STAFFING A MAJOR ACADEMIC MEDICAL CENTER DURING A LONG TERM
DISASTER

A Thesis
By
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Department of Psychology

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FOREWORD

This thesis is written in accordance with the style of the *Publication Manual of the American Psychological Association* (6th Edition) as required by the Department of Psychology at Appalachian State University.

Staffing a Major Academic Medical Center During a Long Term Disaster

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Abstract

An emergency preparedness planning process model and emergency preparedness planning process map were created based upon the pandemic planning process implemented by a large Midwestern health system. The emergency preparedness planning model and process map can be used to assist researchers, practitioners, and health care professionals of large and small health care centers in emergency preparedness planning preparations. The pandemic planning process implemented by the health system was examined to determine best practices regarding emergency preparedness planning. Research and theory from the fields of organizational development, federal disaster planning, and injury prevention were surveyed to determine the proper planning procedures for the health system pandemic outbreak. From a review of the literature, six critical planning criteria were determined to be important for an effective disaster planning process: the determination of environmental factors, proper problem definition, proper problem specificity, generation of multiple solutions, evaluation of solutions prior to implementation, and the inclusion of a feedback loop. Data collection utilized survey responses and document reviews to help build the emergency preparedness planning model and process map.

Staffing a Major Academic Medical Center during a Long Term Disaster

A pandemic is a global disease outbreak that occurs when a disease emerges for which people have little or no immunity and for which there is no vaccine (Toner & Waldhorn, 2006). The disease can spread rapidly from person to person and subsequently sweep across the world in a short amount of time. The world has witnessed several human pandemics in the 20th century. Death tolls for these pandemics range from more than 34,000 in 1968-1969 to upwards of 675,000 in 1918-1919 in the United States (CDC, 2009). The number of Americans that may die during the next severe influenza pandemic is estimated at between 200,000 and 2 million (CDC, 2009).

Thirty influenza pandemics have occurred in the past 400 years, three of which have been in the past century (Toner & Waldhorn, 2006). The largest of these three pandemics was the "Spanish" influenza of 1918-1919, which is estimated to have claimed more than 20 million lives worldwide (Ghendon, 1994). One outbreak that occurred in the 21st century was the Severe Acute Respiratory Syndrome (SARS). SARS swept across the world causing more than 8,000 people to become sick which led to more than 700 deaths (CDC, 2009). Each year, numerous disease outbreaks happen all around the world. When and where disease outbreaks happen can be unpredictable and the spread of disease can occur rapidly. Recent pandemics have spread across most continents within a six-month period (Cockburn, Delon, & Ferreira, 1969). Because of the magnitude of sickness and death, health care systems can experience challenges to provide both preventive and primary care.

The H1N1 influenza virus is an example of an outbreak that has challenged health care systems. The signs of H1N1 flu virus in humans include high fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, and fatigue (CDC, 2009).

Illness with 2009 H1N1 flu virus ranges from mild to severe. Most people who have had

H1N1 flu virus recover without needing medical treatment, but some hospitalizations and

deaths from infection with the virus have occurred. The Centers for Disease Control and

Prevention (CDC) estimated that between 173,000 and 362,000 H1N1-related

hospitalizations occurred between April and December 12, 2009 (CDC, 2009).

Additionally, the CDC estimated that between 7,880 and 16,460 H1N1-related deaths

occurred during this same time period (CDC, 2009). Because most people did not seek

diagnosis of their flu-like symptoms, the actual number of H1N1 illnesses is likely much

higher than the reported data on 2009 H1N1 flu virus.

It is necessary to use more precautions with pandemic outbreak than would be

used with other disasters. Unlike natural disasters, terrorist events, malicious acts, or

technological disasters, a pandemic is likely to be greater in scale and duration (Cameron

& Rainer, 2003). Traditional disasters typically have limited time durations of a number

of days, while a pandemic usually lasts for months on end. As was noted with SARS, "an

important distinction between the SARS outbreak and other disaster response situations

was the likely duration of the problem" (Cameron & Rainer, 2003, p. 411). As a result of

the long-term effects of pandemic disasters, few organizations will be unaffected from

the potential sickness-related absenteeism that may result from a pandemic event. Within

the health care setting, one of the most important challenges faced by organizations will

be the staffing shortage due to sickness and absenteeism.

The overall objective of this study is to gain insight into the pandemic staffing

process of a large Midwestern health system and to determine what portions of theories

from organization development and disaster planning are useful for future emergency

preparedness planning, to determine when the theories are not useful to emergency

preparedness planning, and to provide suggestions for improvement to the planning

theory. The 2009 H1N1 influenza pandemic provides the researchers an opportunity to

observe organizational theories in practice.

Staffing a Health Care Facility During a Pandemic

The inherent nature of the pandemic disaster in particular has been shown to

impact staffing issues (Krajewski, Sztajnkrycer, & Baez, 2005). Krajewski et al. (2005)

reported 98% of staff were willing to help after an airline disaster, 76.4% were willing to

help after a radionuclide event, and 60.9% were willing to work after an infectious agent

scenario. Therefore, staffing a health care organization during an infectious agent

scenario like a pandemic is likely to be a difficult and important task facing hospitals and

health centers.

Shortages of staff may be intensified by the possibility that more health care

professionals than people in the general public will become ill (Hampton, 2007).

Another possibility noted by Hampton (2007) is that some health care workers may fear

exposing themselves to infectious patients. Toner and Waldhorn (2006) conducted

several studies from which they concluded that up to 50% of workers would be afraid to

come to work during a pandemic outbreak. Additionally, Cameron and Rainer (2003)

report:

In an infectious disease outbreak this situation may last for months, so calling

back staff and working double shifts is not a solution. There is also a possibility

that staff may be unable to work because of infection. Detailed contingency plans

for specialist nurses and doctors to supplement ICU and the ED should be in

place. (p. 411)

Measures should be taken at hospitals and health centers to ensure that an appropriate

staffing plan is developed for a potential outbreak of pandemic influenza.

Federal Emergency Management Programs

In disaster planning, emergency management teams are created at both the

national and local level. At the national level, the Federal Emergency Management

Agency (FEMA) exists to support the preparation, protection, responses, recovery, and

mitigation of all hazards (FEMA, 2009). Within FEMA, the National Incident

Management System (NIMS) has been developed to assist in incident management. The

NIMS is a systematic nationwide approach to incident management that can be used in all

sectors of industry by public and private organizations (FEMA, 2009). At the local level,

many communities have created emergency planning committees that exist to support

similar aims as FEMA.

Given that many emergencies involve a dramatic increase in the need for medical

care, most hospitals and health centers also establish their own emergency planning

efforts. Hospitals and health centers receive emergency management planning guidance

from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).

JCAHO exists to accredit hospitals and health care organizations. Many state

governments require JCAHO accreditation as a condition of licensure to operate in the

state. The standards upon which hospitals are judged include but are not limited to:

human resources, medical staff, emergency management, infection prevention and

control, and national patient safety goals (JCAHO, 2009). One of the areas that hospitals

must be surveyed in is emergency management. Thus, hospitals must ensure that emergency management protocols are up to JCAHO standards in order to receive JCAHO accreditation.

Planning Theory

The correct and precise development of a disaster plan is essential to the hospital's ability to run smoothly during a disaster situation. Before a disaster strikes, hospitals have a multitude of plans to run the day-to-day operations of a hospital. In the event of a disaster, the plans created for day-to-day operations are not likely to be able to accommodate the disaster. Accordingly, in the event of a disaster, hospitals must have specific disaster management plans.

In order to determine how disaster management plans should be created, planning research and theory from Organizational Development literature was surveyed to understand proper planning procedures to be applied to the potential hospital staffing challenge. A selection of the Organizational Development planning theory literature appears below.

Both classic and modern theories can be applied to the potential H1N1 Influenza staffing problem to help solve problems and create solutions. The theories described below are different strategic planning theories in Organizational Development (Deming, 1982; Kepner & Tregoe, 1965) and injury prevention (Haddon, 1968). After brief descriptions of the theories are provided, the theories are applied to emergency planning. These models are used to evaluate the pandemic staffing planning process at the host organization of this research study. Subsequent to the model explanations is a review of the specific planning processes that have been developed for health care emergencies.

Deming's Process Improvement Cycle

This process improvement cycle is commonly known as the Plan-Do-Check-Act (PDCA) cycle. Walter Shewhart, the statistical process control expert, originally developed the cycle in the 1930s (Shewhart, 1939). The cycle was popularized and promoted by the quality control expert William Edwards Deming in the 1950s. Due to the popularization of the cycle by Deming, the cycle is commonly referred to as Deming's PDCA cycle. The PDCA cycle can be used in organizations for problem solving as well as for process improvement. The cycle emphasizes that improvement processes must start with mindful planning (Deming, 1982).

The four main phases of the cycle are: Plan, Do, Check, and Act (see Figure 1). All problems and processes should start in the planning phase. In this phase, the organization plans to improve the process by determining what is wrong with the process as it stands and create plans to solve these problems. Once the plan has been created, the organization moves into the "Do" phase. As opposed to implementing the changes on a large scale, changes described in the planning phase are first put into action on a small scale. This provides the opportunity to move into the third phase of the PDCA cycle that Deming referred to as the "Check" phase. During the "Check" phase, the organization evaluates whether the small-scale changes have achieved the desired result. During this stage, if the changes did not produce the desired result, the organization should start back at the planning phase of the cycle. If changes did produce the desired result, the organization can move into the final stage of the cycle, the "Act" phase. During the "Act" phase, the changes are implemented on a larger scale.

It is important to note that PDCA cycle is a continuous process. Once the changes have been made in the "Act" phase, the organization moves back into the "Plan" phase of the PDCA cycle. This process should be continually repeated, with the completion of each cycle bringing the organization closer to achieving their ultimate goals (Deming, 1982).

In the event of emergency preparedness planning, the first phase, "Plan", is the longest and most effortful phase of the process because the plan to be developed has great levels of complexity. Considering the complexity of the staffing pandemic plan to be developed for the health system, the organization may be in the first phase for months. Because of the nature of a pandemic, it is unknown when, and even if a pandemic will occur. Therefore, it is uncertain whether the hospital would be able to complete all steps of the PDCA process. In terms of pandemic planning, the PDCA may be used as a general guideline or reminder to check the plan before it is fully implemented, but lacks the degree of specificity needed in creating and describing a pandemic planning process.

Problem Solving: Kepner-Tregoe

Charles Kepner and Benjamin Tregoe developed the Kepner-Tregoe problem solving process in the 1960s. This problem solving process relies on a structured methodology for gathering information, and then prioritizing and evaluating that information. The purpose of the Kepner-Tregoe model is not to find the perfect solution, but rather develop the best possible solution by minimizing negative consequences of all possible solutions (Kepner & Tregoe, 1965).

When using the Kepner-Tregoe method, there are four basic steps to problem solving (see Figure 2). The first step is a situational appraisal, which involves clarifying

the present situation and outlining concerns. After the situation has been clarified, the

next step is problem analysis. This step involves defining the problem and determining its

root cause. Following a thorough problem analysis, a decision analysis is completed.

During decision analysis, alternative solutions to the problem should be identified. Each

of the alternative solutions should undergo a risk analysis to determine potential benefits

 and risks to each possible solution. The final step in the Kepner-Tregoe model is

Potential Problem Analysis, which involves choosing the best of the alternatives and

continuing to conduct a more in depth risk analysis. The solution should be further

investigated for other potential problems and negative consequences. Once a thorough list

of problems has been identified with the best solution, actions and plans should be

designed that propose to minimize the risks associated with the best solution. The best

alternative solution should then be ready to be implemented within the organization

(Kepner & Tregoe, 1965).

