that they had been ordered by the governor to evacuate their entire hospital. When asked about his views about sheltering-in-place, the representative said that the hospital should have been prepared to evacuate.

A third representative of Hospital C asserted that the hospital evacuation was a mandate from the state. The representative confirmed that this was a last-minute message. A fourth representative of Hospital C also said that they did not have any evacuation plan because they had planned to shelter-in-place. At the last minute, the governor did not approve the hospital's sheltering-in-place plan and ordered the hospital to evacuate completely. The Hospital C representative said, "I believe it was within two hours we had everyone out of the facility, so it was very last minute planning." When asked about his view of the evacuation decision, he replied,

I wish we would have planned earlier. I wish there would have been a little more notice that it was not going to be up to us in the end, and I'm glad that, going forward, we have a better plan.

Even though the governor did not approve Hospital C's plan for sheltering-in-place and the governor ordered the hospital to evacuate, no official evacuation order was issued. This evacuation-order-limbo created difficulty in gaining reimbursement for evacuation expenses. Healthcare facilities needed an official mandatory-evacuation order to facilitate insurance reimbursement.

### **Evacuation Factors**

In addition to asking respondents about their evacuation decision-making process, I also asked them to identify factors that led to their final decision to evacuate or not. Respondents repeated some of the comments reviewed above, but their answers were often more specific than before—more focused on specific flood-related concerns. Perhaps the question made salient the fundamental logic behind the evacuation of vulnerable populations in the 2009 flood—the need

to move vulnerable individuals out of the town first, in case the entire town had to be evacuated. This logic focused attention on the specifics of the flood fight.

For example, a Fargo Cass Public Health official viewed the following issues to be evacuation factors: (a) the rising river level, (b) the possibility of the entire city being flooded, (c) the agreement among flood fighters that health facilities should be evacuated in a timely manner to avoid a rescue operation, and (d) the great support facilities received from others. As noted earlier, the official said, “This was not long after the disaster of New Orleans, and no one wanted a repeat of that. No one wanted people in water and some terrible mishap, so the decision was made that we should evacuate.” Another Fargo Cass Public Health official listed the following factors: (a) concerns about the reliability of dikes as more and more sandbags were added and (b) recognition that breached dikes would rapidly lead to the flooding of very large areas within the city. A third Fargo Cass Public Health official added that they were looking at how much higher the river could get and at what level water could get into certain facilities. Finally, another evacuation factor that received attention was the nature of the nursing home populations. Preparing for evacuation, Fargo Cass Public Health wanted to know how many residents were bariatric (severely obese), how many needed wheel chairs, how many were on ventilators, and how many had other special medical needs. In the evacuation process, they would need special equipment and extra time to move these populations.

A representative of Success Ambulance Service explained that they received information from city and county engineers about increases in river levels, about how much water the city infrastructure could handle, and at what point they would lose the sewer and water systems. Therefore, evacuation factors included the following: (a) the geographic location of the facility, (b) the projection of the river level, (c) if there was a breach, whether or not people would have

been able to stay in their facilities, (d) whether or not the facilities had enough resources to shelter-in-place, and (e) whether or not such resources would last for five-to-seven days. A representative of Rural Ambulance Service perceived the evacuation factors to include the following: (a) frightening weather forecasts, (b) the location of facilities, (c) the flood fighters' recommendations, and (d) timing to avoid an evacuation turning into a rescue effort.

The representative of Nursing Home A said that they were planning to shelter-in-place for the 2009 flood until Fargo Cass Public Health officials called them to recommended evacuation. The official gave them the option not to evacuate, but explained that, if they did not evacuate before an emergency situation developed, Fargo Cass Public Health might not be able to provide them with the resources they would need to evacuate at a later date. Fargo Cass Public Health officials also told Nursing Home A administrators that, if water surrounded their facility, emergency vehicles might not have access to their building. Negotiating back and forth, an administrator of Nursing Home A asked city officials and Fargo Cass Public Health officials if they could keep the two main traffic corridors in their area open. The nursing home administration was thinking that, if the two corridors were open, they could shelter-in-place and evacuate later on, if the worst occurred. The representative of Nursing Home A said,

If they were going to let [the two traffic corridors] flood, getting residents out and getting staff in would be an issue, and so we had to look at that issue of safety. If the city was not going to support our staying as viable, we couldn't do it by ourselves.

Thus, the evacuation factors for Nursing Home A were the potentially negative consequences of sheltering-in-place. The representative of Nursing Home B said that the city could not guarantee providing services such as clean water to the building or maintaining the sewer system of the

building. Without city support, the administration of Nursing Home B believed they would not be able to shelter-in-place.

A representative from Hospital A said that there were many factors that made them decide to evacuate. Among the factors was the possible failure of the city infrastructure. Should the infrastructure fail, the possible consequences included the following: (a) failure of sewer lines, (b) lack of clean water in the building, and (c) the hospital becoming an island. He explained that they were not afraid of water coming into the building. Another representative of Hospital A explained that there was a great deal of uncertainty about what could happen in the few days before Hospital A evacuated. He also asserted that their evacuation process went well because the leadership of the hospital was involved in studying the situation and in the process of decision-making during the 2009 flood. A third representative of the hospital mentions that they were concerned about the safety of their patients. Had Hospital A lost hospital infrastructure, they would have put all of the patients of Hospital A at risk. Therefore, hospital administrators decided to evacuate to avoid the risk. A fourth representative identified evacuation factors to be the safety of their patients and staff, whether or not the hospital would be able to respond appropriately if flooded, and whether or not an inability to respond appropriately would lead to a mass casualty situation. Other factors he noted were frozen roads and stormy conditions. The representative said that Hospital A evacuated before they were forced to evacuate. Had they waited to evacuate until their infrastructure failed, they would have faced greater risk with the poor roads and bad storm.

According to a representative from Hospital C, their initial plan was to shelter-in-place. They were preparing to have enough supplies in storage and enough fuel to power a generator to be self-sustained for 96 hours. However, after the earlier-mentioned dike breach, administrators

became seriously concerned. If a nearby dike failed, responders might be unable to enter the building to rescue patients. The hospital representative said,

It would be easier to move our patients out of the facility before water would rise to the point of needing boats . . . . So, we learned how much more limited we would be than we previously had thought we would be to shelter-in-place.

Additionally, administrators learned that the hospital could not shelter-in-place because their two generators would not be useable if the city infrastructure was lost. The largest generator uses gasoline that is stored under the ground on the first floor in their building, so, if water entered their building, the fuel would be lost. The second generator uses natural gas, so the loss of the city's infrastructure would cut off the gas supply to the building. Thus, evacuation factors for Hospital C included the following: (a) knowledge that a dike in town had breached and (b) concern that a nearby dike behind the Hospital could breach and quickly lead to water filling the Hospital's first few floors. In addition, another representative of Hospital C indicated that the reason for dropping their initial plan to shelter-in-place was lack of resources. Still another representative of Hospital C indicated that the evacuation factors included the following: (a) the location of the Hospital in a low lying area near a major clay dike; (b) the rapidly rising river level; and (c) the extremely negative consequences that the hospital would experience should the city infrastructure fail. The hospital depended on the city for services such as water, electricity, and maintenance of the sewer system.

Commenting on the situation, an official from the Fargo Fire Department said that Hospital C was dependent on city services. Even though the hospital administration initially planned to put their patients in the fourth and fifth floors because flood water would never reach those floors, the hospital would still need city services such as clean water and the sewer system.

Should conditions worsen, patients would need to be rescued by boats through the windows of the building. The official also explained that the concern about the importance of city services was relevant to nursing homes, as well.

Thus, a number of specific, event-related concerns were identified by respondents as evacuation factors. These factors favoring evacuation included the following: (a) the National Weather Service prediction of rising river levels, (b) the possibility of the entire town flooding, (c) agreement among flood fighters and state officials on the advisability of evacuation to avoid subsequent rescue operations with the state as a strong supporter of the evacuation operation, (d) the increasing use of less reliable sandbag diking, (e) the city's very flat terrain, (f) the lack of adequate supplies for five days or more, and (g) the possibility of facilities becoming islands separated from city services. Factors cited as reasons to stay included the impact of evacuation stress on patients, especially the elderly. The difficulty of making the evacuation decision varied from facility to facility depending on the geographic location of the facility, the proximity of exit corridors or the river, and the size of the facility (i.e., the larger the facility, the harder it would be to evacuate).

### **Part Three: Institutional Aspects of the Evacuation**

Flood is a natural part of the ecosystem. In fact, historically, flood has benefited communities. However, the rapid degradation of the natural environment from factors such as human deforestation and agricultural practices has caused floods to become more destructive and harmful to many communities. Therefore, vulnerable communities need to create strategies to protect human life and property, which is a great challenge for individuals because protective measures require specialized skills and vast resources. Institutions, organizations, and agencies are better equipped to develop protection strategies and plans, so institutions are responsible for

protect lives and property in their communities. Thus, in the 2009 flood, the City of Fargo, the City of Moorhead, public health and police departments, and many other institutions worked tremendously hard to protect their community. These institutions also took into consideration that vulnerable populations should be taken care of first. Therefore, they decided to evacuate nursing homes, hospitals, and other vulnerable populations while they were fighting to protect the city from the river water.

### **Institutional Roles**

Many different kinds of institutions have been designed for various purposes. Some of them are governmental, and they are financed by tax payers to serve the community. While these institutions have a great deal of power and authority and are responsible for carrying out many tasks and duties, they may or may not play their expected roles. Protecting the community in disastrous situations is one of their core responsibilities. In New Orleans, institutions came under attack when they could not provide the community with tools and resources that would enable people to move to safe places.

Another type of institution that is designed to serve the community's welfare is the healthcare system, including hospitals and nursing homes. Although some of these institutions are commercial enterprises, they are all responsible for the safety and the well-being of their patients and residents. Thus, in the 2009 flood, local, state, and federal governments worked hard to provide the community with resources, skills, and information to ensure the safety of the citizens, in general, and of vulnerable populations such as hospital patients and nursing home residents, in particular. Administrations of hospitals and nursing homes were constantly informed about the flood stages and flood situation in order to make the right decisions for their institutions and their patients. Similarly, healthcare institutions worked hard and cooperated with



local and state authorities to protect their vulnerable populations and to provide the community with healthcare services. Consequently, some agencies, institutions, and organizations accepted roles and responsibilities that they had not taken on before. Also, some individuals within agencies or organizations had to accept new roles. Fargo, in its long history of flooding, had not engaged in a mass evacuation before the 2009 flood.

### **Public Health and Ambulance Service Roles**

For example, a Cass Health Public official explained that, in the 2009 flood, the role of Fargo Cass Public Health was dramatically changed. The official said,

Historically Public Health has only done tetanus shots, some environmental stuff after the floods, you know, after the fact. Until 2009, that was really our role. So, we had never been a big player in a flood, 2009, that all really changed.

The official explained that Fargo Cass Public Health staff played their role very well. Their department was fighting the flood on “equal footing” like other departments. They were there with their plans and helped to evacuate nursing homes when it was necessary.