The Kepner-Tregoe model of problem solving and decision making has been

generally accepted throughout the business community as a useful way to solve

organizational problems. Because of the detail-oriented stages, the Kepner-Tregoe

method is useful within the setting of pandemic planning. The first step of the Kepner-

Tregoe model is situational appraisal. During situational appraisal, the present situation is

outlined. This is critical in pandemic planning, because current resources must be

gathered and developed, as well as determining the capacity levels the hospital will

operate at. Another part of this phase is "outlining concerns." This is a major part of

pandemic planning, because hospital staff will want to be ready for as many situations as

possible (Krajewski et al., 2005; Hampton, 2007).

The next step of the model is concerned with a clear definition of the problem, which is essential to emergency management planning as well as pandemic planning in particular. In pandemic planning for a hospital, it is likely that there will be additional problems that a hospital will face as well as the original problem. Each of these problems will need to be identified and reconciled in order to achieve the greatest likelihood of plan success. Each additional problem must be evaluated to determine how it affects the original pandemic planning problem, and whether or not the additional problem should be included in the analysis of the original problem. If it is determined that the additional problem will affect the original problem, then the additional problem should be included in the larger planning process. If the additional problem is determined to have an insignificant effect on the original problem, it should not be included in the larger planning process. For example, the additional problem of bed availability is likely to affect the pandemic planning process, thus should be included in the planning for the original problem of pandemic planning.

Following a problem analysis, the decision analysis phase begins. Alternative solutions are generated and critiqued in terms of benefits and risks to the organization. It is essential to the plan's efficacy that a team of trained professionals from a variety of perspectives carefully evaluates solutions in the health system so that many possible outcomes can be anticipated before the pandemic arrives.

Once alternative solutions have been generated, one solution is chosen to implement. According to Kepner and Tregoe (1965), the final solution should undergo one final review of benefits and risks to the organization before implementation. Once this final review has occurred, the solution is ready for implementation.

The Kepner-Tregoe model of problem solving is useful to a health care system attempting to create an emergency preparedness plan because of the high level of detail that goes into scrutinizing benefits and risks to solutions, as well as proper problem definition. The Kepner-Tregoe model lacks health-care specific planning steps, such as the differences of needs and plans of individual departments within the hospital.

The Haddon Matrix: Pandemic Preparedness Planning

The Haddon Matrix was developed in 1968 as an analytic approach to traffic safety and injury prevention (Haddon, 1968). Following its original application to traffic safety, the matrix was applied in the field of epidemiology; more specifically, injury prevention. The current version of the Haddon matrix is based upon the social-ecological framework of Urie Bronfenbrenner (1979). Bronfenbrenner's (1979) theory is based upon the definition of various levels of the social environment, and creates a distinction between intrapersonal factors, interpersonal factors, institutional elements, and cultural elements. It is from these factors and elements that the current version of the Haddon matrix originated from.

One advantage of the Haddon matrix is its ability to take a complex problem and dissect the problem into smaller parts, therefore allowing for individual factors of the complex problem to be analyzed in terms of how the small parts affect the problem before, during, and after an event (Runyan, 2003). The matrix has been applied to different industries and health care settings to reduce morbidity and mortality from a variety of different injury types. In addition to its use in the injury prevention field, the Haddon Matrix has recently been applied to the field of emergency planning and

pandemic preparedness to create planning matrices to assist in preparedness processes (Barnett et al., 2005; Tiwari et al., 2006).

The matrix consists of four columns and three rows. The rows represent different phases of an injury or event (pre-event, event, and post-event), while the columns represent different factors that influence the injury. The factors that are in the columns represent the epidemiological factors of personal factors, agent/vehicle, physical environment, and social environment (see Figure 3). The personal factors column refers to the person or persons at risk of injury. The agent or vehicle of the injury represents how the person becomes injured. According to Haddon (1968), the agent or vehicle of injury affects the host through an object, person, or another animal/organism. When applied to pandemic planning, the agent column was purposely omitted because of its inability to add in the success of planning at an institutional level (Barnett et al., 2005; Tiwari et al., 2006). The physical environment refers to factors of the setting where the injury occurs that contribute to the occurrence of the injury. Finally, the social environment represents the socio-cultural and legal norms of a community, such as laws and regulations that may affect the occurrence of the injury.

Each cell of the matrix contains individual factors and important information relevant to each cell. For example, the Social Environmental Factors/Pre-Event cell is filled with various items pertaining to laws, regulations, and socio-cultural norms of the society that are pertinent to be aware of before the pandemic occurs. Regarding pandemic planning, the Social Environmental Factors/Pre-Event cell would contain the statement: high levels of fear in the community surrounding 2009 H1N1 Influenza virus.

The plan does not address any feedback loops, as do the organization development plans (Deming, 1982; Kepner & Tregoe, 1965). Both Deming's (1982) PDCA Cycle and the Kepner-Tregoe model of problem solving (Kepner & Tregoe, 1965) provide evaluation steps that allow for revisions and further strengthening of the plan. In comparison, the Haddon Matrix is easily applicable to the health care setting, and provides a great deal of specificity in each of the cells, but lacks the critical component of a feedback loop to evaluate the plan.

A completed matrix allows the user to determine potential risk and protective factors for injury, or pandemic, in each cell (Runyan, 2003). Consequently, plans can be created with measures that address each of the factors within each of the cells. Thus, the matrix provides functionality because of its ability to identify strategies to prevent and respond to injuries, or pandemics, at each cell of the matrix (Runyan, 2003).

As noted by Barnett et al. (2005), each phase of a public health emergency constitutes a new set of challenges to curtail in response and readiness efforts. The Haddon matrix provides a high degree of specificity that can be used at each phase of a public health emergency. Once all cells of the Haddon matrix have been completed, each cell represents specific task-oriented items that can be designated and delegated to appropriate personnel to solve that particular problem. Therefore, when applied to pandemic planning, the Haddon matrix provides the necessary adaptability to be applied at different phases of an emergency response.

In addition, the Haddon matrix fosters efficiency of resource allocation (Barnett et al., 2005) by the ability to focus on the appropriate phases of the response effort. The multi-cell structure of the Haddon matrix allows for the determination of when different

factors will become important for the organization to manage. In comparison to the other models, this is a unique attribute of the Haddon matrix.

Although the Haddon matrix was originally created for use in the injury prevention field, the Haddon matrix has been successfully applied to address preparedness for influenza pandemic in nursing units (Tiwari et al., 2006), as well as to SARS response planning (Barnett et al., 2005).

Barnett et al. (2005) applied the matrix to Thailand's H5N1 planning efforts. Although no efficacy data were reported, Thailand's past efforts of pre-event planning were evaluated in the study conducted by Barnett et al. (2005). From the Haddon matrix created, opportunities for further enhancements of the pandemic planning system were noted. For example, during the analysis of pre-event socio-cultural factors, the authors noted the importance of political and social willingness to report disease dissemination (Barnett et al., 2005). The authors noted that initially, the Thai government was criticized for ineffective communication strategies concerning the H5N1 influenza. Thus, from the application of the matrix, the authors were able to determine that future pandemic planning efforts should attempt to create strategies to allow more effective governmental communication concerning H5N1 influenza.

Additionally, the Haddon matrix was applied to pandemic influenza planning in Israel (Barnett et al., 2005). The authors discovered that one of the personal event factors of pandemic preparedness determined important to Israel was focused on training activities for health care professionals. Israeli officials had noted elsewhere that health care workers were well trained in terrorism related emergencies, but received little training on pandemic preparedness. Hence, through the use of the matrix, the authors

were able to determine the importance of proper pandemic preparedness training to the

effective handling of a pandemic influenza.

Consequently, the Haddon matrix provides the degree of specificity necessary for

an emergency preparedness plan, as the matrix has done in the past. The matrix will

allow the steps of each part of an emergency event to be planned, from before the event

happens to after the event has occurred.

Hospital Emergency Preparedness: NIMS & ICS

The NIMS process was developed by the federal government to provide a

standardized approach to assist government departments and agencies in effectively

managing critical incidents. The processes determined by NIMS are supported and

carried out through the Incident Command System (ICS). The ICS is one of three

standardized organizational structures established by the NIMS. The ICS is a

management system used by many public safety professionals to assemble and carry out

systems at a wide range of emergencies (Bigley & Roberts, 2001). The NIMS process

requires operations to be performed in accordance with ICS regulations.

The incident management system is used as part of the response to a disaster.

Compliance with NIMS is a condition for any health care organization receiving federal

assistance, including grants and contracts from such agencies as the Human Resources

Services Administration (HRSA), the Agency for Health Care Research and Quality

(AHRQ), and the CDC. Throughout the NIMS compliance process, ICS is incorporated

into the hospital's Emergency Operations Plan (EOP) and standard operating procedures

(SOPs).

The preparedness component provides useful information to hospitals and health centers that are in the plan development phase of emergency preparedness planning. As stated by the NIMS system, "Preparedness is achieved and maintained through a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action" (FEMA, 2009). All stages of the cycle should be followed in the correct order so that the incident can be properly managed.

The NIMS process is used by hospitals and health centers to assist in disaster planning development. The process is flexible in design structure and size, and may be used at small as well as large institutions (FEMA, 2009). There are multiple components to the NIMS system, including provisions to help with preparedness, communications and information management, resource management, command & management, and ongoing management and maintenance.

ICS is put into action by first identifying an Incident Commander, who serves as the leader of the Incident Command team. Following the selection of an incident commander, the planning process begins. The incident planning process consists of six steps (FEMA, 2009):

1. Understand organization policy and direction

2. Assess incident situation

3. Establish incident objectives

4. Select appropriate strategy or strategies to achieve objectives

5. Perform tactical direction (apply tactics appropriate to the strategy, assigning the right resources, and monitoring their performance)

    6.   Provide necessary follow-up (changing strategy or tactics, adding or

        subtracting resources)

The program emphasizes the development of Incident Action Plans (IAPs) during

the NIMS process. The IAP can be oral or written, and should mirror the overall strategy

for managing the incident within a specified timeframe. Within the IAPs, clear incident

objectives should be clarified. In addition to the specifications discussed, many other

topics of incident planning are discussed, such as: communications planning, transfer of

command, mobilization, and information and intelligence management (FEMA, 2009).

Summary

The NIMS process comes from the disaster management framework, providing

steps aimed at preventing and curtailing disasters and thus represents the emergency

management portion of the theories presented. The models proposed by Deming (1982)

and Kepner and Tregoe (1965) represent theories based upon organizational decision

making processes and organizational change. The organizational development models

provide necessary input into the determination of how a plan should be implemented

from an organizational perspective. The critical component of the organizational

development theories is the inclusion of feedback loops. Neither the Haddon Matrix nor

NIMS explicitly describe feedback processes.

The Haddon matrix attempts to understand and solve pandemic planning

problems from the background of injury prevention. The level of detail that results in

each cell from the Haddon matrix is necessary when evaluating a pandemic planning

process. Unlike the organizational development theories and the NIMS process, the

Haddon matrix allows for the creation of specific steps and problems to be addressed throughout the resolution of the problem.

The NIMS planning process emphasizes proper problem definition, and is similar to Kepner-Tregoe in this way. At the end of the NIMS process, the final step allows for follow-up after plan enactment. Although the NIMS process does not provide a feedback loop, the follow-up step serves a similar purpose. In conclusion, each of the frameworks discussed provide useful information for pandemic planning, but also come with downfalls. The important and unique parts of each of the different frameworks should be used to effectively evaluate a pandemic planning response.

This research presents a case study that was completed on the 2009 H1N1 influenza planning preparations completed at a large health system. The purpose of this study is to examine the step-by-step staffing pandemic planning process implemented by the health system. This research reflects the process that occurred for the staffing pandemic planning process, rather than the overall pandemic planning process that occurred throughout the health system. The planning process is evaluated in terms of fit to the models discussed above. In order to evaluate the proposed pandemic planning method, portions of each theoretical framework are assessed for their inclusion in the planning method at the health system of study. The portions of the framework that are included for assessment of the pandemic planning process were determined by interpreting the important and unique parts of each of the processes discussed above. The plan created by the health system of study is evaluated on inclusion and completion of the following planning criteria determined by the researcher:

A) Determination of Environmental Factors (Haddon, 1968): The status and potential impact of the environmental factors surrounding the problem is assessed before planning begins.

B) Proper Problem Definition (FEMA, 2009; Kepner & Tregoe, 1965): The problem is clearly defined and understood by all members of the problem solving process. All members of the problem solving process agree upon the same definition of the problem, as well as the surrounding parameters describing the problem.

C) Proper Problem Specificity (FEMA, 2009; Haddon, 1968): The problem is described in enough detail that there is no ambiguity concerning the boundaries of the problem. Additionally, the problem is properly specified so that it is not viewed as too broad or lacking focus.

D) Generation of multiple solutions (Kepner & Tregoe, 1965): More than one solution to the problem, or a part of the problem, is developed prior to decision making upon a final solution.

E) Evaluation of solutions prior to implementation (Deming, 1982): Solutions are reviewed for problems prior to implementation.

F) Inclusion of feedback loop (Deming, 1982; FEMA, 2009; Kepner & Tregoe, 1965): Individuals involved in the planning process receive feedback on planning solutions prior to implementation. The feedback is used to revise planning solutions.

Method

Participants

Relevant subject matter experts in emergency planning and pandemics at the health system completed online surveys regarding plan development and review over

time. This research was approved by Appalachian State University's Institutional Review

Board # 10-0089 (see Appendix A). All survey participants contacted by the researcher

completed an informed consent form (see Appendix B). In addition, an agreement letter

of participation was signed by the health system that outlined assurances of

confidentiality of data, and anonymity of employee interview responses (see Appendix

C). All employees surveyed were referred to only by job title.

Setting

The study was conducted at a large Midwestern health system. The health system

included numerous hospitals and health centers, a medical school, and nursing school. At

the time this study was completed, the health system had 930 total licensed beds,

performed around 45,000 surgeries each year, employed approximately 19,000

individuals, and had an operating expense of roughly 1.8 billion dollars (University of

Michigan Health System, 2009).

The health system was structured such that the Executive Vice President for

Medical Affairs was the head of the health system. At the health system, a Director and

Chief Executive Officer reported to the VP. Under the supervision of the Director and

Chief Executive Officer were 11 directors of smaller categories within the health system.

The job titles were: Patient Care & Nursing Services, Hospital & Ancillary Operations,

Ambulatory Care Services, Clinical Affairs, Medical Center Information Technology,

Human Resources, Quality Improvement, Financial Services, Chief Compliance Officer

& Privacy Director, Chief Medical Information Officer, and Associate Dean & Director

of Graduate Medical Education. The individual director roles were insignificant to the

purposes of this study, but are provided as further information to assist in the explanation

of the structure of the health system.

In the event of an H1N1 pandemic, the hospitals and health care centers of the

health system estimated between 30-40% of the staff would not come to work. In

addition, patient volume levels were estimated to increase upwards of 30% for a severe

pandemic situation. Thus, the hospital was forced to create a pandemic plan for staffing

the health system during the 2009 H1N1 pandemic influenza.

The health system's Incident Command team convened for the first time in March

2009. At the meeting, it was determined that it was necessary to create Pandemic

Planning teams to effectively coordinate the pandemic response effort. The Incident

Command team, lead by the Incident Commander, selected individuals to become leaders

of the Pandemic Planning teams. The Incident Command team created 21 Pandemic

Planning teams, each in charge of one aspect of the pandemic planning process. The

Pandemic Planning teams established were: Data Modeling, Scarce Resource Allocation,

Emergency Department Triage, Pandemic Urgent Care, Outpatient Capacity, Inpatient

Capacity, Respiratory Care, Home Care, Mortuary Services, Chain of Command,

Communication, Departmental Business Continuity Plans, Education, Employee Health,

Employee Mental Health, Infection Control, Laboratory, Pharmacy, Patient Support,

Staffing, and Supply (see Figure 4). Each pandemic planning team lead was responsible

for identifying individuals that were integral to their particular pandemic team, and

recruited these individuals to become members of that team. Once each pandemic

committee team lead identified individuals to join their pandemic committees, each

pandemic committee convened to generate solutions to the tasks delegated to the

associated Pandemic Planning team.

Materials and Procedure

Throughout the planning process, Pandemic Planning teams created planning

documents to assist in the execution of the pandemic plan. Principle subject matter

experts that were integral parts of developing and revising the plan completed online

surveys regarding plan development and review over time. As previously noted, this

research focused on the staffing pandemic team planning process that occurred. As a

result, the document review and survey of managers reflect the process that occurred

specifically for the staffing pandemic planning process as opposed to the health system

pandemic planning process.

Naturalistic observation by principle investigator. Prior to the possible

pandemic outbreak, the researcher attended meetings and assisted in the planning process

of the pandemic staffing committee. The researcher took notes, provided suggestions, and

created planning documents for the pandemic staffing committee.

Survey of managers. Surveys were administered to subject matter experts within

the staffing pandemic team. The survey generated responses that described the steps

taken behind the plans and provided additional insight into the planning process. Survey

questions sought to allow the researcher to understand what involvement subject matter

experts had with the creation of the plans, what challenges were faced with plan

development and implementation, if the critical planning criteria occurred, and if subject

matter experts had any suggestions for improvement. The survey questions were

generated based upon the previously defined critical planning criteria (see Appendix D).

Critical planning criteria were developed based upon evidence from the literature

regarding essential elements to effective planning processes (Deming, 1982; FEMA,

2009; Haddon, 1968; Kepner & Tregoe, 1965). Survey questions prompted respondents

to state explicitly whether or not each critical criterion occurred during the planning

process at the health system. Additionally, questions were developed and revised with the

input of the Staffing Team Lead.

 Pandemic committee job titles of subject matter experts that completed the survey

were:

- Human Resources Systems Lead

- Staffing Team Lead

- Administrative Lead

- Volunteer Team Lead

- Nursing Services Lead

- Supply & Equipment Management Lead

- Project Manager of Staffing Pandemic Team

 Document reviews. Planning documents were obtained for the overall pandemic

plan as well as the staffing pandemic plan. The broad level planning documents described

the steps taken to ensure that the health system could continue to run properly during a

pandemic. The documents showcased how the plan was developed around a theoretical

model of disaster planning, and described each of the steps in the plan. The planning

documents obtained represent the completed pandemic plans, rather than planning

documents created and used during the planning process. Therefore, the documents

reviewed through the analysis provide an indirect route by examining the final pandemic

documents created by the health system; the researcher was able to infer the steps that occurred during the planning process. The planning documents reviewed were:

- Intake Script (Appendix E): Script created to assist individuals processing requests for additional staff. Outlines the steps necessary to determine the number and type of staff needed.

- Labor Pool Operations (Appendix F): Describes the duties of the Human Resources labor pool operation and the different duties to be completed during each phase of pandemic alert.

- Matching Process (Appendix G): Provides direction concerning the steps of the matching process of relocating individuals to short-staffed departments in need of employees.

- Human Resources (HR) & Labor Pool Pandemic Operations (Appendix H): Specifies the duties of the Human Resources and Labor Pool Pandemic Operations team. Duties of this team include the continuance of critical Human Resources functions, operating the organizational labor pool, and coordinating organizational staffing and personnel reporting.

- UMHS Pandemic Planning Staffing & Labor Pool (Appendix I): A conceptual process map of the staffing labor pool communications and redeployment process.

- Emergency Management Event: Describes the simulation exercise completed by the health system. The document is structured such that each objective of the pandemic planning process is defined; following each element are the strengths, weaknesses, and strategies to change the element for future planning purposes. For example, one objective described in the document is the security operations.

Strengths, weaknesses, and suggestions for improvement are provided for this

element, as well as a contact person and deadline to complete revisions to the

plan. For the purposes of this research, this internal document was not available

for reproduction.

- Department Specific Staffing Plan: Specifies the duties of a specific department.

   Duties are categorized according to whether they are critical, intermediate, or

   non-essential to the functioning of the department, especially in the event of a

   disaster. According to the classification of each job duty within the department

   and the level of the disaster, departments can use the business continuity plan to

   determine the tasks to be completed in the event of a disaster. For the purposes of

   this research, this internal document was not available for reproduction.

- Task Calendar: Assigns and defines tasks of the pandemic plan to Staffing Team

   individuals based upon urgency level. For the purposes of this research, this

   internal document was not available for reproduction.

- HR Pandemic Operations Roster: Lists each individual employee of the Human

   Resources Department; specifies working capabilities to determine redeployment

   opportunities in the event of an emergency event. For the purposes of this

   research, this internal document was not available for reproduction.

Results

The pandemic planning process enacted by the health system was evaluated on

inclusion and completion of critical planning criteria based on Deming's PDCA Cycle

(1982), Kepner and Tregoe's Problem Solving Cycle (1965), Haddon's Matrix (1968),

and the NIMS emergency planning process (FEMA, 2009):

- Determination of Environmental Factors

- Proper Problem Definition

- Proper Problem Specificity

- Determination of Multiple Solutions

- Evaluation of Solutions Prior to Implementation

- Inclusion of Feedback Loop

Each of the critical planning criteria were systematically assessed using survey responses, document reviews, and personal experience to determine the extent to which the pandemic planning process created by the health system conformed to the critical planning criteria. The survey responses, document reviews, and personal experiences were applied specifically to the staffing pandemic plan as opposed to the overall pandemic plan created by the health system.

Process mapping: sequentially depicting the critical criterion within the planning process. First, a best practice emergency preparedness planning model is proposed based upon the critical criteria. Subsequently, the best practice emergency preparedness planning model is described in further detail in the form of a process map. The steps of the proposed planning process are sequentially depicted to illustrate the steps in the process, and to provide more detail on how the process occurred. The proposed emergency preparedness model and process map reflect the process that occurred specifically for the staffing pandemic planning process, rather than the overall pandemic planning process that occurred throughout the health system.

Survey analysis. The survey responses from subject matter experts were incorporated into the analysis as quotes representing single statements around a process

step (see Tables 1-6). Relevant statements were evaluated based upon their description of

critical planning criteria; statements from survey participants were cited to provide

evidence of the process step in the health system's planning. No statements were found

that did not effectively represent one of the critical planning criteria.

      Document analysis. Documents created by the health system were reviewed and

evaluated against the planning process as well. The documents were created as a result of

the planning process that occurred and provided an archive of the decisions made and

processes developed. The statements referenced planning activities that can be inferred to

have happened during the planning itself.

      For example, the HR & Labor Pool Pandemic Operations document provided

evidence of proper problem specificity in that it detailed operating assumptions used by

the health system. During the creation of the document, steps similar to the following

occurred: meetings were held to discuss what should and should not be considered an

operating assumption, operating assumptions were chosen, evaluated, elaborated upon

and finalized. Therefore, the details contained within the HR & Labor Pool Pandemic

Operations document exist because the planning process contained problem specificity

steps. It was through the inferences mentioned above that critical process steps were

determined to have occurred during the health system's planning.

Emergency Preparedness Planning Model

      Based upon analyses of the survey and documents, an emergency preparedness

planning model was created for the health system pandemic planning process. The model

is a high level description of the process that was used during the pandemic planning at

the health system, and is based on the theories and federal guidelines previously

discussed (Deming, 1982; FEMA, 2009; Haddon, 1968; Kepner & Tregoe, 1965). Each

of the six critical criteria were included and serve as the framework for the six major

phases of the proposed emergency preparedness planning model (see Figure 5). The

major phases of the emergency preparedness planning model are briefly introduced

below, followed by a detailed explanation of each in the context of the process map.

      Anticipate. Planners should gain a thorough understanding of the environment

surrounding the problem in order to properly *anticipate* issues that must be considered

prior to plan development. In the course of this phase, environmental and organizational

factors of the incident situation are assessed. This step addresses Haddon's (1968)

determination of environmental factors.

      Boundaries. Planners should clearly define the problem to be solved and set

boundaries as to what does and does not encompass the problem. Incident objectives and

assumptions should be established during this phase. Additionally, the problem should be

described in enough detail so that there is no ambiguity concerning the boundaries of the

problem. This step addresses the need to have proper problem definition (FEMA, 2009;

Kepner & Tregoe, 1965) and proper problem specificity (Haddon, 1968; FEMA, 2009).