When another Fargo Cass Public Health official was asked if individuals, companies, and departments had higher expectations for Fargo Cass Public Health, the official said, “I think, initially, there may have been some resistance as to why Public Health was becoming so involved; every facility kind of wanted to do their own thing.” When asked if others viewed Fargo Cass Public Health as the “big brother,” the official responded negatively. He made clear that no one could deal with the situation on their own. All involved parties met around the table to discuss the situation and possible plans. The official noted that Fargo nursing homes had mutual aid agreements with each other, but all of them needed to be evacuated simultaneously. When others understood that Fargo Cass Public Health was coordinating activities in the 2009

flood, they wanted to meet all the time. When asking whether others were satisfied with the role Fargo Cass Public Health played, the official said,

Yes. They are very happy. . . that somebody else is taking care of it. They certainly look to us for this expertise. . . .It was so new to all of us. Somebody had to make the decision that somebody had to be in charge here. It only made sense that it had to be us to be in charge.

An official from the City of Fargo commented about the role of Fargo Cass Public Health:

They embraced their responsibilities in '09 and went through it for the first time and they did a good job. I think they did a self-evaluation after '09 and determined they could do some things differently that would enhance their capabilities.

The official stated that there were some issues when it came to transportation, but it was about who would have to pay for what services. The city officials addressed these issues later.

Similarly, a representative from Hospital B explained that Fargo Cass Public Health learned much from the 2009 events so that they were better in 2010 and 2011. Fortunately, neither the city nor the facilities were flooded in 2009, so the 2009 flood proved to be a valuable exercise for authorities, agencies, organizations, companies, and even citizens. Everyone learned from that event. In the 2009 flood, Fargo Cass Public Health was significantly involved in planning strategies, helping nursing homes evacuate, and providing updated information to the healthcare facilities and general public.

A representative of Hospital A further explained that they carried out their hospital evacuation, but Fargo Cass Public Health was supportive. He also said that Fargo Cass Public Health learned from the process of evacuating Hospital A. When another representative of

Hospital A was asked how satisfied he was over the role Fargo Cass Public Health played in the 2009 flood, he answered,

I was extremely happy with Fargo Cass Public Health. . . . prior to this, we met on a regular basis. They provided us with information. We worked in tandem. We were very satisfied with the State and Fargo Cass Public Health.

He stated that the State of North Dakota and Fargo Cass Public Health continuously informed Hospital A as events unfolded in the area. Another representative of Hospital A viewed things differently. When he was asked if he was pleased with the role that Fargo Cass Public Health played in the 2009 flood, he responded, “We weren’t in 2009. We’re much more encouraged now because they, too, have learned. They are much more organized for scenarios like that.” He indicated that his perception was based on the health department’s inexperience and lack of resources: “I think they knew what to do, but they did not have the resources or the knowledge to accomplish it. I think that’s what they have built up over the last couple of years as I’ve interacted with them.”

A Clay Public Health official expressed his satisfaction over the role his agency played in the 2009 flood. He said, “Public Health was new to the whole game. We had established what Public Health would do during a disaster, but it hadn’t been practiced. And, we were accessed and used effectively.” The official explained that, besides helping to carry out the evacuation, Clay Public Health staff helped sheltering and established communication with the American Red Cross. Another thing they did was establish a public shelter liaison in order to have consistent communication.

Regarding ambulance services in the 2009 flood, I asked the representative of the Success Ambulance Service if people asked them for services out of the range of their responsibility or if

people had greater expectations than the Success Ambulance Service could provide. He said,

The question was, “How would you surge up your hospital facility to receive more patients and how would you take your less acute patients and move them to nursing homes?” They all uniformly said, “Call 911, the ambulance service will take care of it.”

Nursing homes did not do much of their homework. They left most of it to Success Ambulance Service. The representative indicates, “I would say there was a great expectation that they would just call, and we would take care of it. And that was too much to expect and wasn’t accurate.”

He explained further that, after the 2009 flood, they more realistically understood the role that the Success Ambulance Service can play in evacuations. Before 2009, a culture that did not emphasize planning and exercises, combined with previously successful flood fighting experiences, led to a common belief that the city was unlikely to ever really flood and may have contributed to the previously-mentioned “readiness syndrome”—that calling Success Ambulance Service for almost any disaster-related problem at any day or time would result in positive outcomes because they could take care of any challenge.

The representative of the Success Ambulance Service gave another example of facing issues out of their area of expertise. He said, “After discussing it and figuring it out, well, we need a lot of buses and wheel chair vans. Well, that’s not our area. We don’t have buses and wheel chair vans.” He explained that it was the responsibility of the nursing homes and public health department to sign contracts with school districts to access school buses and with private transportation companies to get wheel chair vans.

A representative of Hospital A expressed satisfaction over the role that the Success Ambulance Service played—that the Success Ambulance Service did an excellent job. Although Hospital A and Success Ambulance Service had never practiced evacuation together before, the

evacuation went well. Regarding Fargo Cass Public Health staff, the representative of Hospital A explained that they made their best effort, but they were in a difficult situation, and their hands were tied. He continued,

They do a fantastic job of looking at the elevation points, and we talk about risks. We do risk assessments for our facilities, so they set a prioritization of which facilities are at the highest risk. We concentrate our evacuation processes on them first, so I think that they're very truthful and think they do a fantastic job.

He also explained that the Success Ambulance Service played the intermediate role between Hospital A and state officials. There were ambulances from different states to help. The Success Ambulance Service was available whenever they called, the representative said. A representative of Hospital B also indicated that the Success Ambulance Service staff members were supportive by “making sure we were going through the process. They have helped us tremendously to make sure we have our processes in place.”

When asked if he was pleased with the role that Fargo Cass Public Health played in the 2009 flood, a representative of Hospital B said,

Overall, yes. I think, if there was one area we were not satisfied—in fact, we were disappointed—that we were not more actively involved once Hospital A made the decision to evacuate, that we were not brought into that discussion much earlier on in the process.

He added that it would have been an opportunity for Hospital B to learn what might need to be done differently. He continued,

I do think that was a communication break down because that discussion was being done within the City/County EOC and Hospital A and the National Guard and others, and, we

were excluded from that process. I think that was a serious breakdown.

A representative of Hospital C stated that Fargo Cass Public Health officials explained several safety concerns to the administration of Hospital C—specifically that the hospital was located too close to the river and too near the clay dike. Thus, evacuating the hospital was in the best interests of the patients, the hospital administration, and the community. The representative stated that someone had told the governor that Hospital C was still operating, but that it should not have been operating because of its location. That statement convinced the governor that Hospital C should be evacuated. The representative stated that, at the time, the Hospital C administration believed they could cope with the situation, but that continuing to operate was probably not risk-free. When asked if he was satisfied with the role that Success Ambulance Service played, he said, “They were great—couldn’t have been done without them, really.” He added that the Success Ambulance staff joined the Fargo Cass Public Health staff and helped them more than they even expected.

Another representative of Hospital C viewed the role of Fargo Cass Public Health more positively. When asked how satisfied he was over the role Fargo Cass Public Health played, he replied, “I think they did the best that they could. I think people just did not realize the magnitude of it . . . I just don’t think they were prepared for it.” The representative also commented about the role that Success Ambulance staff played in the evacuation: “Yes, they were very helpful with the folks that we had to send out.” Another representative of Hospital C said that they were not aware of any evacuation plans and that they were admitting patients up to the day that they evacuated their facility. In regard to the role of the Success Ambulance Service, the representative said, “They were very helpful with the transportation piece; accordingly, with other communities, they provided all of the transportation.”

The representative of Nursing Home B expressed how satisfied he was over the role Fargo Cass Public Health played: “I’m very satisfied. I mean I couldn’t give them enough compliments for what they were dealing with on the fly. We coordinated as a group; we came together as a community; we had a good plan going in.” He also stated that the Success Ambulance Service did an excellent job: “In 2009, they came through with flying stars, you couldn’t ask for more.” He also appreciated the help provided by state officials. Regarding the role of the Federal Emergency Management Agency, he said,

Where were all the big bosses at the federal level? What resources can they bring in?

Are they really here to help us out? But, government’s set up to be locally managed, so, for us, everything worked out fine. It’s just when you see FEMA, it’s always after the fact, after the disaster.

The vast majority of healthcare facilities and other actors fighting the 2009 flood were satisfied with the role that Fargo Cass Public Health played in the flood, although Fargo Cass Public Health was new in the flood fight. Similarly, all of the research participants were satisfied with the role that Success Ambulance Service played and the assistance they provided healthcare facilities.

### **Hospitals**

A representative of Hospital A expressed dissatisfaction over the role that the media played in covering the Hospital A evacuation. He said, “I wasn’t happy with them. I mean, if they really wanted the true story, they should have come and asked.” He also argued that Hospital A should have promoted the event:

I think the mistake we made was we didn’t pull in media people to handle the external

communication. We were concentrating on internal communication, making sure our staff understood because, unfortunately, many of our staff members found out about the evacuation after it had occurred because they weren't here on shift.

He said it was a learning experience. They should have invited PIOs and marketing experts, and they should have concentrated on external communications in order to tell the true story. A representative from Hospital A commented on this issue by saying, "One of our radiologists ended up doing patient triage. . . . He was great at it, but he did not know he was going to do that." A representative of Hospital A clarified that the Hospital A administration wrote the evacuation plan for the 2009 flood just two days before they carried out the evacuation, so there was not enough time to let all of their staff know about the plan. However, the Hospital A representative expressed his belief that it was better that they wrote the plan just before the evacuation because the reality of the flood threat allowed the Hospital to put together the best experts to write an evacuation plan that, consequently, was rich with important details. According to the representative, those experts do not have time in their normal routines to sit down together and write a plan. Also, the plan was specifically designed and detailed for the 2009 flood. In contrast to emergency management and disaster research, the representative was convinced that a plan written before the disaster struck would not have been as useful as the one written two days before the evacuation.

A representative of Hospital C said, "In '09, it was hard for us because everyone was thrown into roles they're not typically in, and it went well. Teamwork was what it needed to be to get out of here." Because many people view hospitals as the safest institutions, they might try to seek shelter in hospitals when a disaster strikes. As it is explained in the literature review chapter, a hospital can be a victim. In fact, that was the case in the 2009 flood, especially for



Hospital C because of its low elevation and location near a major clay dike. With a breach in the clay dike, Hospital C's first and second floors would be filled quickly with water. In order to avoid becoming disaster victims, hospitals need to prepare before a disaster strikes. The California Hospital Association (2011) explains, "Hospital plans for full or partial evacuation should incorporate pre-planning and address the incident command and management structure established for its operational area (community)."

The 2009 flood in Fargo changed the way that city administrators, health officials, and even the general public viewed floods. In 2009, Hospital A—the largest hospital in town—and Hospital C—a mental health hospital—and all nursing homes were entirely evacuated. Hospital B prepared for sheltering-in-place. Representatives of Hospital B said that they had an evacuation plan if the situation worsened and forced them to evacuate. When asked about his organization's view of Hospital B's situation, a Fargo Cass Public Health official stated, "It was a decision made by the facilities and encouraged by us because it was a decision closer to the river and lower elevation and higher risk. And, [Hospital B] decided they would not evacuate."