      Create solutions. This phase enacts steps to *create solutions* whereby multiple

solutions are considered to solve the problem. Kepner and Tregoe (1965) emphasized the

importance of the generation of multiple solutions as noted by the critical criterion,

generation of multiple solutions. This phase is complete when one solution is selected as

the final solution; this solution continues to be developed during the Design phase.

      Design. During this phase, the solution is *designed*. Additionally, planning

documents and data collection documents are created.

Execute. The plan is *executed* when implemented. The formal execution of the

plan takes place in the event of a pandemic or other emergency event. Deming (1982)

notes the importance of plan evaluation prior to actual execution of a plan and suggests

that plans should be evaluated on smaller scales prior to widespread implementation.

Therefore, when there is no pandemic or other emergency event, simulation exercises

should be executed.

Feedback. During and after the execution phase, the plan is evaluated to provide

feedback for improvement. Strengths, weaknesses, and suggestions for improvement

should be created and the plan should be revised. This step requires the inclusion of a

feedback loop (Deming, 1982; FEMA, 2009; Kepner & Tregoe, 1965) in order to perfect

the plan.

Although the feedback phase is placed in the model after the execution phase,

feedback occurs throughout the planning process. Thus, the model contains arrows from

each step in the process to the feedback phase indicate the continuous relationship with

the other phases.

Emergency Preparedness Planning Process Map

An Emergency Preparedness Planning Process Map was created based upon the

model and conclusions from the critical planning criterion analysis (see Figure 6). The

process map illustrates when and how critical planning steps should occur. Each step of

the process map corresponds with a phase of the emergency preparedness planning

model.

The process map is divided into five rows to represent the different levels of the

organization involved in the planning process. The first row considers the environmental

factors of the planning process. Environmental factors describe current attributes,

external and internal to the health system, as they relate to the emergency event.

Environmental factors considered include certain epidemiological data elements, JCAHO

guidelines, federal emergency preparedness guidelines, and other existing emergency

planning documents internal to the health system. The second row involves actions and

decisions within the Command System including the actions of the Incident Commander

and the Incident Command team. The third row involves actions, decisions, and

documents generated through pandemic committees where decisions are ultimately made.

Examples of these committees include Outpatient Capacity, Inpatient Capacity,

Communication, and Staffing. The fourth row includes the actions that occur at the

department level. Examples of departments include the Emergency Department,

Pathology, Materiel Services, and Human Resources. For the purposes of this process

map, most actions at the departmental level are concerned with providing feedback to the

committees rather than generating solutions to the problems. The generation of the

solution occurs at the committee level, with feedback provided by the departments. The

final row on the process map describes the improvement process. Steps within this row

are concerned with changes and revisions that occur during the planning, execution, and

feedback process.

        In order to correctly interpret the process map, it is important to keep several

things in mind. The process map is read starting in the top left of the map, with the

"Assess Epidemiological Data" box. Each shape is connected to another shape by an

arrow. Arrows represent movement; they direct the reader to the next step in the process.

Each shape represents a different step in the process that must occur in order for the

following step to occur. Rectangular boxes represent actions, such as completing a

simulation exercise. Boxes with a curved line on the bottom represent documents; these

steps indicate that a document is created during that particular step. Parallelogram shapes

on the process map represent where process data is collected, displayed, and analyzed.

The diamonds on the process map represent decisions where the answer directs the user

to the next step in the process map.

Each letter on the process map corresponds to the same letter from the Emergency

Preparedness Planning Model. Numbers combined with the letters suggest different steps

within that process phase. Thus, each letter and number combination is a description of

the events that occur during the corresponding step. What follows are descriptions of

steps within each phase of the Emergency Preparedness Planning Model along with

evidence from the document analysis and survey responses to describe how the health

system planners engaged in these steps.

Anticipate.

A: Assess environmental/organizational factors of incident situation. During the

first phase of the planning process, the Incident Command team assessed environmental

and organizational factors of the incident situation. The type of information gathered

during this phase includes information regarding levels of staff absences, current supply

levels of protective equipment, and disease outbreak level in both the community and

worldwide.

A1: Federal emergency preparedness guidelines. The government assists in

emergency management and planning efforts by providing guidelines and information

regarding emergency preparedness. These documents must be consulted during plan

development. Documents to reference include documents from the FEMA, more

specifically the ICS and NIMS processes. The guidelines documents specify the steps

necessary to successfully implement the NIMS system, which includes the

implementation of the ICS. The ICS team serves as leadership during an emergency

event, and holds decision-making power throughout the incident. Following the ICS

activation, federal planning documents guide health systems to effectively coordinate a

response to an emergency event.

A strong emphasis was placed upon NIMS standards and other federal guidelines

by the planning staff at the health system. As noted by the Administrative Lead, the

"entire planning efforts contemplated ICS as an overarching management tool. We went

into a limited activation of our Incident Management System in June 2009, to effectively

manage our continuing response" (Table 1, Entry 1). Similarly, the Staffing Team Lead

noted the chain of command structure originations from the NIMS system:

The main element of NIMS we used was the concept around central command

and control. We discussed how information should flow and how the Staffing

Team Lead needed to ensure that sufficient data/information was relayed to them

so they could appropriately interact with the Incident Commander or Disaster

Command Center accordingly. (Table 1, Entry 2)

Several other survey responses provided support for the use of federal emergency

preparedness guidelines (Appendix D); five of seven respondents unconditionally agreed

that federal guidelines were used. The other two respondents did not use the guidelines in

their planning, however they agreed that individuals at a higher level of the planning

process likely used the guidelines.

A2: JCHAO guidelines. JCAHO guidelines should be consulted and referred to during plan development to ensure compliance with JCAHO standards. Landesman (2005) discusses the importance of meeting JCAHO standards in emergency situations such that, "hospitals must meet expected standards for comprehensive emergency management as part of their accreditation by the Joint Commission on Accreditation of Health care Organizations." In order to receive and maintain accreditation, JCAHO specifies six critical areas of emergency management that hospitals must be proficient: communications, supplies, security, staff, utilities, and clinical activity (JCAHO, 2009). Consequently, hospitals and health systems must ensure compliance with JCAHO standards during emergency preparedness planning in order to continue to receive JCAHO accreditation.

A3: Epidemiological data. Data elements that determine the level of threat posed by the emergency event must be collected in order to anticipate the effects of these elements on health system processes and functionality during an emergency situation. Data elements include data from the Centers for Disease Control regarding current outbreak levels at the local, national, and worldwide level, and the percentage of staff at risk of infection.

Several different forms of epidemiological data were gathered by the health system. The Project Manager of the Staffing Pandemic team discussed the types of data used in the planning process:

The IMS group used various sources of information, including Subject Matter

Experts from UM, national groups like the CDC and OSHA, state/local groups

like MIOSHA and the Health Department, professional groups like nurses and

physicians associations, practices from peer institutions, general public news

sources like New York Times, CNN, etc. to understand the environment. (Table

1, Entry 3)

The Staffing Team Lead provided support for the previous statement and the use of

external environmental factors in planning: "we carefully evaluated how the community

was reacting to the pandemic by reading newspapers, watching the news, etc." (Table 1,

Entry 4).

The Labor Pool Operations document divided operations according to three

different phases: Pre-Phase, Limited Phase, and the Full Phase (Table 1, Entry 10). The

three different phases of the Labor Pool Operations document were determined based

upon the current influenza phase reported by the CDC, the number of patients at the

health system with H1N1 or flu-like symptoms, the number of staff absent, and the

number of departmental requests for additional staff.

A4: Internal environmental/organizational factors. In addition to external

epidemiological factors monitored by the health system, the effects of internal factors on

the health system were also considered. Examples of internal factors monitored by the

health system included: potential for school closings, supply levels of protective

equipment, current and future staff absence levels, and the number of patients with H1N1

or flu-like symptoms. The Administrative Lead of the pandemic staffing committee

noted, "the potential for staff absences was also considered as a potential issue. High

daily census in hospital facilities also posed major challenges" (Table 1, Entry 5). The

Supply and Equipment Management Lead noted similar concerns over a decrease in

staffing numbers (Table 1, Entry 6).

The Staffing Team Lead listed a number of internal environmental factors considered during the planning process such as, "Staff fears of contracting H1N1 and simply not showing up to work. The 80%+ female population in our environment who are primary caregivers at home, so sick children and/or closed schools could significantly affect our capabilities" (Table 1, Entry 7). The knowledge of the relatively high population of female staff helped the planning team anticipate an increased staff shortage.

Documents created as a part of the final pandemic plan discussed actions that inferred the determination of environmental factors during the first phase of the planning process as well as during the emergency event. The Task Calendar document determined which job tasks should be completed and when job tasks should be completed based on the pandemic planning urgency level (Table 1, Entry 11). The pandemic planning urgency level was a metric specifically created by and for the Payroll section of the Human Resources department of the health system, and was not used by any of the other pandemic planning committees. The pandemic planning urgency level was determined based upon the number of individuals in the department able to complete job tasks. For example, when three to four individuals were available to complete job tasks, the document specified only three of the ten original job tasks to be performed.

Finally, The Intake Script document (Appendix E) provided instructions for employees regarding staffing needs during a pandemic to obtain "background on the situation that caused the need" (Table 1, Entry 12). In order to make the proper request for more staff, the script prompted the individual to understand the environmental factors surrounding the situation gained during the Anticipation phase of the process.

A5: Emergency planning documents. Planning documents and plans previously

created by the health system should be reviewed to assist in future plan development.

Referring to planning documents created in 2006 for the SARS outbreak, the

Administrative Lead discussed the use of prior planning documents on the pandemic

planning process, "having the prior planning from 2006 was very valuable. Even though

imperfect, the efforts provided a good basis from which to refine existing plans to better

ones" (Table 1, Entry 8).

The Business Continuity Plans developed in 2006 for the SARS outbreak

provided the groundwork for further plan development. When asked what components of

the planning process worked well, the Volunteer Lead discussed the use of business

continuity plans, "I can't believe we didn't have these before" (Table 1, Entry 9). The

business continuity plans were developed in order to determine the essential and non-

essential tasks performed by each department. Once each department created a list of

critical tasks performed, the plans were used to determine the critical functions necessary

to continue in the event of an emergency event, as well as those functions that were not

essential to continue operations at the health system.

Boundaries. The second phase of the process is concerned with creating

boundaries to properly define and specify the problem.

B1: Properly define the problem. The first part of this phase is proper problem

definition, which involves creating a defining statement of the problem that all members

agree upon. At the health system of study, problem definition included determining the

possible severity of the pandemic, and the problems that may arise as a result of the

pandemic. There were numerous occurrences within the planning process that problem

definition occurred in order to define a smaller subset of the original problem. The HR &

Labor Pool Pandemic Operations document provided a defining statement to place

parameters around the role of labor pool operations:

> The purpose is to coordinate HSHR Labor Pool operations in the event of an
>
> emergency event such as a pandemic. In the event of the emergency, HSHR
>
> would be responsible for business continuity of existing critical HR functions,
>
> operating the organizational labor pool, and coordinating organizational staffing
>
> and personnel reporting. (Table 2, Entry 3)

The survey responses provided two examples of proper problem definition that

occurred during the planning process. The Project Manager of the staffing pandemic team

stated, "For purposes of the staffing plan, we clearly defined the problem as how to

maintain essential operations while facing a potential 40% absenteeism rate" (Table 2,

Entry 1). Similarly, when asked what steps occurred during the planning process, the

Nursing Services Lead identified one of the steps as "identify the problem to be solved"

(Table 2, Entry 2).

B2: Properly describe the problem. The second part of the phase, proper problem

specificity, has occurred when the problem is described in enough detail that there is no

ambiguity concerning the boundaries of the problem. Additionally, the problem is

properly specified so that it is not viewed as too broad or lacking focus. Document

analysis yielded three examples of specifying the problem during the planning process.

The Labor Pool Operations document described the steps taken to deploy external

volunteers to work assignments within the health system. According to the document, the

steps of the process were, "Security and Screening, In-Processing, Medical Station,

Orientation, Training, and Deployment" (Table 2, Entry 8). The specificity of the external

volunteer deployment process described in this document allowed labor pool intake staff

to be knowledgeable of the correct process to properly assign and deploy external

volunteers to a work assignment within the health system.

The Intake Script planning document provided guidelines to employees taking

staffing requests from units such as "ask questions regarding background, education and

coaching, order detail, prioritization, take order, conduct matching" (Table 2, Entry 9).

The specificity of these questions allowed intake staff to make well-informed conclusions

regarding the needs of unit requests for additional staff.

The Department Specific Staffing Plan document described the job tasks, skill

level required to perform the job tasks, and work redesign and redeployment strategies of

the job tasks within a specific department (Table 2, Entry 10). The document was to be

completed by all departments within the health system so that each department had an

individualized emergency preparedness staffing plan. The details provided described the

critical and non-critical job tasks within each Department Specific Staffing Plan; this

allowed the Incident Command team, and the department itself, to assess the emergency

readiness of the department.

Similarly, four survey responses provided support for the proper problem

specificity criterion. The Project Manager of the staffing pandemic team discussed the

use of detail in plan development, "planning for the pandemic required thinking outside

the box and preparing to behave in ways we are not used to behaving. This required a lot

of communication and detail to help people think differently" (Table 2, Entry 4). The

Supply and Equipment Management Lead noted the inclusion of details in the plans

created for departmental operations, "the documents we prepared for how we would

manage our operations were very detailed and then we got into specifics about how

departments could collaborate to ensure continued service to our patients" (Table 2, Entry

5). Along these lines, the Project Manager of the staffing pandemic team stated:

> We provided a lot of detail to the institution to frame the situation. This allowed
>
> staff to understand what we were preparing for and how we were preparing.
>
> Planning for the pandemic required thinking outside the box and preparing to
>
> behave in ways we are not used to behaving. This required a lot of
>
> communication and detail to help people think differently. Many new guidelines
>
> had to be developed and others had to be modified to guide behavior. (Table 2,
>
> Entry 6)

B3. Establish incident planning principles and assumptions. Following the

completion of the proper problem definition and description steps, the health system

created incident planning principles and assumptions. The incident principles and

assumptions represented a list of critical planning premises created by the health system.

The assumptions were used as a framework of the critical elements for individuals to

keep in mind during the upcoming solution generation and design phases. A list of six

principles and three working assumptions were created for staffing pandemic planning

purposes. The Staffing Team Lead noted, "we divided the work into departments and

created planning principles" (Table 2, Entry 7). The planning principles created were

(Appendix D):

- Not business as usual.

- Plans should leverage existing resources and mechanisms.

- Redeployment of staff should be done in a tiered manner.

- Redeployment of staff will be balanced between the critical needs of your own department and the critical needs of other departments.

- Staff with clinical skills should be utilized in some clinical capacity.

- Internal staffing will be approached differently than external/volunteer staffing.

The corresponding working assumptions used for staffing pandemic planning purposes were (Appendix D):

- Actual presentation of a pandemic may not be known in advance.

- Event is expected to be protracted with 12-week waves over several years.

- Staff absenteeism estimated at 30-40% due to sick staff, staff caring for family members, or fear of infection can be expected.

The planning principles and assumptions created by the health system allowed for proper boundaries to be placed upon the problem. Moreover, the creation of planning principles and assumptions minimized confusion concerning the scope of the problem. By creating boundaries to the problem and properly defining the problem, the health system was able to effectively establish parameters to surround the problem.

Create solutions. More than one solution to a problem should be developed prior to making a final decision. During the brainstorming phase that occurred at the health system, a variety of solutions to the pandemic staffing problem were discussed.

C1: Generate multiple solutions per element. This process occurred at the committee level. Committees engaged in brainstorming sessions to create multiple solutions to the problem. Additionally, committee members solicited feedback of the

multiple solutions from the relevant departments and the committee revised the plan according to this departmental feedback.

Unfortunately, documents used during the planning process that described occasions of generation of multiple solutions were not available for the purposes of this research. The researcher attended meetings during which the generation of multiple solutions occurred. Meeting notes of the staffing pandemic committee supported the occurrence of the generation of multiple solutions. These notes were not available to the researcher for the purposes of this research. During meetings of the staffing pandemic committee, several ideas were discussed regarding the most effective way to recruit external volunteers during a pandemic. Several individuals suggested the use of a pre-existing health system volunteer network. Other individuals advocated for the recruitment of external volunteers from other area health care facilities. Still other individuals presented the option of external volunteer recruitment through a classified newspaper posting. This example supports the occurrence of the generation of multiple solutions in regards to external volunteer recruitment.

C2: Obtain feedback from key constituents. This step involved retrieving feedback on potential solutions from key constituents in relevant hospital departments integral to the planning process. Committee members asked subject matter experts in departments, usually department chairs, to evaluate the solution developed and provide constructive feedback on how to improve the plan. The feedback came in two forms: a meeting between the committee member/s and the subject matter expert from the department, or through an email from the subject matter expert to the committee member/s. The Volunteer Lead stated that, "the meetings I attended were filled with a

constant back-and-forth of feedback and ideas" (Table 3, Entry 1). Feedback received

was then shared with other members of the committee who then discussed the importance

of the feedback and decided through consensus to incorporate the feedback received and

revise the solution to reflect these suggestions.

    C3: Choose one solution to continue to develop. Following feedback from key

constituents, one solution was chosen. Committee members held meetings to determine

which solution was ultimately chosen. At the meetings, all committee members were free

to voice their opinions both in favor and not in favor of proposed solutions. In order to

arrive at the most effective solution, the committee chair reminded the committee

members of the planning assumptions and principles upon which the health system

operated under, as well as current environmental and organizational factors surrounding

the pandemic. The committee chair reminded committee members of this information to

ensure that the solutions were considered based upon all relevant information so that

members chose the best solution for the problem.

    Discussion ensued upon the solutions until a consensus was reached upon which

solution to choose to develop. Within the staffing pandemic committee, decisions were

made by consensus, with the committee chair holding veto power. Once one solution

reached consensus by the committee, committee members began work to aggressively

develop the chosen solution.

    For example, the staffing pandemic committee created a number of solutions to

recruit external volunteers. Discussion ensued upon the solutions to this problem, and

individuals voiced support and concerns for the different solutions. Following this

discussion, one solution was chosen. The strategy that was chosen unanimously by the

staffing pandemic committee was to use the pre-existing health system volunteer network as the external volunteer recruitment strategy.

Design. This phase of the process is concerned with the design of the solution. The solution should be created in as much detail as possible.

D1: Incident action plan documents created. Planning committees created planning documents to assist in the execution of the pandemic staffing planning process. These documents were based upon the solutions developed during the previous phase of the planning process. The purpose of the documents created was to aid in the implementation of the IAPs in the event of disaster occurrence.

One such document was the Pandemic Planning Staffing & Labor Pool document (see Appendix I) created by the staffing pandemic committee wherein the staffing planning process was depicted in the form of a process map (Table 4, Entry 3). The map detailed the steps that should occur in the event of a disaster. Standards for communication and reporting, the use of business continuity plans, communications coordination with the Incident Command team, and an overview of the Labor Pool operations process were depicted on the map.

In order to document solution development, each department created IAP documents. IAPs specified the actions that occurred within each department in the event of the enactment of Incident Command mode. Each department listed the tasks and duties that occurred within their department during day-to-day operations. Then, each task or duty was ranked in terms of criticality: critical, intermediate, or non-essential. In the event of an emergency, critical tasks were to be completed first, followed by intermediate tasks, and lastly the non-essential tasks. The Department Specific Staffing Plan

represented a non-final version of a departmental IAP (Table 4, Entry 4). The finalized

IAPs are discussed in later steps (see Step D3).

D2: Data collection plan created. In addition to the IAP, a data collection plan

should be created to track progress and evaluate the effectiveness of the plan during and

after the execution phase. This plan should detail what data elements the organization

wishes to collect regarding the implementation and review of the plan.

The health system created plans to collect the following data elements:

- Patient volume measures: The number of beds filled in each hospital compared to

  the number of open beds.

- Percent of patient census being treated for H1N1 or flu-like symptoms: The

  number of patients being treated for non-H1N1 or flu-like symptoms compared to

  the number of patients being treated for H1N1 or flu-like symptoms.

- The number of staff absent each day because of the H1N1 flu virus versus other

  causes: The number of staff absent daily specified for the reason of H1N1 or flu-

  like symptoms was compared to the number of staff absent daily for any other

  reason.

- The number of staff available for redeployment: Consisted of the number of staff

  available for redeployment to other departments.

- The number of departments in need of assistance: Consisted of the number of

  departments in need of additional staff to complete job tasks.

- Amount of staff not working in their regular assigned department/job role:

  Consisted of the number of staff not working in their regular assigned

department/job role compared to the number of staff working in their regular non-

pandemic assigned department/job role. Percentages were calculated for each.

- The number of services offered by department: Consisted of the number of

    services offered by each department.

- The number of people that volunteer through the external labor pool for

    redeployment: Comprised of the total number of people that sign up to volunteer

    through the external labor pool.

- The number of external labor pool volunteers that are sent to work in the hospital:

    Consisted of the number of external labor pool volunteers that volunteered to

    work and were then sent to work in the hospitals. Data was also collected on the

    departments and level of specialization job that the volunteer was placed into.

As completed by the health system, a wide range of information was surveyed by

these data elements. Emergency preparedness plans should include plans for the

collection of data across a wide variety of categories as was completed by the health

system.

   D3: Continually reevaluate the solution. In addition to feedback solicited by

committee members from subject matter experts within departments, solutions were

reevaluated during the design phase. The Human Resources Systems Lead described a

variety of efforts to evaluate solutions, "we identified limitations of the system we chose

and continued to reevaluate those as we moved through the process" (Table 4, Entry 1).

The Administrative Lead discussed the use of feedback in a portion of the revised

plan that was created to include a patient placement algorithm, "we found a need to

circulate the draft more broadly, and received additional anticipatory feedback from those

not yet affected by the actual placement changes" (Table 4, Entry 2). Undoubtedly, the committee member solicited feedback from subject matter experts in order to design the most effective solution, providing support of the occurrence of feedback on solutions.

D4: Final incident action plan created. The final IAP has been created once the simulation exercise is completed (discussed later in step "E1"). These documents represent the finalized and authorized plan of action.

The final staffing IAP created by the health system was represented by the HR & Labor Pool Pandemic Operations document (Appendix H). This document coordinated all Labor Pool operations in the event of an emergency event, such as a pandemic (Table 4, Entry 5). The staffing pandemic committee created the final plan, with assistance from departmental subject matter experts and adapted the plan based on data from the completed simulation exercise.

D5: File incident action plan for future use. Once the Final IAP is created, the plan should be appropriately stored and filed for use, whether this is anticipated in the near or in the distant future. At the health system of study, the final IAP was filed with the health system's emergency management specialist, as well as with the Staffing Pandemic Lead. These two individuals stored both electronic and hard copies of the final version of the IAP, and were responsible for providing the Incident Command team with the final IAP.

Execute. The pivotal step in the process is the implementation of the IAP either as a simulation or actual pandemic event.

E1: Complete simulation exercise. A simulation exercise should be completed following the creation of the finalized IAP. The simulation exercise should include all

departments and individuals integral to the implementation process. During the exercise, the plan should be simulated to understand the outcomes and consequences that follow each step in the process. For example, individuals integral to the planning process convened in one location to complete a "tabletop" exercise where they discussed the plan from the first step through the last step. At each step, each individual was given the chance to voice their concerns over the step as well as provide suggestions for improvement.