The official clarified that Fargo Cass Public Health did not need to force Hospital B to evacuate. They did not force Hospital A either, but they were quite concerned about Hospital C because of the location of the hospital. The hospital is just next to a permanent dike, and, if the dike breached, the water would have covered the hospital up to probably the third floor. He said, "We did not want to be rescuing them out of windows with boats. . . .[Hospital A] evacuated all their patients, but because they didn't have any [clean] water [in the building]." Hospital A did not close their emergency room, and they still provided some services, such as emergency surgeries, but would not keep patients in their facility overnight. The official said,

They provided care for the community, as needed, but just got the patients out of the hospital for safety. At the same time, [Hospital B] provided emergency services, and they backed off. They did not do elective things; they did not do elective surgeries. They were just doing what needed to be done to keep the hospital functioning.

He also stated that Fargo Cass Public Health asked state officials to arrange for a federal medical team to set up a hospital in Casselton as a back-up medical facility, in case Fargo hospitals were flooded.

According to a Fargo Cass Public Health official, Hospital A and Hospital B provided the community with essentially the same type of medical services. Hospital A evacuated and Hospital B sheltered-in-place, but the service outcome was very similar. A representative of Hospital B representative explained the situation:

We were at 41 feet at the time . . . . The projected rise in the river was to be at 43, and the hospital made the decision to stand and hold, which felt that, basically, if [Hospital A] went down, you needed to have one hospital in this size of community.

However, a Fargo Cass Public Health official, who is a neutral party to both hospitals, made it clear that Hospital A and Hospital B provided the community with the same type of medical services. Another Hospital B representative explained the final service decisions by saying, “I think it was a business decision, more than a community decision, on each party’s part.”

A representative from the Success Ambulance Service explained that Hospital A evacuated their main campus, their second campus on South University Drive, and a small facility for critically ill patients called Kindred Hospital that was also located on South University campus. Another hospital in town, the Fargo Veterans Affairs Medical Center, had transferred all its patients to other facilities in the weeks preceding the 2009 flood, so Hospital B

was the only one in town that did not evacuate. The ambulance representative said that the elevation of Hospital B caused concern because, had there been a dike breach at the water level that the National Weather Service anticipated, Hospital B would have been surrounded by water. Their facility would be dry but there would not be access into the building of Hospital B.

There were political issues involved in the situation so that Hospital B did not evacuate, while Hospital A did. These two hospitals are rivals in town. There were people who said that Hospital A evacuated because its administrators cared about the safety of their patients and their staff. On the other side, there were people who said that Hospital B did not evacuate in order to serve the community. A representative from Success Ambulance Service expressed his perception of the situation:

Of course, hindsight is 20/20. I believe the elevation of the two facilities in relationship to the river had just as much to do with it as any. I find it hard to believe that, if [Hospital B] was located where [Hospital A] was, that they would remain open. The circumstances were different for each.

A city official also explained his view of the situation of Hospital A: “Well, what we really criticize them for is really not coming down and talking to us about that because, working with engineers, we would have told them the risks of doing that.” I, as a researcher, was wondering if I could cross-validate this city official’s statement by asking a third party whether or not Hospital A administrators spoke with flood campaign leaders to evaluate the situation and assess their level of risk during the 2009 flood. When asked, a Fargo Cass Public Health official stated,

[Hospital A] was in constant consultation with us, with the State Health Department, and with the National Weather Service, the City of Fargo emergency managers . . . . I mean

there was constant communication of “Do we go? Do we stay?” Their location, obviously, is at much higher risk than [Hospital B], and I think the larger concern at [Hospital A] was city infrastructure.

The Fargo Cass Public Health official added, “They certainly did not make that decision on their own. They were in constant communication with us, with the city, with city officials. I truly believe everybody made the best decision they could with the information they had.”

A representative from Hospital B also believed that Hospital A had attended meetings with city officials before evacuating. Another representative from Hospital B stated that the county/city emergency operations center, state officials, the governor, and the National Guard were working fairly closely with both Hospital A and Hospital B. He said that Hospital A did not notify Hospital B that Hospital A had issued an evacuation order. The representative of Hospital B said, “Once they had made their decision, we had already started proactively taking down, and, if we were actively looking at high acuity patients and wanted to be transferred into us or directed somewhere else, we weren’t taking.” When the river level was at about 36 feet, Hospital B stopped taking patients and directed them to other triage facilities outside of the flooded area. The official added, “We worked directly with the governor’s office, with the National Guard, with FEMA to determine if we were escalating to a risk level where we needed to evacuate.” At that point, if they had to evacuate Hospital B, they would have to evacuate dozens of patients instead of hundreds. He explained that hospital size was an incredibly important component in this case, and it played a role whether to evacuate or not. His hospital had 100 beds, while Hospital A had 350 beds.

The city official who said that Hospital A did not attend the meetings believed that Hospital A did not need to evacuate. He stated,

We're a flat area . . . if we had a breach in our system, what would happen is the water would come over the edge, start to fill the neighborhood, and you have four to six hours to do things—you'd have quite some time before you'd have anything happen . . . , so [Hospital A] could have had a contingency dike all the way.

The official argued that, if the infrastructure of Hospital A did not get overwhelmed, Hospital A could have defended itself. He also explained that the city had numerous pumps that could pump water out, if needed. He gave the example of the breach at the Oak Grove school; the city dropped sandbags to seal the hole, and then they pumped the water out. He stated that there were two breaches in the 2009 flood, and they repaired both of them within 12 to 24 hours. According to the official, Hospital A evacuated in four to six hours, and, even in a dike breach, one would have four to six hour to evacuate because Fargo is a flat area. In other words, if Hospital A had not evacuated and the dike was breached, Hospital A would still have had four to six hours to complete their evacuation. In contrast, all of the other interviewees supported the concept of evacuating in advance to avoid rescue operations, suggesting that they could not be sure of having the time needed to evacuate.

A representative of Hospital B did not express an opinion about whether or not the evacuation of Hospital A was necessary in 2009; he stated, "That's something that is a hard call. I cannot have any comment on." Another representative of Hospital B pointed out the differences in the locations and elevations of Hospital B and Hospital A. He stated that Hospital B and Hospital A were coping with two different realities: "I do think there was a level of risk, or perceived risk for our colleagues at [Hospital A] was different, both from a perception and a reality perspective that we would have faced here."

Asked whether the evacuation decision of Hospital A made sense, a Fargo Cass Public Health official said, “Well, [Hospital A] evacuated all their patients, but, because they didn’t have any water, they didn’t stop like emergency services and things like that. They still provided some services; they didn’t keep patients in the hospital like overnight.” When asked if four to six hours would be enough to evacuate a large hospital if there was a major dike breach, the representative of the Success Ambulance Service explained that, as far as he knew, flood water did not get into any health facility in 2009:

I don’t know that any healthcare facilities did [experience flooding] in 2009. Again, from our perspectives, we don’t want to do rescues. When you do rescues, people are dying and it’s too late. We’re putting people in harm’s way when we don’t have to. I think the decision to evacuate in 2009 was the right one.

In my data collection, I did not find any other official or representative from the city, the public health departments, the police department, the fire department, the ambulance service, or any healthcare facility who expressed support of a four-to-six-hour time window to evacuate after a dike breach. In fact, I brought this issue to one of the city leaders who responded,

Not knowing just how high the water was going to go, and the predictions we were receiving that we were going to get three more feet of water than we did, we would rather take the risk of moving these people out than trying to rescue them if we weren’t successful in holding the water back.

When a dike is breached and a major health facility has four to six hours to evacuate because the water is filling up the area, emergency management strategists view the process as a rescue operation, not an evacuation. An official from the Fargo Fire Department said, “After a major levee breach, should one occur, if we have neighborhoods that are inundated with water,

that transitions from evacuation to rescue.” Likewise, a Fargo Cass Public Health official said, “It could have been more catastrophic had a dike breached, and we were taking them out through, and we were doing a rescue mission and not an evacuation.” The fire department official explained further that groups with special needs should be evacuated before they are in an emergency situation and that patients lying in hospitals undoubtedly have special needs. The official said,

Evacuation for special needs is done prior to a total emergency. It’s when one is at an eminent threat and there’s a significant possibility we could have a breach—evacuating people with special needs at that time would be more of a rescue. And, if it’s a rescue, there’s a lot more danger involved than in an evacuation.

A comparison of the four-to-six-hour claim to the claims of the other research participants raises the following questions: Should Hospital A have waited to evacuate until there was a dike breach? If so, what would happen if flood fighters could not repair the breach?

The city official who made the claim of the four-to-six hour time window said, “I don’t know who made the decision, but, in my situation, we had meetings twice a day. Nobody from the [Hospital A] institution came over to talk to us.” In addition, he stated that the liaison of Hospital A said that they were evacuating, but they did not allow the city officials to argue the issue. Furthermore, he said that, eventually, the liaison asked the mayor for a disaster declaration, but the mayor refused to comply because city officials thought that they could protect Hospital A.

Another Fargo Cass Public Health official explained that the public health department was heavily involved in the evacuation of nursing homes in Fargo, but not very involved in hospital decisions. Hospitals were finding their own ways to evacuate or not, but they kept

Fargo Cass Public Health officials informed about their plans. Hospital A was working with a Sioux Falls hospital and another hospital in the Twin Cities. The health official stated that Hospital A decided to evacuate at night time “because we were using the majority of the transportation assets during the daytime, and it was just a little easier to do it during the night.” A representative of Hospital A confirmed that all transportation resources were utilized during the day to evacuate Fargo nursing homes. The Cass Public Health official explained that the night evacuation “didn’t get all the media attention; it was just an easier, simpler way for them to do that; plus, they had tons of air transport or ambulances coming in and out, so it was just an easier time, better time, to fly.” Regarding media attention, the representative of Hospital A expressed his view:

I thought the media would want the story, but, when we did it in the middle of the night, I was surprised that a lot of people didn’t know that we even moved patients that night. It did make headlines in the paper the next day.

Another representative of Hospital A approved of the media coverage and stated that the administration of Hospital A had good relationships with the media. A third representative of Hospital A commented on the media by saying, “I called a press conference. I gave a press conference. I have pictures of it. No, it was not about no media.”

One of the major issues in emergency management is when politics affect the decision-making process in hazardous situations. A representative of Hospital B explained that, when the Red River rose to the 36 feet level, they stopped taking division transfers. They started referring patients to other triage facilities in the region outside of the flooded area. The representative explained that they were working directly with the governor’s office, the National Guard, and FEMA to evaluate the situation and assess the risk to ensure that the administrators of Hospital B



were not escalating the risk. A Fargo Cass Public Health official stated that the administration of Hospital B took a risk by not evacuating their facility. Had the infrastructure of Fargo been lost, Hospital B would have become an island and moving their patients out of the building would have been a rescue operation rather than evacuation operation. The official said, “Well, our recommendation as a health department to [Hospital B] was that they evacuate. We didn’t agree with their decision to stay put, but they’re a private business.” The official explained further,

Knowing the politics and knowing that we really had to continue to work with [Hospital B] on many projects, that that was their decision. We just made it very clear to them that, if they got wet, we could not guarantee that all their patients could be rescued in a timely fashion.