Several survey responses noted that the "tabletop" exercise provided support for the evaluation of solutions prior to a potential implementation. The Human Resources Systems Lead discussed the "tabletop" exercise: "the final meeting was a run-through of the process and how to use the system by doing a sample order and match process" (Table 5, Entry 1). Likewise, the Staffing Team Lead discussed the evaluation of solutions critical criterion in terms of the "tabletop" exercise: "We performed tabletop exercises on our pandemic staffing process to test our process and assumptions, and identify strengths and weaknesses in our plan" (Table 5, Entry 2). The result of the "tabletop" exercise was revised IAPs. The data generated by the simulation provided the health system with relevant feedback regarding the plan's potential effectiveness.

E2: Simulation data. Data should be collected in order to capture the findings of the simulation exercise. In the "tabletop" exercise, the staffing pandemic planning committee chair took notes and created a feedback document. This document was not available for the purposes of this research. These data concerning the pandemic plan were then used to improve and revise upon the IAPs (see letter "F").

E3: Conduct training. Training must be conducted before the core of the IAPs can be implemented. The content of the training programs should be predetermined and designed in accordance with the final IAPs. The health system created a separate pandemic training committee that oversaw and designed all training operations and content for the pandemic event (Table 5, Entry 3). Regardless of whether training is developed in a separate committee or developed by each committee, training must occur prior to the execution of the IAPs so individuals are able to perform the job tasks and duties required during an emergency event.

E4: Alert communications committee to begin execution of plan. The ICS is activated when the health system is posed with an event that threatens the day-to-day operations of the health system. The Incident Commander holds the authority to determine when the Incident Command Center is activated and deactivated. When such an emergency event occurs, the communications committee is alerted by the Incident Commander to begin the execution of the IAPs. At the health system, the pandemic did not reach a level in which plan implementation was necessary. If it had, the Incident Commander would have alerted the communications committee to contact all pandemic committee leaders and instruct them to begin execution of IAPs. Following the start of plan execution, pandemic planning committee leaders would provide updates on plan implementation to the Incident Command Team.

Feedback. The execution phase of the planning process is followed by a formal feedback phase. During this phase, the finalized IAPs should be formally evaluated and improved upon. As previously discussed, the feedback phase also occurs informally throughout the planning process.

At the health system, feedback occurred during the Create Solutions phase where feedback is obtained from departmental subject matter experts. Additionally, the Staffing Team Lead noted the use of feedback during the "tabletop" exercise. When asked whether planners received feedback, the Staffing Team Lead responded, "yes, via the tabletop planning process" (Table 6, Entry 1). Similarly, during the creation of IAPs and the completion and evaluation of the simulation exercise, departmental subject matter experts and committee members provided feedback to the committees who then revised the IAPs. The Volunteer Lead stated, "the meetings I attended were filled with a constant back-and forth of feedback and ideas" (Table 6, Entry 2).

F: Formally evaluate and improve incident action plan. Evaluation methods to evaluate IAPs can differ. Organizations may choose to use surveys to assess member experiences or perceptions of the plan's effectiveness. Additionally, organizations can review collected event data to determine the plan's effectiveness, or hold focus group or town hall meetings to assess organizational member's response to the plan. There are certainly many other evaluation options.

The staffing pandemic plan at the health system was formally evaluated following the completion of the finalized IAPs. The feedback phase occurred at the health system in the form of a formal evaluation of the IAPs. The resulting Emergency Management Event document detailed the objective, accomplishments, challenges, and improvements for the several hundred tasks that were simulated in the IAPs (Table 6, Entry 3). Individuals who were integral to the planning process assisted in revisions of the IAP by contributing feedback to the Emergency Management Event document. The document represented a feedback loop in the health system planning process.

F1: Develop post event reports. During the evaluation process, the proceedings of the actual events and the results of data evaluation should be recorded so the findings can be used to revise the plan for future use. Once the reports have been created, they are also filed away for use in future planning efforts.

The health system completed a post event report titled "Emergency Management Event." This document was not available for reproduction for the purposes of this research. In this document, the health system created an archive of the events that occurred during the pandemic planning process. Over one hundred "objectives" were identified and outlined in terms of accomplishments, challenges, and improvements to be made in the future for the specified objective. For example, one of the objectives was concerned with the Labor Pool objective. Accomplishments of the Labor Pool objective included the "creation of planning principles and working assumptions," challenges of the Labor Pool objective included, "we struggled with figuring out who we needed to even be in the conversation around developing processes," and finally, improvements of the Labor Pool objective included, "ensure the principles are still applicable for future planning." As a result, each objective was summarized, and suggestions for improvement were noted for future plan revisions.

Overall conclusions

The process that was observed at the health system involved continual re-evaluation of problem definitions, solution generations, and feedback loops. It is likely that this occurred because the health system developed the plan quickly in reaction to a looming potential H1N1 pandemic. If the health system had had the time to engage in proactive planning, the problem definition, solution generation, and feedback loop

processes would have been likely to be more streamlined and systematic. Given the just in time circumstances of the health system planning, the health system effectively defined the problem, generated multiple solutions, and used feedback loops concurrently.

Rather than planning just in time as the health system was forced to, hospitals and health systems should plan proactively for emergency management events. They should create an emergency preparedness plan before the threat of an emergency event exists. Despite the just in time planning that occurred, the observed planning process at the health system provided an example of the steps necessary in order to effectively plan for an emergency event.

Discussion

The pandemic planning process created by the health system effectively acted on the original six critical planning criteria discerned from the literature. The emergency preparedness planning model and process map created by this research can enhance the emergency preparedness planning processes at large and small health systems.

The emergency preparedness planning model allows for flexibility in the planning process in that the model can be used to plan for a variety of emergency events faced by health care centers. Although the planning model and process map were created based upon the pandemic planning process that occurred at one health system, the model was designed to be used for all emergency management disasters that face health care centers.

Planning processes at different health care centers are admittedly different. For example, the size and location of health care facilities play a key role in the emergency preparedness planning process. Accordingly, the proposed emergency preparedness

planning model and process map were designed to allow for flexibility in planning.
Rather than determine specifics surrounding plans for a particular type of emergency
event faced by health care centers, the resulting model and process map focused on
describing the steps necessary to effectively plan for an emergency event.

The resulting planning model and process map were backed by theory and created
based upon a case study analysis. The proposed model and process map were created
based upon critical planning criteria determined from established planning theory. The
planning model and process map were partially validated by the review of the case study
of the health system's pandemic planning process. Health care professionals can use the
model (see Figure 5) and process map (see Figure 6) as a step-by-step process to guide
emergency preparedness planning.

At the time this research was originally proposed, the researcher speculated that
two separate planning processes would be created: one process to describe the planning
process that occurred at the health system, and one process to describe the ideal and
proposed planning process for emergency preparedness planning. Surprisingly, the
process used by the health system provided a good representation of an ideal planning
process, with minor revisions. Therefore, only one planning process was described.

It is important to note that the scope of this research project was focused primarily
on the staffing plan created by the health system as opposed to the overall pandemic plan
created by the health system. To this end, the system maps reflected the process that
occurred specifically for the staffing pandemic planning, rather than the pandemic
planning that occurred throughout the entire health system. By focusing only on the
staffing pandemic planning process, the researcher was able to thoroughly investigate the

planning process that occurred. This level of detail would not have been possible if the

focus had been on the pandemic planning process of the overall health system. However,

the process used for the other pandemic planning areas of the health system was similar if

not identical to the staffing pandemic planning process.

Difficulty arose concerning various federal guidelines recommendations during

the planning process. As noted in the Emergency Management Event document, the CDC

and World Health Organization recommendations for care did not always coincide with

literature suggestions for care. The difference in recommendations created uncertainty

and confusion in terms of which guidelines to follow. In the future, an integrated set of

guidelines from governmental agencies regarding health care emergency management

would ensure a smoother planning process.

Limitations

Despite the potential addition to the field of emergency preparedness planning

this research represents, several limitations exist. First, planning should occur before an

event takes place, as opposed to right before or during the event. The planning process

that occurred at the health system was reactionary as opposed to proactive; planning

occurred as a reaction to the imminent threat of widespread pandemic outbreak. Several

survey responses indicated the limitations to the reactionary planning that occurred

within the health system. Many survey participants commented on the importance of

beginning the planning process before the event occurs. These respondents indicated that

there was not enough time to plan effectively. When asked about challenges that were

faced during the planning process, the Staffing Team Lead stated, "I just simply felt that

there was not enough time to devote to all of the issues" (Appendix D). Additionally, the

Administrative Lead stated, "the combination of the rapidity of developments, together with the large and complex nature of our organization made this process imperfect, and, at times, solutions had to be rolled out and tested immediately, with adjustments made after the fact" (Appendix D). These responses highlighted the importance of planning for an event before it occurs as opposed to planning when the event occurs.

Another potential limitation may have been personal bias. The researcher was a part of the planning process, which had both positive and negative outcomes on the research. A positive outcome of this was the enhanced ability to provide additional detail to descriptions and easily understand the survey responses of participants. Conversely, the researcher may have had personal biases that affected the outcomes of the research.

The limited amount of data may also have affected the robustness of the evaluation. The researcher was unable to conduct quantitative analyses of the planning process because the pandemic plan was never fully implemented. A review of quantitative data to determine plan effectiveness and efficiency (see D2 for a list of effectiveness measures) would provide a useful extension of this research.

Similarly, although the researcher had access to a large number of documents that were used in the planning process, a number of additional documents existed that were used in the planning process which the researcher was unable to obtain. The documents that the researcher was able to gain access to represented the completed plans to be used in the event of a pandemic. This provided a less than optimal amount of qualitative data in regards to the planning process. Meeting notes, minutes, and agendas described the planning process in ways that were not captured by the documents to which the researcher had access. For example, meeting notes of the staffing pandemic committee

described multiple solutions to external volunteer recruitment. Documents that contain

such data could improve future research efforts.

A final limitation of this research concerns the nature of the research itself. The

research methodology was qualitative as opposed to quantitative in nature, thus making it

difficult to provide validation measures of each planning criteria. Furthermore, the

research was conducted at one health system as opposed to a number of health care

facilities; findings may not be fully applicable to other health care centers.

Suggestions for Future Research

More data should be collected throughout all phases of plan development. If

possible, data should be obtained before, during, and after the emergency preparedness

planning process. Data elements to be collected should include both quantitative and

qualitative elements. Quantitative data elements should include efforts to assess the

effectiveness of the plan on organizational outcomes such as the number of pandemic

patients, number of staff redeployed, number of volunteers, number of volunteers

redeployed, length of the pandemic, when the pandemic plan was implemented, materials

supply information, and many others (see D2). Qualitative data elements for inclusion

should be similar to those data elements collected in the survey used for the current

research (see Appendix D). Additionally, a content analysis should be conducted of

qualitative items to determine validity. Content analysis was not conducted for the

purposes of this study because the aim of this research was to propose a streamlined

emergency preparedness planning process, rather than to determine the reliability and

validity of survey responses regarding plan development.

If future researchers choose to distribute a survey similar to the survey used in the present research, a broader range of participants should be utilized. Additional respondents to survey include other staff, patients, and volunteers during the emergency event.

As noted earlier, research was conducted at one health care system. Future studies should examine additional health care systems to determine the applicability of the planning process suggested by this research. Finally, further research should refine the proposed emergency preparedness planning model and process, and provide reliability and validation studies of the critical planning criteria.

Conclusion

Detailed emergency preparedness planning process proposals were scarce in the literature and tended to emphasize the importance of planning without describing how the steps in the planning process should occur. The emergency preparedness planning process proposed in this current research represents a uniform model that can be used to assist health care professionals, researchers, and practitioners in emergency preparedness planning efforts.

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Appendix A

IRB Approval Form

Date: 3/11/2010

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)

Study #: 10-0089
Study Title: Staffing a major academic Medical Center during a long term disaster

Submission Type: Modification
Expedited Category: (7) Research on Group Characteristics or Behavior, or Surveys, Interviews, etc.

Approval Date: 3/11/2010
Expiration Date of Approval: 1/12/2011

This submission has been approved by the Institutional Review Board for the period indicated. It has been determined that the risk involved in this modification is no more than minimal.

Investigator's Responsibilities:

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Should any adverse event or unanticipated problem involving risks to subjects occur it must be reported immediately to the IRB.

Appendix B

Informed Consent Form

APPALACHIAN STATE UNIVERSITY

**Informed Consent for Participants in
Research Projects Involving Human Subjects**

> **Institutional Review Board
> Study #: 10-089**

Title of Project: **Staffing a major academic Medical Center during a pandemic**

Investigator(s):   **Ariel Grosshuesch**
                                  Timothy Ludwig, Ph.D.

I. Purpose of this Research/Project:

This research will examine how a major academic Medical Center plans and prepares for the onset of a potentially detrimental pandemic outbreak of H1N1 flu. The focus will be on determining how the medical center developed its plan for staffing all units and departments with employees throughout the health system during the pandemic.

II. Procedures:

Plans regarding the allocation of staff to different departments will be described and analyzed as it relates to major disaster planning theory. Following the explanation of the plan, the plan will be analyzed in terms of its usefulness to other hospitals and medical centers.

Principle subject matter experts that were integral parts of developing and revising the plan will complete an online survey regarding plan development and review over time. The survey link will be sent to participants through email. Participants will complete the survey once. Completion of the survey should take no more than thirty minutes. Participants will be asked to respond to questions regarding the pandemic planning process. Completion of the survey will not positively or negatively affect any job outcome. Completion of the survey is voluntary, and you have the opportunity to withhold information, as well as drop out of the study at any time for no reason.

III. Risks:

- Organizational data and responses to survey items could be sensitive to the reputation of the hospital and/or the executives and key planners of the H1N1 staffing plan.

- Given that only one person holds each surveyed position, other persons at the medical center may be able to determine who said what comments.

IV. Benefits:

- Assist in furthering the field of disaster planning.
- Any information obtained will be published in a scholarly journal to disseminate H1N1 planning information to other hospitals and medical centers.

V. Extent of Anonymity and Confidentiality:

- At no time will the researchers release the results of the study to anyone other than individuals working on the project without your written consent
- Surveyed participants will be recognized by job position; individual names will not be used
- The hospital name will not be used
- Data will be aggregated (No individual data will be collected or reported)

VI. Compensation:

Participants will not be compensated for completion of this research. It is understood that no funds have been set aside for any injury or illness resulting from this project.

VII. Freedom to Withdraw:

Subjects are free to withdraw from a study at any time without penalty.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board of Appalachian State University and University of Michigan Health System.

01/13/2010   01/12/2011
IRB Approval Date   Approval Expiration Date

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

Review disaster planning staffing plan and answer questions within the online survey regarding pandemic planning (Please see attached questions). You are free to not answer any questions without penalty.

X. Subject's Permission

I have read and understand the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date_____
Subject signature

Should I have any questions about this research or its conduct, I may contact:

Investigator: Ariel Grosshuesch   Phone: (828) 719-1401   email: grosshueschar@appstate.edu

Faculty Advisor: Timothy Ludwig, Ph.D.   Phone: (828) 262-2712   email: ludwigtd@appstate.edu

_____
David Nieman, Ph.D. (IRB Co-Chair) Phone: 828-262-6318   e-mail: irb@appstate.edu

Graduate School and Research and Sponsored Programs
Appalachian State University
Boone, NC 28608
irb@appstate.edu

Appendix C

Agreement Letter

**University of Michigan
Health System**

September 30, 2009

To: Dr. Timothy Ludwig
      Professor of Industrial/Organizational Psychology
      Department of Psychology
      Appalachian State University
      Boone, NC 28608

Subject: Ms. Ariel Grosshuesch-Master's Thesis

We agree to participate with Ms. Grosshuesch in conducting research for her thesis. Ms. Grosshuesch worked with us this past summer on internship and gained valuable knowledge in the topic being considered.

We understand the goal of this research is to describe the pandemic staffing plan developed by the University of Michigan Health System(UMHS). It will focus on the process developed and (dependent upon outbreak this fall) the process executed. The data should be collected retroactively and shall not interrupt the daily operations of UMHS. No individual patient data shall be collected and will comply with HIPPA privacy guidelines for protected health information.

The result of the research and project will be a written report of publishable quality describing the pandemic staffing process at UMHS.

In agreement to participate in this thesis we agree to the following:

- Allow the thesis team to interview relevant subject matter experts in emergency planning and/or pandemics at UMHS.

- Data elements for collection include but are not limited to: patient volume measures, percent of patient census being treated for H1N1 flu or flu-like symptoms, the number of staff absent each day because of H1N1 flu virus versus other causes, amount of staff not working in their regular assigned department/job role, the number of people that volunteer through the external labor pool, and the number of external labor pool volunteers that are sent to work in the hospital.

- Publish results as an academic thesis and in scholarly journals

As the research is being conducted, it is understood that all data will be confidential so that no employee or company can be identified by anyone other than the research team. UMHS participation in this project is strictly voluntary and not a condition of

employment at University of Michigan Hospitals and Health Centers. There are no contingencies for employees who choose to participate or decline to participate in this project.

- The thesis will be approved by Appalachian State University's Institutional Review Board.

- Data collected from University of Michigan Health System will not be distributed outside the research team unless otherwise authorized by University of Michigan.

- University of Michigan Health System may adapt their participation or withdraw from the project at any time due to business necessity or other concerns.

- University of Michigan Health System will be able to review and make comments on any reports generated from this research before public dissemination.

- If desired, University of Michigan Health System will be recognized on all reports generated for its participation in the research.

We look forward to working with Appalachian State University toward the completion of the thesis of Ms. Grosshuesch.

Sincerely,

Deborah Childs
Chief Human Resources Officer
University of Michigan Health System

Shon Dwyer
Associate Hospital Director
University of Michigan Hospital & Health Centers

2

Appendix D

Summary of Pandemic Planning Process Survey Responses

Question 4: What was your role in the planning process?

1. I was the lead for Human Resources Systems. My job was to identify a solution (Manpower's PowerBase) and how we could get the solution up and running quickly in the event of a pandemic. My role was also to figure out the long-term impact of the current system.

2. I am lead for the staffing team, which has responsibility to develop the plan to ensure that the health system has enough faculty and staff available to meet the patient care needs in the event of a pandemic.

3. Since 2006, I have been the Administrative lead for the pandemic planning process.

4. I assisted with coordinating the Nursing Services staffing response to a pandemic event. Specifically, I assisted in the planning and coordination of volunteers and temporary paid staff recruited from area schools of nursing (students and faculty), health system RN retirees within the past three years, and volunteers who would assist nurses in the inpatient areas. Also, I was involved in planning and prescreening of internal health system employees with nursing or patient care related background who might be reassigned to work in a direct care capacity. My focus was doing any initial contact, pre-screening and preparation before going to the Nursing Central Staffing Resource department for assignment.

5. I was the Nursing Lead for the Limited Activation Team and for Nursing Services in general.

6. I am the Director of Materiel Services and was responsible for supply and equipment management including everything from acquisition to distribution. In addition, I was also responsible for working with my team to develop our own Pandemic Plan to ensure our continued operation.

7. I was the Project Manager that assisted the Staffing Planning team.

Question 5: What are the job titles of other individuals that were instrumental in the planning process? What did these individuals contribute?

1. The Human Resources Consultants helped with their knowledge of what departments might request help, and how they would go about filling openings was instrumental! They also helped us narrow down a list of skills to use in the system to do our matching.

The Employment Process Coordinators do the hiring for positions now, and their input was incredibly important in helping us figure out processes.

The Recruitment coordinators - The Nurse Recruitment and Volunteer Services coordinator and her team were instrumental in helping us parse out the different Skill

Categories (A, B, C and D). Staff from Central Staffing Resources was able to provide insight into their current process and what works well and what does not work well.

2. The Incident Commander and Associate Hospital Director provided a structure for us to understand and discuss the potential scenario we would most likely experience. This allowed us to develop some assumptions that we were then able to share with departments as we worked to develop potential staffing scenarios and how we might manage the process.
The Emergency Management Specialist helped all the various groups and teams working on the project stay connected to one another by placing information on our website. Additionally, she made sure we all knew what each other were doing.

3. The Chief of Staff is a respected physician lead who brought about broad physician engagement with the process that led to enhanced success of the planning process. The Chief Operating Officer supported funding for my efforts, and supported the time investment of others who engaged in the effort. The Chief Operating Officer also supported funding of the support position, the Project Manager, who ultimately transferred over from Office of Clinical Affairs to Emergency Management to continue this and other work. Various physician and administrative leaders who led committee work were also instrumental in the planning process.

4. The nursing lead assisted in the overall coordination of Nursing Service efforts.
The manager of the Central Staffing Resource department helped me.
The Director of Nursing Professional Development and Education helped me.
The Nurse Recruitment and Retention specialist helped me.
The Educational Nurse Specialist helped me.
The Human Resources Decision Support manager helped me.
The Staffing Team lead helped me.

 5. The Safety Director and Infection Control Leadership, program leadership, Director of Materiel Services, Assistant Chief of Staff, Marketing Director, Human Resources director and many others helped me.
I am unable to answer this broad of a question concerning the large number of people involved in the health system H1N1 planning.

6. Naturally, my management team was instrumental and in particular the Manager of our Warehouse Operations and the Manager of Patient Equipment was especially helpful. Contracts and Procurement was another area that I worked with in particular as we developed our reserve order of supplies early in this process. I continued to work with Contracts and Procurement as we brought in substitute products and dealt with the company representatives. Our Value Analysis team was another group that I worked with as they played a key role is assessing and evaluation substitute products. Other areas that I worked closely with were Infection Control and Nursing, as I needed their counsel on product decisions. Finally, I would note that I worked very closely with our vendors including our medical product distributor, Owens and Minor.

7. The Human Resources Manager, the Safety Management Manager and other Staff, Nursing Manager, Operations Manager, Support Services Manager, Infection Control

Manager, Volunteer Services Manager, Man-Power Staff, Education Manager, and the Process Improvement Specialist helped me during the planning process.

Question 6: Briefly describe the steps that occurred during the planning process

1. I met with the Staffing Team lead to help him identify a system. Once we identified the system, we walked through the process of how to use the system and make a staffing request. We then took that process and an overview of the system to additional Human Resources and Recruiting and Staffing professionals to get their insight and input on how to streamline the process.

There were numerous ongoing meetings with this large group to continue to streamline the system and the process. The final meeting was a run-through of the process and how to use the system by doing a sample order and match process.

2. Once the limited activation of the Incident Command Structure was activated, I needed to identify who would need to be involved in the planning process for staffing. I Identified individuals from Nursing, Human Resources, Office of Clinical Affairs, MLearning, Volunteer Services and other ad hoc members.
Given our assumptions, we then began to develop a high level process for potential use. We then scheduled numerous meetings, and through discussions and work sessions, we were able to identify a general process to use for staffing.

3. When we first heard of the H1N1 threat in Mexico in late April, 2009, we convened our previous Pandemic Planning Committee, first by conference call and then subsequently in meetings, to prepare for the impact. Planning continued, weekly and more often, both in the large group and smaller work groups by area of concern.

4. Continuing from the list already started in the question:
4) Make requests for pertinent data needed for next steps (i.e. requesting Human Resources Decision Support staff assistance with running a report containing the names of all RN staff who retired within the past three years.)
5) Reviewing data (names submitted from Unit/Department Business Continuity Plans) and working with the Staffing Team lead to determine which employees would be assigned through Human Resources and which would be assigned through Central Staffing Resources.
6) Review Retiree data and check with the retiree's last nurse manager to get a recommendation to call for this work.
7) Create a list of Schools of Nursing with existing affiliation agreements- and contact names and numbers so that letters to faculty and staff could be sent from Nurse Recruitment and Retention on behalf of the Chief of Nursing Services asking for volunteers or temporary paid staff.
8) Collaborate with the Nursing Education Department and Central Staffing Resources to develop process details for volunteers, temporary staff, and internal staff reassigned.