In disastrous situations, the mayor or the governor has the authority to issue an evacuation order. When an order is issued, law enforcement agencies have the responsibility to ensure that people follow the order by evacuating the area. When there are people who cannot leave the disaster area—for any reason—the fire department has the responsibility to rescue them. An official from the Fargo Fire department explained that no one knew how high the river could rise in 2009, but the National Weather Service was predicting that the river could rise to 43 feet. Had the water risen to 43 feet level, Fargo nursing homes and hospitals would have been flooded, and the people in the facilities would have been rescued, not evacuated. He said,

We were concerned about having to rescue these people instead of evacuating them ahead of time . . . . The rescue was going to be incredibly more difficult than evacuation. . . . you would rather evacuate than rescue these people? If we wait too long, then we are dealing with a rescue, and we really don’t want to have a rescue.

The official also explained that evacuation is a complicated process that could be very costly. He continued, “There should be some way of satisfying the facilities without putting them at risk of having to be rescued when we know there is a good chance they might flood.”

When asked to explain the hospital situation in the 2009 flood, an official from the City of Fargo said that Fargo city leaders were asked to make the decision of whether or not the hospitals should be evacuated. He stated that Hospital A evacuated and Hospital B did not. He said, “And that was their decision; we left it completely up to them. We decided it was not in our best interests to [decide for them] because we still needed medical care in the community.” He explained his view that Hospital A could be “self-contained for up to 4 or 5 days; if there was water in the streets, they would be self-contained, but they decided to evacuate.” When asked for his opinion about the different decisions—one to evacuate and one do shelter-in-place—he stated that they knew the elevations of their buildings and whether or not they could self-contain if the water continued to flow.

Regarding the evacuation decision, a representative of Hospital A said, “It was a decision based on the internal and external factors we made . . . you have to make these decisions on the information we had at the time, and we had to make the decision for us as an organization.”

Another representative of Hospital A also commented on the evacuation decision: “The decision we made was on our interpretation of the risk we would incur if our infrastructure was threatened. It was our decision. It was not the city’s or anyone else’s decision.”

### **Nursing Homes**

Nursing homes provide services for the elderly, one of the most vulnerable groups in a community. In the 2009 flood, all nursing homes in Fargo and the largest nursing home in Moorhead were evacuated. Many administrators of those nursing homes thought that they were

prepared for the flood. Even when Fargo Cass Public Health staff informed the nursing homes about the need to consider evacuation, the nursing homes thought they were ready, but they were not. For example, Success Ambulance Service had to create its own triage system to standardize the triage systems of the nursing homes. Similarly, Fargo nursing homes had mutual aid agreements to help each other if one home needed to evacuate its residents to another facility in town, but they had not prepared for the simultaneous evacuation of all Fargo nursing homes to locations outside the community. Apparently, the initial sense of readiness was based on the assumption that a call to the local ambulance service would suffice to secure the necessary transportation in an evacuation event, but this sense of readiness faded as multiple homes simultaneously sought help from the same service in the midst of stormy weather with the need to transport patients some distance.

The situation triggered some frustration. An official from the Fargo Fire Department explained,

[Nursing Home D], what is their emergency plan? Well, they're going to call [Success] Ambulance. What's [Nursing Home E's] plan? They're going to call [Success] Ambulance. [Nursing Home F]? They're going to call [Success] Ambulance. Well, there are not enough ambulances around. That's kind of where we were in '09 and [Success] said, "Wait here, and you want us to evacuate a hospital too?"

A Fargo Cass Public Health official said that, initially, the decision was made to evacuate four nursing homes. However, before they started evacuating the four homes, the city made the decision to evacuate all of the nursing homes in Fargo. The representative of the Success Ambulance Service mentioned thirteen nursing homes, and a Fargo Cass Public Health official suggested,

[The total] was probably around 15. . . it was about 2,500 patients, and that was from all nursing homes, all the assisted living facilities, and the group homes. Hospitals were, kind of going on their own . . . , [but] they kept us informed.

A representative of Nursing Home A explained that there were many transportation-related problems during the 2009 flood. There were not enough vehicles, and school buses that were used in 2009 evacuation were not equipped properly. He described the situation: “These were not ideal conditions to be in cold school buses.”

Arranging transportation also involved arranging shelters. A Fargo Cass Public Health official reported,

My role was mainly dealing with the shelters. I didn’t do a lot with transportation. I had some dealings with the nursing homes, but my role really at that time was talking with the Red Cross people and setting up the shelters that we needed and who was going where and those types of things.

At that time, the only shelter was the Red Cross shelter. The official explained that a large facility for individuals living independently with physical disabilities was evacuated to a general shelter in Casselton, but the shelter did not work well. The Public Health official explained that some individuals had to be moved to hospitals and nursing homes across North Dakota instead because they could not sleep on cots. This was a learning experience—to realize that not everybody could be sent to a shelter. Another learning experience came from confusion caused by terminology used by Fargo Cass Public Health and state officials. For example, both healthy and sick people needed shelters, but a given shelter might not have the supplies necessary to address the needs of both groups. A “ready” shelter for healthy residents and a “ready” shelter for ill or disabled individuals were not “ready” in the same sense.

Nevertheless, the nursing home evacuations were judged by some to have progressed fairly smoothly. An official from the City of Fargo commented,

With the nursing homes—and I have a personal interest in that my mother’s in a nursing home here—they anticipated taking as much as 48 hours to evacuate the nursing homes, and they had no idea where they were going to place them, and so forth. But, it went much more efficient than anticipated.

He explained that they found facilities across North Dakota that offered to receive evacuees.

In Moorhead, a police officer reported that only Nursing Home C was evacuated. Nursing Home C is a large facility with over 800 residents. The officer stated that there were other facilities with vulnerable adults in Moorhead were owned by the federal government, Clay County, or the City of Moorhead, but only Nursing Home C needed to be evacuated.

#### **Part Four: Evacuation Processes**

Once two of the community’s hospitals and nearly all its nursing homes had made the decision to evacuate, the evacuation process began. Evacuation is a stressful and frightening process for staff, inpatients, and nursing home residents. Presumably, a successful evacuation requires certain preliminary steps to be completed, including the following: pre-evacuation planning, thorough exercising of the plan, prior experience with a similar event, careful coordination of all parties, identification of facilities to receive the evacuees, access to the proper transportation resources, and time. However, many of these self-evident pre-conditions to a successful evacuation had not been addressed, and rapid changes in the river level and weather conditions were rapidly closing the window of opportunity to complete the evacuation.

Nevertheless, as will be discussed later, the mass evacuation of healthcare facilities across the metropolitan area was subsequently viewed as a generally successful and smooth process. The

sections below examine two aspects of the evacuation process, communication and improvisation, to provide insight into the nature and success of the evacuation.

### **Communication**

Communication may determine, to a significant degree, the success or the failure of a disaster response. Views of the communication process during the 2009 flood event varied substantially among research participants. Out of 26 research respondents, 11 indicated that communication during the flood went well, while 7 clearly disagreed. Some of the disagreement can be explained by the number of different issues involved in assessing communication. The section below discusses several of these issues, including variations in the views of external and internal communications, timing, factors affecting communication, the role of communication technology, and the people doing the communicating.

### **Internal Versus External Communication**

Research participants from various agencies and health institutions referred to two aspects of communication: internal and external. Some facilities reported efficient internal communication and less-efficient external communication, but other facilities reported the reverse. A Fargo Cass Public Health official said that his organization's internal communication worked properly, but he did not comment on the external communication. The representative of Nursing Home A said, "Internally, here, we didn't have any problems communicating. We had a good team." Similarly, a representative of Nursing Home B said that Home B did not have any difficulty with communication until they evacuated and put their residents in a church. The church was not designed to receive large numbers of incoming and outgoing phone calls, which made external communication difficult. A representative of Hospital C discussed his view:

Internally, [communication] was an issue because there were different views on [whether to] evacuate or not, what level would we evacuate at. Once the level was given, communication quickly came into place because we had a timeline. We had to get the patients out of here and get the information with them. Externally, I do think that it went well for the entire community.

Collectively, the above comments suggested that communication problems were relatively modest, but digging a little deeper revealed several issues. The effectiveness of communication during evacuation varied within and between organizations, and it varied during different stages of the evacuation. Other variations were based on organizational expectations, technology, and miscellaneous additional factors. These aspects of the evacuation communication process are reviewed below.

### **Differences Within Organizations**

Personnel within agencies occasionally differed in their evaluations of communication during the 2009 flood. In several instances, multiple participants from the same agency or the same institution viewed communication efforts very differently. For example, I conducted a total of four interviews in the two hospitals that evacuated, and all four participants gave different views about the communication efficiency.

### **Differences Across Organizations**

In addition, the overall communication profiles of the two hospitals that evacuated were very different. Communication success varied by the size of the institution, geographical location, level of preparation, and timing of their evacuation decisions. Probably the most well-planned communication structure was Hospital A's structure. Hospital A, a large hospital, had a team of radio operators to assist the facility if the facility's landlines were lost. In addition,

Hospital A had asked Sprint Corporation to send in a disaster team to assist, in case Hospital A needed additional communication support.

### **Evacuation Stage**

As a representative of Hospital C explained, some facilities had problems with communication at one stage of the evacuation but not other stages. For example, the representative of Nursing Home B explained that communication was not an issue initially. However, as noted above, after they evacuated and put many residents in a church, they did face problems in communication. They had to use walkie-talkies to speak with each other and brought in cellular phones for external communication. A Clay Public Health official explained that it took time to educate people about communication procedures and to implement the procedures. For example, Clay Public Health educated their staff about communication flow in an incident command system when events occurred. The official said that communication worked very well after communication lines were established, and everyone understood what, when, why, and to whom they should communicate.

### **Expectations Versus Reality**

One major issue in the response to the 2009 flood was that city administrators, Cass Public Health and Clay Public Health administrators, emergency management services, and health facilities had not anticipated that a Red River flood would reach a level that would trigger a mass evacuation. A number of the interviewees mentioned that they designed much of their evacuation plan while dealing with the flood. They had flood experience, but their experience told them that local floods do not trigger mass evacuations. A Fargo Cass Public Health official indicated that they were developing ways of communicating during the flood. Thus, a communication structure was not in place that was specifically aligned with the demands of



coordinating a mass evacuation. For example, the mayor said in his interview that he had fought twelve floods, and he explained the resulting expectations: “Nobody thought we were going to get to those levels, in the Weather Service or among ourselves. [It was] the highest river level we’ve ever had in the community in 104 years.” Nevertheless, the above-mentioned Cass Public Health official said that the communication went well, although they needed better information flow.

### **Technology Versus People**

None of the research participants considered technology to be the cause of any communication inefficiencies. The flood did not cause problems with phone lines, Internet lines, or cellular towers. In fact, the flood had almost no impact on communication infrastructure. All communication lines were running at full capacity. In other words, communication infrastructure was functioning as well as it did before the flood. Thus, the communication problems were viewed to be human problems.

For example, a Fargo Cass Public Health official said, “Communication was not an issue . . . because we could not communicate. Communication was an issue because we needed to assign people to the right role.” A representative from Hospital C said that “everybody [seemed to be] getting the same message—communication didn’t seem to go as smoothly as it could.” Perhaps part of the challenge was due to an overwhelming use of cellular phones during the flood. Calling one another on cellular phones during the flood created communication complications. One of the Fargo Cass Public Health officials said,

There were many times when we were all on our cell phones—and this could be 2:00 a.m. as there’s 8 or 10 of us in a room—and we are all on our cell phones. There were many times we all [were] on our cell phones, and . . . talking to somebody, and we say,

“Oh, no! You want to talk to this person.” So our cell phones were going off all over the place, and my cell phone might ring, but you are the one on it.

Another human communication issue was the frequent calling of different people and asking each of them the same questions. A Fargo Cass Public Health official said that this issue existed despite the fact that there were daily conferences to update all agencies and health facilities with the same information. One Fargo Cass Public Health official said, “Some of the State Officials— one of them—calling me, asking me about a facility. And then another State official would be calling [another Fargo Cass Public Health official], asking about the same facility.” This redundancy led to waste of time and resources. The public health official said, “They would start on something, then, we would start on something and not always remember to communicate back and forth with each other.” A city official noted,

The criticism I’d have about the evacuation was that not everybody was talking to each other as far as where to move people. [Hospital A] took it upon themselves, but there were resources from Minnesota and North Dakota that we’ve learned that if people kind of talk to each other, then maybe you don’t have to move patients as far as St. Cloud or as far as Sioux Falls.

### **Miscellaneous Factors**

Another communication issue was triggered by differences in the use of key terms. There was a lack of commonly-agreed-upon definitions of emergency management terminology, disaster situations, and processes such as evacuation or sheltering-in-place. Different parties would use the same terms for different purposes, which caused some confusion and frustration. Part of this may have been due to stress and fatigue. A Fargo Cass Public Health official explained that factors hampering efficient communication were sleep-deprivation and stress.

The official mentioned that they were working twenty hours a day during the flood. Still other communication complications emerged across state and local areas. Some state officials did not know whom to contact when they needed updates. Similarly, when a Fargo Cass Public Health official was asked whether they had communication problems, the official responded, “We did, in 2009. Not necessarily locally, but I think it was local/state. Lots of miscommunications, lots; you know, the State wouldn’t necessarily call us, but they would call someone else, you know, Red Cross.” Despite these issues, there were communication structures in place. For example, the Fargo Police Department developed a working communication plan that divided up the disaster area into a number of zones staffed by the National Guard. The police had a structure through which designated individuals among guard members and officers would communicate.

### **Improvisation**

Improvisation refers to a situation in which an individual or group must create a suitable option outside a prepared plan. Thus, improvisation is needed when a part of a plan has become irrelevant or unsuitable under the circumstances. Sometimes, while an individual or a group is following a plan, an unexpected event will occur that requires an alternative action. Respondents in the present study were specifically asked to identify examples of improvisation during the evacuation process.

In response, a Fargo Cass Public Health official said that preparing patient records to accompany the patients during evacuation was a new experience. For example, Hospital A had transferred patients to other hospitals before the 2009 flood, but they had never transferred all of their patients at once. Despite the time pressure, patient medical records needed to be accurate to ensure proper medical treatment. The demands of time and accuracy led to improvisation. The Fargo Cass Public Health official commented, “I think there had to be a lot of improvisation

because the patient track system did not work, so it took more labor time.” Another Fargo Cass Public Health official observed,

Pretty much the whole thing [was improvised]. It really was because we had never done it before. There was no plan in place. There was no model to follow. Was it true improvising? Maybe not, but it was lot of making the best of a decision based on what little knowledge you did have.

Another Fargo Cass Public Health official said, “In 2009, probably the whole thing [was improvised].”

Similarly, a Clay Public Health official addressed improvisation with the comment, “Yes, one [example of improvisation] was the process of assigning people to go onto a bus to go to a facility.” Facilities would be asked how many residents (male or female) the facility could receive. Then, they would put that number of residents into a van or a bus to be sent to the facility. A Moorhead Police Department official responded to the question about improvisation by simply noting that the community had never engaged in a mass-evacuation before. Similarly, a Fargo Fire Department official said,

There’s always going to be improvisation in an incident like this. I think those that work in emergency services have to be prepared to improvise. That’s just part of the deal, in my mind anyway. I don’t know how much there was, but I can imagine there was a ton of it.

Ambulance services frequently face the need to improvise because they are called to duty at all hours to help with various types of health issues. Thus, the need to improvise was not a new experience for Success Ambulance Service, but the size of the 2009 evacuation provided a new challenge. A representative of Success Ambulance Service commented,

Improvisation—yes, certainly, we weren't prepared to house, feed, and occupy our folks, our mutual aid folks [i.e., other ambulance service personnel] who were here for many, many days . . . . We had to call up and get a bunch of rooms, hotel rooms.

He explained that Success Ambulance had twelve hotel rooms, but they had 30 people from various ambulance services helping them for two days. Thus, Success Ambulance improvised a plan to work with the hotels. They sent workers to the twelve hotel rooms to sleep for eight or ten hour shifts, and arranged for the cleaning ladies to clean the rooms and change the beds between the shifts. In addition, as noted earlier, one representative noted that the triage system required improvisation on the part of ambulance services: “There was no set system you could take off the shelf and say, ‘Red, yellow and green mean this, so we improvised and wrote our own documents.’” A representative of the Rural Ambulance Service responded to the improvisation question by saying that every disaster is different, so there would always be some improvisation in dealing with disasters.

City authorities also found it necessary to improvise. For example, a Fargo city official explained that city leaders had to bring in many ambulances from neighboring states. Because North Dakota and Minnesota had different regulations for dealing with disasters, some resources available for use in Moorhead could not be loaned to flood fighters in Fargo when Moorhead did not need the resources. The city official added that hospitals had to improvise when deciding how many patients could be loaded into vehicles because of varying medical needs.

When another City of Fargo official was asked how much improvisation was used by city authorities, he said, “I would like to say none, but I don't think that's true.” He said that there was improvisation in details, but, otherwise, the evacuation plan was properly constructed. A city official indicated that he was not sure how much health facilities had to improvise, but he

said, “I know there was a great deal of improvisation in that community. I mean, all the way down to the people that were protecting their own homes. We were responding.” He explained that city leaders did their best, and citizens played their role. The suggestion was that everybody did his/her part, and it worked together like a symphony.

A representative of Hospital A responded to the improvisation question by saying, I don’t think there was any improvisation around the major decisions that had to be made to truly execute on an evacuation . . . . If there was improvisation, it was not in the major components of the evacuation.

Another representative of Hospital A observed that they were carefully studying the situation and working with experts to determine what to do in worst-case scenarios. He added that there was some improvisation, but they found ways to do things safely. A City of Fargo official discussed the situation of Hospital C:

They had some improvisation . . . . What you have to do is—on patients—on suicide precautions— you have to be careful [to avoid giving them] any kind of materials that they could hang themselves with.

Similarly, a representative of Hospital C said that it was much more challenging to evacuate their mental health facility because of the nature of their patient population. He noted,

We have to look at many more things like the risk of elopement . . . or risk of self-injury, or escapement, because, quite frankly, some of them don’t want to be saved. They’re more at risk outside of the walls into general transportation or general public than they would be sheltered in place here.

Discussing the level of improvisation required in the 2009 evacuation, the representative said that they usually have days to prepare a patient to be discharged and implied that the short time frame they faced for evacuation required improvisation.

Specifically, in the 2009 flood, Hospital C's administration had three hours to evacuate the entire hospital building. The hospital had never been entirely emptied and then re-filled. The Hospital C representative said that it was a great challenge to evacuate the hospital and communicate with the receiving hospitals. The patients were under stress because they did not know where they were going and when they would be back. Another representative of Hospital C said that they had difficulty keeping patient records and tracking which patients were evacuated to which health facility. Hospital C worked with five different facilities to house their patients, which made it challenging to send enough information and medical records for each patient to be properly treated. Physicians at receiving facilities needed to have complete information about psychiatric patients, information that had originally taken a great deal of time to collect. In addition, some patients had to have enough medication during the evacuation to remain stable. Smaller issues, such as delivering personal belongings, also became difficult, so some patients arrived at the receiving facilities without key items such as eyeglasses. Another representative of Hospital C commented that medical records were improvised because of the time crunch. He noted that "we probably did the bare minimum to make sure they had something on the patients, but not nearly as much as you would hope." Typically, emergency patients would be transferred by helicopter, but they did not have that option in the 2009 flood.

A nursing home representative indicated that much improvisation was done:

I would say a good 70 percent of the evacuation process was all having us improvise. We

didn't have good detailed plans to staff our evacuation sites, to track staff as they started to be evacuated from their own homes.

The representative also said that they did not have inventory lists of what they would need during and after the evacuation. They moved their residents to Wahpeton, where they rented and staffed a building. Transporting staff back and forth from Fargo to Wahpeton was another challenge because the weather was cold and stormy. Sometimes, roads were closed. Placing some of the residents in Casselton and others in Wahpeton was another difficulty. However, they learned much from the 2009 flood, the representative said.

Thus, a wide variety of respondents from multiple agencies and healthcare facilities reported that the evacuation process involved considerable improvisation. There was some hesitation among a few respondents to say that improvisation played a significant role perhaps because such a comment was thought to reflect negatively on the planning that had been done, but none of the respondents completely denied the importance of improvisation.

In fact, one of the respondents claimed that improvising plan details at the last minute positively impacted the evacuation process and that improvising was better than planning the details of the evacuation in advance. A representative of Hospital A commented,

I would say more improvisation than would be required now. The plan had been hastily prepared, the people hastily trained. Most of the improvisation came by people jumping into roles that they really did not expect to play. . . [but] to the extent that was improvisation, it was very healthy improvisation.

Furthermore, the representative said, "I think that, if we would have had a massive evacuation plan in writing, I don't think it would have worked at all, based on our experiences that we went through." He went on to explain that the seriousness of the situation helped hospital



administrators to assign the right individuals to the right tasks at the proper time. Some physicians were brought into the improvised planning because of the immediate need to do so, physicians who might not have become involved in pre-planning. The involvement of the physicians provided to be very valuable. The many experts were able to design a cohesive plan that would respond to patient needs and ensure patient safety. The representative noted,

I don't think that level of detail on an average planning group could have taken place without the right people, and I think those right people are usually too busy under normal circumstances to write that kind of plan . . . . They really went to efforts that I don't think we ever could have written.

In sum, the generally successful outcome of the evacuation (see below) might be due, in part, to the willingness and capability of multiple parties, agencies, and facilities to improvise effectively.

### **Part Five: Reflections**

Natural disasters, in general, disrupt the social system, harm humans, and destroy property. Such destruction can have long-lasting impacts. Respondents were asked to reflect on their evacuation experiences, to evaluate the evacuation, and to indicate what they learned from the experience. What emerged was a general consensus that the evacuation went well, but that much needed to be done (and has been done) to improve planning for the possibility of a future mass evacuation.

Respondents were asked, "Why, do you think the evacuation plan came out the way it did?" An official from Fargo Cass Public Health answered that they had the right people working on the plan, that all activities were well-coordinated, and that the staff worked very hard

to lay out a working plan to evacuate. The staff spent a full day and night to add the necessary details to complete the plan, and the plan was carefully reviewed after it was completed.

A representative of the Success Ambulance Service answered the question by saying, I think, probably, the largest benefit we had was time. We had time to prepare and time to communicate. The other part of it is that, in general, when you have disasters, people step up to the plate. I think that's been shown over and over again.

He noted that surveys in 2010 and 2011 showed that people would step in and help again if Fargo faced another large-scale disaster.

A city official explained that there were discussions about what the City of Fargo should do, based on previous experiences:

[The decision] was based somewhat on the historical information we saw after the 1997 floods in Grand Forks and Ada and how it was carried out there. Those evacuations were done when there was water in the streets. We recognized early on that we had to be more proactive in terms of doing something for the adult vulnerable population.

A representative of Nursing Home A claimed that the evacuation came out the way it did because he had established a good relationship with Fargo Cass Public Health staff before the 2009 flood:

Perseverance by our staff and our—my—emergency team that I—we basically just took charge. I really think it went well for us because of the good relationship I had with Public Health, that I had established relationships with them.

Consequently, the relationships paved the way to mutual trust that aided the coordination.

Hospital B did not evacuate because the administrators believed they could shelter-in-place. One representative explained that Hospital B was helped when the hospital invited a

number of officials to take a look at their plans to ensure that they were dealing with the situation in a proper way.

A representative from Hospital C answered the question by noting that Fargo Cass Public Health and the State of North Dakota strongly suggested that Hospital C needed to evacuate. The representative said, “I think it was really an action step taken by those, perhaps, having more objectivity than we . . . [had] at the time.” Finally, a representative of Hospital C added that the evacuation’s success reflected the concern of all healthcare facilities about the safety and wellbeing of their patients or residents.

### **Injuries and Immediate Fatalities**

Natural disasters frequently threaten the safety and security of society. Some disasters are highly destructive, causing many fatalities. The challenge of evacuation—especially the evacuation of vulnerable populations—surfaced in the experience of a City of Fargo official. The official said that he visited his mother in a nursing home during the flood and that the residents of the nursing home stopped him and said, “I do not want to be evacuated.” Clearly, evacuation triggers concerns about health consequences of such an effort. Thus, the present study asked respondents if any injuries or immediate fatalities occurred as a result of the evacuation.

The question proved to be more difficult to answer than anticipated. There were no reports of injuries or fatalities during the actual evacuation, but respondents felt that it was hard to assess if the stress of the evacuation may have affected the long-term health of patients or contributed to earlier deaths. By definition, the hospital patients and nursing home residents were vulnerable populations and likely to be susceptible to the stress of either sheltering-in-place or evacuating. For example, a Fargo Cass Public Health official said, “We’ve tried to look

because people died, but people die in nursing homes every day.” He explained that it was hard to judge whether or not somebody with poor health died as a result of the stress caused by evacuation. If the same person had sheltered-in-place, he or she also would have been exposed to the stress of not being evacuated to another location. The official said,

We had no one who was injured or died because of the transportation, but these are elderly and frail individuals, and— all of the turmoil of moving them—did that cause any premature death? That’s a very difficult one to quantify.

A representative from Success Ambulance Service responded to the question about injuries and fatalities with the comment, “No one died en route or just after arrival.” However, he noted that taking elderly people out is always stressful— even taking them to a hospital appointment. He said,

So, did people die sooner in the nursing home that were expected to die, I assume so, but I don’t have that. I heard anecdotally that it did occur. But, I think it’s hard to pin back to the evacuation.

He said the Success Ambulance evacuated patients and residents slowly and very carefully because some of them were in a very critical condition, but none of them died in transit or soon afterwards. The ambulance representative said that the evacuation went very smoothly as a result of being very carefully carried out. Similarly, a representative of Rural Ambulance Service indicated that nobody was injured or died during the evacuation process.

A representative of Nursing Home A observed,

We did have residents die. Some of them, we were anticipating their deaths. Some of them, we feel, were a direct result of the stress—of the trauma of the evacuation, but that’s not the cause of the death. I feel we lost them because of the evacuation.

A representative from Nursing Home B said that there were no immediate fatalities or injuries as a direct result of the evacuation; however, the stress and trauma hastened some deaths. For example, one very sick resident arrived safely at the destination facility and then died.

Hospital A was the largest facility that was evacuated. A representative of Hospital A stated, “There were zero fatalities and zero injuries.” Many staff members believed that two quite critical patients might not survive the evacuation, but both of them arrived safely, although one of them died later. The other three representatives of Hospital A also indicated that there were no injuries and no fatalities as a result of the evacuation. One said, “Some of the people we evacuated had significant diseases . . . , [but] we know that the people we evacuated arrived at their destination in stable conditions.”

All four representatives from Hospital C stated that there were no fatalities or injuries during the evacuation. One representative said, “There may have been symptoms worsening after being discharged prematurely . . . there were several that had not completed treatment . . . Their symptoms worsened, maybe looking at later hospitalization, but not death.”

An officer from Fargo Police Department also stated that there were no injuries or immediate fatalities as a result of the evacuation. He explained that stress certainly accompanied the evacuation, but that a decision not to evacuate would have also triggered stress. In other words, staying in a facility within the risk area would have been stressful, as well.

A Clay Public Health official said that there were no injuries or deaths as a result of the evacuation. When asked whether there were any as an indirect result, he said, “According to Nursing Home C, they did not see an increase in morbidity out of the normal process of living in a skilled nursing facility, their normal dying process.”

Finally, not all those involved in the evacuation saw the experience as traumatic. A Fargo Cass Public Health official reported that some evacuees actually enjoyed the evacuation event:

But, there was also some of the calls we got back from the folks— they went on a plane to their sister facility—[where the] people had the time of their lives because they had never been on a plane before, and so, to them, it was like just a huge adventure.

In sum, the evacuation was stressful, but the nature and level of stress depended on the perception of individual evacuees.

### **What Went Well and What Needed To Be Improved?**

One of the most important questions for this research project was “What went well and what needed to be improved?” In other words, what can be learned from the evacuation to enhance the probability of success in the future? Also, if some aspect of the evacuation did not go well, what were the factors that led to the problem?

#### **What Went Well?**

Respondents perceived that several aspects of the evacuation went well: the support they received, the overall coordination, and the communication. Perhaps the single most important aspect that went well was that the evacuation was completed successfully—there were no injuries or immediate fatalities during the evacuation, and the evacuation was completed quickly.

A Hospital C representative said, “Things that went right were staff that stepped up to help ... volunteerism.” He stated that their staff volunteered to follow patients to Jamestown or Grand Forks. Staff gathered patients’ belongings to ensure that the belongings would be sent with the patients. Some staff members volunteered to copy records, and others helped patients to get into buses. Another representative of Hospital C also emphasized the value of “the support

that we had locally.” According to a Hospital C official, “We had great cooperation from the facilities to which we were sending patients. They were incredibly willing to assist, so any problems we encountered were system issues, not personnel issues.”

A representative of Nursing Home B explained that coordinating with facilities went well. Fargo Cass Public Health officials worked with facilities, and they did not make any decisions without consulting with the involved facility or facilities, with the Long Term Care Association, and with the North Dakota Department of Health. Public Health had frequent meetings and conference calls to update everyone and discuss events. The Long Term Care Association and healthcare facilities worked closely together to find receiving facilities for evacuees. The North Dakota Department of Health made it easier to address regulations while sending evacuees to other health facilities. These efforts went well.

Furthermore, decisions were made locally, instead of federally, so the result was great communication under such circumstances. A Fargo Cass Public Health official noted that one thing that went well was that they reached all the parties and entities that were involved in evacuation. He said that, in disasters, “there are always those horror stories in other parts of the country where one entity does not speak to another entity. That was not the case here. We were able to be on board with everybody.” Another Fargo Cass Public Health official said, “I think what went right on a local level was local communication and local teamwork... I think communication from local to state was something that did not go well that year.”

With respect to transportation challenges, a representative of Hospital A explained that they decided to evacuate at night and that the process went well. Had they evacuated during the day, they would have caused considerable traffic congestion. He also noted that it was the first time that the hospital had used the Incident Command System, and it worked well. Another

representative of Hospital A said that the effort to transfer patients and their medical information was successful.

A Success Ambulance representative said that the list of what went right was longer than the list of what did not. He noted that planning early, discussing all aspects of planning, and planning extensively resulted in a smooth implementation process. He added that his company deals with disasters and floods on regular basis, but other entities had no experience to draw from:

Public Health, this was new to them. I think they did an outstanding job, both Cass and Clay Counties [Fargo Cass Public Health and Clay County Public Health] stepping up to it. They don't do disasters. That's our business, but, for them to step into it and really grab the bull by the horns in this case and collaborate and get everybody together, it went well.

Similarly, a representative of Rural Ambulance Service gave a positive response to the question about what went well:

I think the planning went well—to have that number of rigs available for evacuation if something major did happen. It turned out something major didn't happen, but they had evacuated the nursing homes prior to bringing in the additional rigs for standby.

The rigs were made available, in case an unexpected event occurred. The official said, “In Fargo, I thought it went well. There was a lot of downtime, a lot of waiting, but that was necessary with so many rigs waiting.”

A Clay Public Health official said the key thing that went right was the overall evacuation, “I want to say the luck of the draw that everything went well because it could have been a disaster in and of itself.” According to the official, it was amazing that things were



arranged within such short time—two days—when it was decided that several facilities, including large ones, would evacuate.

Finally, major efforts, such as the evacuation, are full of surprises, and some can be positive. An anecdote illustrates this point: when Hospital A was totally empty, the administrators used the opportunity to thoroughly clean the facility without interfering with ongoing hospital activities.

### **What Needs Improvement?**

Despite the evacuation's overall success, respondents clearly saw areas that needed improvement. Their concerns focused on planning, coordinating medical records, sharing information, locating receiving facilities, establishing situational awareness, arranging mutual aid agreements, coordinating transportation, and tracking. Most respondents, however, did not see these issues as significant enough to undermine the sense that the evacuation was an overall success. For example, when asked for possible improvements, a Clay Public Health official said,

That is a really hard question because it is just the minor things we were able to overcome. So, we don't really look at those that went wrong. It is just that we were able to overcome and find another solution, think outside of the box.

Nevertheless, he did note that communication was an issue.

A representative of Hospital C explained the types of planning that needed to be improved: "Proactive planning, internally and externally, and planning ahead of time with the community." He also commented about the sharing of information. He noted that many facilities were giving updates about their plans and sharing information but that the process could have been organized in a way that would have enabled multiple stakeholders to learn from one another and to learn about available options. For example, each hospital initially worked

independently to find hospitals outside the flooded zone to receive their evacuees. He said that, eventually, everybody realized that they had no option but to work together in such a situation. According to a Fargo Cass Public Health official, future improvements should include better transportation, receiving locations that could be staffed before evacuees arrived, and better situational awareness because they “did not have a good analysis of which roads were going to be staying open in 2009.” A representative of Hospital C indicated that the tracking process was not always effective. For example, one patient was “misplaced.” The patient had arrived safely at a hospital, but it was not the location that had been designated for the patient.

A Fargo Cass Public Health official said that they took advantage of 2009 flood experiences in preparing for the floods of 2010 and 2011. Prior to 2009, Public Health had not been given the role of finding vehicles for an evacuation. In 2009, potential sources of help were busy dealing with sandbagging and construction, so Fargo Cass Public Health had to ensure that there were buses, ambulances, and wheelchair vans available when health facilities needed them.

Another Fargo Cass Public Health official explained that transportation planning has improved since 2009. He said, “Now, transportation is greatly improved—three years later—unbelievably improved. The State’s triaging method, the patient tracking. That system the State had in place in 2009 crashed; it didn’t allow us to update; it didn’t work.” He stated that, in 2009, they had emailed an excel spreadsheet back and forth to each other, which did not work well. A much better system has now been created.

Another problematic issue related to transportation was the use of a staging area onsite to prepare patients for pickup. A representative of Hospital A explained that they took all their patients to their staging area at one time, which caused confusion and stress because the patients reacted as if the situation was an emergency, such as a fire. Bringing all the patients down to the

staging area, lining them up, and making them wait for their rides caused them great anxiety and concern about where they were going. The official said that it probably would have worked better to bring patients in shifts so that only patients whose rides had arrived would be brought to the staging area and immediately loaded into vehicles. The representative of Hospital A said, “One of our major improvements is that they don’t get physically called down until their transportation is arriving.”

Similarly, a respondent noted that facilities are now working to computerize medical records, but he added that facilities will still have a practical way of preparing hard copies of charts and other medical records. A representative of Hospital C stated that sending patient medical information in envelopes was not adequately safe because the information could have been easily removed or changed, which could have led to health complications or even death. That aspect of the evacuation process did not go well.

Finally, several miscellaneous areas in need of improvement were mentioned, specifically, the timing of the evacuation order and mutual aid arrangements. One official suggested the need for “a longer period of notice before the mandatory evacuation came” because “we had such a small window to accomplish [the evacuation].” A representative of Hospital C said that there was very little time to do any preparations for the evacuation. They did not have lists of patients or mutual aid agreements with other hospitals outside the community to receive the patients, which slowed down the evacuation process considerably. A representative of Success Ambulance Service explained that “mutual aid issues between the states is a problem, was a problem. It actually prohibited us from using those assets and so it really was something that went wrong.”

## **What Is the Most Important Lesson To Be Learned from the 2009 Flood?**

The lessons learned by respondents in this research project can, hopefully, improve future healthcare facility evacuations, should they become necessary. One of the principles of emergency management is to expect the unexpected, but that is a tall order. Much happened in the 2009 evacuation that was unexpected, so respondents were asked what they learned from the 2009 flood. Once learned, the unexpected can become the expected for future events.

Fargo Cass Public Health actively participated in the evacuation of all of Fargo nursing homes and provided all health facilities with information and updates. A Fargo Cass Public Health official said they learned from the 2009 flood that their information about facilities was limited. Since the flood, public health authorities have studied each and every facility, so they now know each one's elevation, distance from the river, and vulnerability to flooding. Each facility has prepared its sewer lines, its water supply, and its electrical service to successfully shelter-in-place, if needed. Fargo Cass Public Health has shared all information with City of Fargo and all care facilities.

In addition, Public Health now knows that the city will not be suddenly submerged in water, if another major flood threatens the area. In 2009, they thought they needed to get people in the health facilities completely out of town, but that view is no longer held because they now understand that flooding can be slowed in some areas with secondary dikes.

Another Fargo Cass Public Health official said that the "most important lesson" is that "planning really is important" because so much needs to be done. A related lesson is that planning takes time. An official reported that he was up for 34 hours straight when planning for the 2009 flood. He said, "In 2009, we didn't have time; we came into it with our blinders on, so, once we were in it, it was too late. We had to just work through it and get the work done."

Public Health learned that it needs to organize its staff to rotate in 12 hour shifts to ensure its staff enough rest when disaster threatens.

Fargo Cass Public Health also learned much more than they ever expected to learn about logistics. An official noted, “We were put in charge of transportation, which public health should not do. That’s a logistic issue and the emergency operations center, but, by default, we were put in charge of it.” The official continued,

We’ve now learned that . . . it’s not just getting them there; it is the contracts, the MOU’s, the agreements with all of these bus companies. We are not logistics; we are public health, but, yet, we sure learned a lot about logistics.

For example, they learned that school buses were not suitable for transporting nursing home residents because many residents in wheel chairs could not get into these buses. Since 2009, Fargo Cass Public Health has contracted with school districts to order conversion kits for the buses that will make it easy to remove bus seats, so buses can be used to evacuate residents with wheel chairs when needed.

With these lessons in mind, I asked the Fargo Cass Public Health respondent to comment on the current situation; specifically, if Fargo faces a disaster now, do they know who is who, and who should do what? He responded,

Absolutely. It’s not to say we’re done learning; we’re constantly learning. Because each flood is going to be different, we’re going to have different needs . . . . But, we’ve learned so much that, if we don’t know the answer, we know where we can go and dig a little deeper.”

A representative of Success Ambulance Service summarized their lessons with four points: (a) flood fighters need to communicate with all involved parties, (b) they need to start

meetings early and meet frequently, (c) updates are needed to ensure that all parties are on the same page, and (d) discussions should cover all aspects of the issues. If all involved parties communicate, they can find reasonable answers to disaster-related questions. One of the parties in communication with Success Ambulance was Rural Ambulance Service. A Rural Ambulance official said, “We learned a lot from the Fargo response, and we used it to plan . . . . It helped us plan the staging area, how many rigs we needed, and the paperwork involved, too.” He said that a representative of the Success Ambulance Service visited them when they needed and was very helpful in explaining what they needed to do to be reimbursed by the state and FEMA.

Along with Public Health and the ambulance services, the hospitals learned much from the evacuation, as well. A Hospital B representative offered a list:

To be self-sustaining with our own generator—what we would need to do that . . . . The portable water—how to bring water in and protect it . . . . We also learned Incident Command—once it was set up, how to run that effectively.

Another representative added, “We’ve learned to have to practice more and have everything clearly defined. There can’t be any gray areas. We really have steps written out about exactly what we’re going to do.” After the 2009 flood, the official said that everyone, including physicians, take emergency issues seriously: “When we have drills and have mass casualties coming in, everyone responded.” A third representative added, “I think you can never plan too much, you can never model too much . . . . If you think you’re prepared, you’re not because there are so many scenarios that can occur.”

A representative of Hospital A stated that they learned much from the 2009 flood. He said, “We learned that there’s a lot of politics in disasters. We learned that it pays off to take the high road and not let the politics interfere with your decisions.” The representative explained

they learned that, in disasters, people come together and become stronger and can perform remarkable feats in order to protect what they care about. Furthermore, he expressed his dissatisfaction over the way media covered his hospital's 2009 evacuation. He said that they learned that Hospital A should have told its story in a positive way. Hospital A should have explained to the public its actual reasons for the evacuation decision. Another representative of Hospital A said,

Well, the main things, you've got to understand the Incident Command Structure and respect it. And, I would say that, the Incident Command Structure, I didn't know much about it until I was doing it. The on line course does not tell you enough.

He explained that it is important to present simulations that help people to understand the real situation in disasters.

Finally, a Hospital A representative said that the hospital learned to evaluate every facility based on the facility's location. He also explained that the administration became more aware of the significance of preparing for disasters. Yet another representative of Hospital A said,

We learned [how] these things happen, and we have to be prepared. If we were to have that experience again, we would not evacuate because we have the backup power systems; we have the oxygen system; we have the water protection; we have the sewage plan.

He explained that the administration of Hospital A has invested millions of dollars to make their facility safer. Hospital A has made many changes, so their facility can be self-sustaining for several days without asking for external resources.

A representative of Hospital C said the hospital learned that their facility cannot shelter-in-place when the area is flooded. He said they also learned, “The importance of the evacuation actual strategy, to be more mindful about the appropriateness of phases and when to go about doing that, and to look at the fortitude of our facility.” He indicated that they believe their facility is strong and can withstand certain types of disasters, but there are also some weaknesses that put their building at a disadvantage when it comes to a flood situation. Another representative of Hospital C clarified that they learned to be prepared for disasters, especially for flooding. He said that their hospital administrators need to know where to send their patients “today, or tomorrow, or the next day and who would go . . . based on the needs of the patients.” A third representative of Hospital C stated that the hospital learned that “you have to be prepared, and you have to start reviewing it with staff early in the year. You know, exactly what you’re going to do, who’s going to do what.” He said that they also learned they need a mutual aid agreement with a local facility where they can send their patients instead of sending them out of town when flooding.

A representative of Nursing Home A said that the most important lesson the nursing home learned was “Don’t evacuate unless you absolutely have to, unless you are really threatened.” In addition, the representative said that they learned that they should not evacuate before there is a mandatory evacuation order. A representative of Nursing Home B explained, “The major things that we’ve implemented since then is kind of better tracking of the residents themselves on the HG Standard system. We have more people trained on that.” He continued, “One of the main things was just kind of dusting off the incident command structure and having more people in charge of certain things.” Furthermore, he said that, while most of the decisions went through him in the 2009 flood, they have learned to assign different people to different



duties, so one person would not have to make decisions over many issues. They also learned the importance of making lists of staff member who can stay and ones that cannot stay during emergencies.

An officer from the Fargo Police Department explained that the police learned much from experiencing the 2009 flood. He felt that that one important lesson was the need for better coordination and better communication. Fargo agencies and departments learned how to work together better in disasters.

A Fargo City official commented, “I think we learned that the incident command procedure does work. There was a lot of discussion that it might not work.” He said that they learned many other lessons from the 2009 flood, too, based on conversations held by city officials with many people from various neighborhoods in town. They made a number of structural changes, bought out homes, and constructed many more dikes. He said, if the 2009 event occurs now in Fargo, “we’ll probably have pretty much business as usual, people are not going to have to evacuate.”

Similarly, an official from the City of Fargo said, “We always learn. We always, you know, refine our plan . . . . We had to look at hard copy maps in the past.” He explained that people can check the status of flood in their neighborhoods because the City can post the maps and flood zones, thanks to advanced technology. An official from Fargo Fire Department said, “We learned how to organize ourselves—that was probably the biggest thing. The Fire Department is in charge of rescue, so it’s really not our responsibility until something goes really bad. We’re in an auxiliary role for everything.” He indicated that they helped with sandbagging, which was the responsibility of the engineers, and they helped organize volunteers. He also clarified that his department helped the police to carry out the evacuation.

An officer from the Moorhead Police Department explained that they learned how to work together because, without coordination, it is hard to get things done. For example, police can ensure that there are ambulances, wheel chairs, and buses to evacuate residents or patients, but police cannot find places to receive the evacuees. Similarly, the police do not have the knowledge of how to do triage. Coordination among agencies and organizations is important. However, when the responsibility and authority of teams overlap, it creates a challenge.

Thus, many lessons were learned. Some lessons were learned repeatedly by diverse facilities, including the need to proactively plan, to coordinate, to communicate, and to establish mutual aid agreements. Other lessons were more specific to the facilities in question, including the need for wheelchair conversion kits to transport nursing home patients in buses, for good shift arrangements, and for a review of infrastructure to enhance a facility's ability to shelter-in-place. Another lesson learned by the facilities was that they did not want to evacuate again, unless specifically ordered to do so.

## CHAPTER FIVE. CONCLUSION

### Summary of Results

This study is unique because it involves the evacuation of multiple healthcare facilities: two hospitals and all the nursing homes in Fargo, ND, and the largest nursing home in Moorhead, MN. In addition, the evacuation took place in an urban center in what otherwise is a rural area—a situation that required evacuations to distant locations. This research project studied both the preparations for evacuation and the process of evacuation. The evacuations were triggered by major flooding along the Red River of the North in 2009 that threatened to inundate the Fargo and Moorhead communities.

Discussions on disaster evacuations often focus on the relocation of the general public. In this case, the evacuation involved only the vulnerable population in healthcare facilities in the Fargo-Moorhead area. However, the evacuation of the facilities occurred under very severe conditions, including a blizzard, extremely cold temperatures, and severely frozen roads. The community had just won a battle in 1997 against what was considered to be one of the worst floods ever—an event that was only rivaled by a flood one hundred years earlier. In addition, the Fargo-Moorhead community had faced flooding of a lesser magnitude many times and had been consistently successful in staying dry. Neither city leaders nor the community's healthcare institutions anticipated that an even worse flood than the 1997 flood would happen so soon, a flood that threatened to inundate the entire metropolitan area. Thus, the city leaders and the healthcare institutions had done minimal preplanning for the events that unfolded in 2009.

Evacuations are especially challenging when vulnerable populations are involved. Such evacuations require extra resources and planning. For example, inpatients and nursing home residents need physical assistance. Bariatric cases, evacuees with wheel-chairs and/or oxygen

tanks, and the elderly all need extra support. The evacuation of elderly individuals also needs to be timely or the elderly face the risk of dehydration. In addition, the urban area where the healthcare facilities are located had no experience with evacuations of any kind, which made the challenge even greater. Despite frequent flooding, the Fargo-Moorhead community had never experienced a mass evacuation. The absence of evacuation experiences, the minimal pre-planning, the infrequent exercising of plans, the extreme weather, and the absence of nearby healthcare facilities to receive patients all combined to make the evacuation difficult for the companies and institutions involved. Nevertheless, the evacuation took place with great local cooperation and with excellent support from external healthcare institutions so that the process was viewed as a success by nearly all respondents in this study.

The present study is based on interviews of multiple parties from the community's healthcare institutions, city government, ambulance services, public health agencies, and first-responder organizations. The researcher found both successful and less-than-successful evacuation policies and practices. The key claim to success is based on the absence of immediate fatalities associated with the evacuation. In addition, patients and residents were transferred to other facilities in a timely manner with minimum confusion. However, the study also found some worrisome practices. There was little evidence of significant pre-planning and evidence of faulty assumptions. For example, nursing home administrators appeared to assume that a call to Success Ambulance Service would be sufficient to accomplish a facility evacuation. Perhaps, such a call would be sufficient for the evacuation of a single facility, but administrators seemed unaware of the impact that a multitude of such calls would have on the ability of Success Ambulance to respond. A key finding of the present study is the need for communities similar in size and location to the Fargo/Moorhead community (i.e., sizeable communities in otherwise

rural areas) to plan ahead for the efficient use of limited resources when faced with the need to evacuate multiple healthcare facilities simultaneously and to send the patients to hospitals and nursing homes outside the originating community.

### **Research Questions**

The present study began with several, general research questions. First, without substantial preparation or preplanning, why were the outcomes of the evacuation successful and not catastrophic? To answer this question, the researcher analyzed the social context in which the disaster occurred. The success appears to be due to the extraordinary cooperation among government agencies (city, public health, and first-responders) and the healthcare organizations in the Fargo-Moorhead area. Healthcare facilities generally followed the advice of local and state governments and public health agencies, while the authorities provided and updated healthcare facilities with timely information. In addition, a spirit of volunteerism and cooperation was evident in the comments of respondents and in the reported actions of multiple parties, a spirit has been present repeatedly in the area's frequent flood fights. Finally, the ambulance services and the neighboring states provided transportation resources, and many regional healthcare facilities were ready and willing to receive evacuees—even calling Fargo/Moorhead healthcare facilities to offer help.

A second question was asked because a cross section of health institutions evacuated from the same flood. Did these institutions have a common perception of their success or did they perceive success differently? The nursing homes tended to have a more or less common perception of their success, which may have been because they were all evacuated under the direction of the same agency, Fargo Cass Public Health. The three hospitals, on the other hand, made assessment of the risks and evaluations independently. They held different perspectives of

their respective success because they assessed the risk and evaluated the situation differently. Consequently, they followed different paths when responding to the 2009 flood.

Third, one of the three hospitals (Hospital B) chose not to evacuate, so another question was asked: Did this hospital perceive its success in the same way as the other two hospitals that chose to evacuate? The non-evacuating hospital perceived its success in a different way from the two evacuating hospitals. Hospital B considered itself to be self-sufficient and fully-prepared for evacuation, should it become necessary. The non-evacuating hospital was located at a higher elevation; it had access to emergency exit corridors, such as air evacuation and interstate highways; it had a generator with fuel enough for a week; and it had food, water, and medicine supplies for a week.

Fourth, this study is unique because it not only included healthcare institutions, but also it included transportation, public health, and city agencies that were all directly or indirectly involved in responding to the flood. Did these external agencies perceive the evacuation outcomes in the same way as the health facilities did? Results indicate that the external agencies did not perceive the outcomes in the same way as the health facilities. For example, in some cases, the external agencies did not perceive the health facilities as well prepared as the healthcare facilities perceived themselves to be. When Success Ambulance Service asked a nursing home if they were ready to be evacuated, they responded positively. When the ambulance staff asked how many ambulatory residents they had and how many residents used oxygen tanks and/or wheel-chairs, the nursing home staff could not answer. The nursing homes thought that they were prepared for Success Ambulance, but Success Ambulance did not share that view. Similarly, both nursing homes and hospitals had triage systems, but the ambulance staff found that these systems and their colors did not mean much, so the ambulance staff had to

establish their own system by defining what the three colors meant for the hospitals and nursing homes.

### **Implications**

Initially, many, if not all, of the healthcare facilities acted independently. They began the evacuation with limited planning for their own institution's evacuation and even more limited planning for community-wide evacuations involving other healthcare facilities. It quickly became evident that this was not an optimal approach to large-scale evacuation. A key implication of the present study (one the institutions in this study are already addressing) is that individual institutions needed to anticipate the needs of other institutions, as well as their own institution's needs, to be fully prepared for community-wide hazard events. Second, success can still be achieved in the absence of adequate planning if there is sufficient cooperation among facilities, cooperation and coordination between facilities and various third parties, and flexibility in the willingness of institutions (e.g., public health) to adopt new roles. However, this is a significant list of prerequisites for success, so the message is still one that emphasizes the need to plan ahead and to plan across individual facilities.

### **Future Research**

Several specific findings in the present study deserve more research. First, more information is needed to further explain the "readiness syndrome" identified in this study. Second, the post-evacuation evaluations of some respondents suggest that there exists a trust deficit among healthcare facilities with respect to government officials that was created by the hesitancy of authorities to clearly declare a mandatory evacuation. Finally, the present study directly addressed the role of improvisation in an evacuation and found improvisation (despite

some respondent denials) to be important for success. Each of these findings will be briefly discussed below.

First, the “readiness syndrome” is a label intended to capture a phenomenon that appeared between the lines in multiple interviews. A number of respondents described a level of readiness for evacuation that seemed to reflect an overestimate of their actual readiness based on respondents’ subsequent comments. Without direct documentation of actual readiness, the accuracy of this observation is open to debate, and, if correct, the size of the overestimate is also open to debate. However, the “readiness syndrome” appears to have one key characteristic—a belief that planning is done when there exists a plan even though the plan might lack significant specifics. An example was the shared perception that institutions were ready because all they needed to do to evacuate was to call Success Ambulance. There is a level of readiness involved in being able to identify a reliable source of transportation, but an examination of the specifics, that is, the number and types of vehicles needed by each institution and the simultaneous need for these vehicles, would have suggested that institutions were really not fully ready for this aspect of the evacuation. Future research needs to explore why this syndrome is apparently a widely shared.

Second, research is needed on the role of trust in evacuations and on the implications of partial loss of trust. A trust deficit can occur when one agency is perceived to have failed to react in ways expected by other agencies. In this study, many financial complications occurred because insurance companies found the City’s advice to evacuate was not equivalent to a mandatory order to evacuate, that is, not sufficiently strong to suggest that the evacuating facilities experienced loss due to forces beyond their control. Several respondents indicated that there would be considerable hesitation to pursue evacuation in the future without assurances in



writing that their losses would be covered by insurance. Whatever the explanations are behind what happened or did not happen with respect to evacuation orders, it is apparent that perceptions of a trust deficit from one event have the potential to affect what happens in the next event.

Third, the present study examined improvisation and its role in the evacuation. There was reluctance on the part of interviewees to admit to having improvised during the 2009 flood apparently because some saw improvisation as an admission of inadequate planning. In fact, improvisation appeared to make a positive contribution to the success of the evacuation. Future research is needed to understand how best to encourage creative solutions in emergency management.

### **Contributions to Emergency Management**

The present research project replicates one of the fundamental principles of emergency management: individuals deny the risk they face and are overconfident about their preparedness for potential risk (Rubin, 2012, p.21). The “readiness syndrome” among healthcare facilities is likely a product of this denial and overconfidence. Even in healthcare facilities whose staff members deal with risk every day on an individual level, this denial and overconfidence—the readiness syndrome—apparently blocked awareness to the threat of city-wide flooding and the need to plan for the simultaneous evacuation of multiple healthcare facilities. However, more research is needed on organizational preparedness (Tierney, Lindell, & Perry, 2001) and on the role that organizational dynamics, including the internal dynamics of healthcare organizations, might play in creating a readiness syndrome.

The present study also suggests that it is critical to better understand how private organizations prepare, not just at the organizational level, but also at the community level. How

do organizations face the need to simultaneously engage in tightly coordinated action in pursuit of the same resources (e.g., transportation) and the same goal (e.g., evacuation from the community)? The present study suggests that two, third-party entities are important to make coordination work across distinct healthcare facilities: a public entity (health department) and a private entity (an ambulance service). These two entities served as coordination bridges in the inter-organizational effort to share the available transportation resources and to identify receiving facilities. The role of such “bridge entities” deserves further examination.

One of the key findings in the present study was the importance of improvisation. Even though some respondents seemed hesitant to credit improvisation over planning for the successful outcome of the evacuation, a number of respondents did highlight the importance of improvisation. The gap between the relatively-limited planning going into the event and the success of the event also suggests that improvisation played an important role in the evacuation of healthcare facilities in the 2009 flood. More needs to be understood about improvisation and what makes it work. The apparent use of improvisation in several facilities and the largely successful outcomes of the evacuations hint at the notion that there may be rules to this seemingly non-rule or rule-breaking process.

Finally, a counter-intuitive finding suggests that the on-the-spot planning that was done in one facility might have proved more beneficial than pre-planning because the pressure of the event forced participation on players (e.g., physicians) who might not have otherwise participated— with the end result that their knowledge proved critical to the evacuation. This unique finding deserves more attention in face of the otherwise compelling logic of improving disaster response through pre-planning.

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