5. Identify experts, identify problem to be solved, gather the correct people to assist in solving the problem or planning, agree upon recommendation, connect with all departments and associated processes to ensure consistency of action to be taken, get

feedback from stakeholders, finalize the plan, develop an implementation plan with a clear communication process and target dates. The general communication strategy was developed and replicated each time the change was introduced. Leadership was charged to fan out information to their staff. The Website was utilized as the source of truth.

6. After the SARS situation of a few years ago, we had built up a reserve of N95 masks which we stored offsite. As this situation began to evolve early this summer, we recognized that we needed to expand this reserve order to include other protective gear including: surgical masks, gloves, procedure masks, hand sanitizer etc. We then began to work with our vendors to build up such a reserve. From my review of the units, it was also made clear to me that Materiel Services needed to implement a better process to manage the PAPR units and so we constructed a cart to hold the PAPR's and corresponding protective gear. Our Incident Management System group met almost daily for months.

7. First, we partially activated the Incident Management System team according to federal Emergency Preparedness Guidelines. That group was in charge of identifying areas to work on and responsible individuals to work on those areas. The Incident Management System team coordinated efforts across the institution and managed communications. Second, the Incident Management System team identified the need to have a Staffing Plan. Third, the Staffing Team lead was tasked with responsibility to develop, coordinate and implement the staffing plan. Fourth, the Staffing Team lead gathered groups of stakeholders to design the plan. Various meetings were held. Fifth, regular meetings were held with the Incident Management System team to report on progress, troubleshoot, and make sure the plan met the needs of the institution.

Question 7. Were EMERGENCY PREPAREDNESS PLANNING GUIDELINES, such as NIMS and ICS guidelines used to aid you in the preparation for this pandemic? If yes, how so?

1. We kept the guidelines in mind for the process development.

2. The main element of NIMS we used was the concept around central command and control. We discussed how information should flow and how the Staffing Team lead needed to ensure that sufficient data/information was relayed to them so they could appropriately interact with the Incident Commander or Disaster Command Center accordingly.

3. Yes, our entire planning effort contemplated ICS as an overarching management tool. We went into a limited activation of our Incident Management System in June 2009 to effectively manage our continuing response. This plan served us very well.

4. I didn't emergency preparedness planning guidelines in my planning, but I am sure "upstream" from me they were used.

5. Yes, we utilized some of their processes.

6. I have to say that I did not specifically use those tools in my preparation, although from being familiar with those tools, they probably influenced my actions.

7. We used Federal Emergency Preparedness Guidelines. This is common practice. All staff involved are trained in NIMS.

Question 8: Planning literature has highlighted the importance of gaining a COMPREHENSIVE UNDERSTANDING OF THE ENVIRONMENT and factors of the environment that surround the problem BEFORE creating a plan to solve the problem. Did our organization effectively identify environmental factors of the problem that would affect the plan?

2. Staff fears of contracting H1N1 and simply not showing up to work.
The 80%+ female population in our environment who are primary caregivers at home, so sick children and/or closed schools could significantly affect our capabilities.

3. Yes, the low-threshold and rapidly changing case definition caused large numbers of patients presenting to be placed into pandemic precautions. The potential for staff absences was also considered as a potential issue. High daily census in hospital facilities also posed major challenges.

4. I think we did try to look at these types of factors.
We anticipated fear of those not currently working in direct patient care suddenly working in this environment. We also talked about the heightened anxiety levels, and the need for ongoing support from EAP.
We also discussed that not all departments were as forthcoming with available staff for reassignment when they were completing their Business Continuity Plans. This gave a distorted look at the resources that are available.

5. Yes, community and staff responses were identified and addressed with ongoing information sharing.

6. Much of our early work centered on how would we handle our own operations should we experience high absences due to our staff and their families being impacted by H1N1.

As protective gear supplies became scarce and we had to conserve, naturally we were concerned about how this would be viewed by staff.

7. The IMS group spent a significant amount of time understanding the ever changing environment. The IMS group used various sources of information, including Subject Matter Experts from the university, national groups like the CDC and OSHA, state and local groups like the state OSHA branch, the Health Department, professional groups like nurses and physicians associations, practices from peer institutions, and general public news sources like New York Times, CNN, etc. to understand the environment.
With the information gathered, we developed assumptions about how our staffing could be impacted. These assumption included: % of staff that could become infected, time off work if infected, potential for school closings, spread of fear of infection that could result in absenteeism, potential for H1N1 and seasonal flu to show together, potential for waves. After all this we calculated up to 40% absenteeism in 12-week waves.

Question 9: The planning literature emphasizes the importance of CLEAR PROBLEM DEFINITION. Did our organization properly define the problem

(staffing pandemic planning process)? When was this done?

1. I think this was done more on the staffing lead team level.

2. Pandemic Staffing planning began several years ago, probably starting back in 2005 when the worry was the "bird flu". We had some very high level discussions but given that nothing really materialized at that time, discussions were very high level. With the H1N1 flu, Pandemic staff planning began as soon as we heard the disease was present in Mexico and human-to-human transmission was occurring.

3. Yes, we began working to implement our prior pandemic planning outcomes, and rapidly realized the adjustments that were needed, particularly in terms of patient placement in the hospitals. We also realized that real-time data about placement was a deficit that we had to rapidly address. Confirmatory testing to rule out H1N1 produced some challenges, since the rapid test had a high level of inaccuracy, and more definitive testing was badly bottlenecked. This had a relationship to demand for staff that were fit tested for the N-95 mask, and therefore qualified to care for H1N1 patients.

4. I believe so.

5. For most issues yes, although I believe occupancy management planning could have been more robust.

6. The point I wish to make here is that to me the problem was regularly changing. By this I mean that the first wave of patients we saw were very critical and required intense care and ECMO. In the second wave, we saw more patients, but their physical condition was not as critical.

7. Yes. For purposes of the staffing plan, we clearly defined the problem as "How to maintain essential operations while facing a potential 40% absenteeism rate".

Question 10: The literature draws attention to the importance of PROVIDING ENOUGH DETAIL to properly understand the problem. Did the planning process include a great amount of detail? If yes, how was this done, and what did this look like?

2. We provided the following to departments:

INCIDENT MANAGEMENT SYSTEM PRIORITIES
1. Safety of staff, faculty and patients
2. Continuation of patient care within the concept of the greatest good for the greatest number
3. Conservation and effective use of resources

PLANNING PRINCIPLES
1. Not business as usual: in the event of a pandemic or major disaster, some services will need to be stopped and others will be provided in a different manner.
2. Plans should leverage existing resources and mechanisms.

3. Redeployment of staff should be done in a tiered manner: first redeploy within your own department, then redeploy to and from your partner departments/units and lastly pool from other internal/external resources (i.e. Labor Pool).
4. Redeployment of staff will be balanced between the critical needs of your own department and the critical needs of other departments.
5. Staff with clinical skills should be utilized in some clinical capacity.
6. Internal staffing will be approached differently than external/volunteer staffing.

WORKING ASSUMPTIONS
1. Actual presentation of a pandemic may not be known in advance. High volumes of flu patients coming through clinics and ED, and/or direct transfer of patients with acute respiratory disorders coming into intensive care units can be expected.
2. Event is expected to be a protracted with 12-week waves over several years.
3. Staff absenteeism estimated at 30-40% due to sick staff, staff caring for family members, or fear of infection can be expected.

3. Yes, previous patient placement plans turned out to be naive, in the face of the reality of nearly constant high census, with unoccupied beds a rarity. The number and distribution of fit tested staff, and the number of available Powered Air Purifying Respirators (PAPR's) presented significant challenges, so a number of things had to happen. Previous, incomplete data on fit tested personnel had to be augmented. PAPR management had to be centralized, and efforts instituted to obtain more PAPR's and masks in the face of national shortages and distribution restrictions. Fit testing resources were wholly inadequate, based on prior organizational inaction on the problem, and extreme measures had to be implemented to rise to the need, producing tremendous stress on both those performing the testing and those with a need to be tested.

4. Yes- I think as much as we could anticipate. I know there were unanticipated challenges that arose which we should continue to work through... i.e. shortage of basis equipment (especially masks of all varieties), impact on the ICU staff on the types of patients affected and the severity of their illness, demands on ECMO staff and resources, affects of staff needing to wear the protective gear for hours at a time...

5. The business continuity planning process was a huge undertaking that required many follow up steps. Staffing process was weak and needed more comprehensive planning

6. The documents we prepared for how we would manage our operations were very detailed and then we got into specifics about how departments could collaborate to ensure continued service to our patients. Another point about detail is that in Materiel Services we maintained a daily log of key products showing how much was used, how many days of product we had on hand, etc.

7. Yes, we provided a lot of detail to the institution to frame the situation. This allowed staff to understand what we were preparing for and how we were preparing. Planning for the pandemic required thinking outside the box and preparing to behave in ways we are not used to behaving. This required a lot of communication and detail to help people think differently. Many new guidelines had to be developed and others had to be modified to guide behavior.

Question 11: Research suggests that the EVALUATION OF SOLUTIONS prior to implementation assists planners to foresee potential problems, as well as to create solutions to these problems before they occur. Were solutions evaluated for effectiveness prior to implementation? If yes, what did this look like?

1. Yes, we identified limitations of the system we chose and continued to reevaluate those as we moved through the process. We understand that the current system is not a final solution and have made sure to keep track of the information that would help us in developing a long-term solution. We also met with Ambulatory Care Services to identify their experience during their brief flu clinic and identified common goals for a future solution.

2. We performed "table top" exercises on our pandemic staffing process, to test our process and assumptions, and identify strengths and weaknesses in our plan.

3. As much as possible, solutions were discussed by stakeholders who were involved in the planning process as the solutions were being prepared for implementation. The combination of the rapidity of developments, together with the large and complex nature of our organization made this process imperfect, and, at times, solutions had to be rolled out and tested immediately, with adjustments made after-the-fact.

4. Yes, I think we tried to do some dry-run exercises. For example, I was able to witness a dry-run of using the Manpower software to handle unit requests for help.

5. We planned to pilot a Scarce Resource allocation process, but it did not get off the ground due to lack of leadership follow through

6. As we explored product substitution options, we evaluated our options for effectiveness. We looked at various scenarios to see how a product decision could impact other practices or products.

7. Some aspects and solutions were piloted. For example, the process for managing staffing, called the Labor Pool was piloted. The process for allocating scarce resources was also piloted. Other emergency preparedness exercises were also held as part of our standard emergency preparedness plans. However, various things had to be implemented without being piloted due to timing. In those cases, we always made sure we had people who understood the issue and implications in the room making decisions.

Question 12: Did integral individuals to the planning process RECEIVE FEEDBACK on their work? If yes, how often did this occur? What did the feedback consist of?

1. This occurred on a monthly basis. The purpose of our monthly meetings was to gather feedback from essential personnel regarding the process and the system. Their feedback

was instrumental in getting the system up and running!

2. Yes, via the table-top planning process.

3. The revised plan, to include a patient placement algorithm, was worked on as a draft for several weeks, with testing and feedback based on real-time experience. At some point, we found a need to circulate the draft more broadly, and received additional anticipatory feedback from those not yet affected by the actual placement challenges.

4. The meetings I attended were filled with a constant back-and-forth of feedback and ideas.

5. Yes

6. As part of the Incident Management System group, we played a key role in reviewing and evaluation department pandemic plans. Each one of us took a few plans, read them and then reported our findings.

7. I do not recall a standard process for getting feedback along the way. However, we just had an internal debrief meeting where we all evaluated our planning process.

Question 13: What components of the planning process do you think worked well?

1. I think the large group meetings in Human Resources, including representatives from Nursing and Ambulatory Care, were essential in helping us create a viable process.

2. The Planning Principles, Working Assumptions, Limited Activation of Incident Command Structure, and Regular meetings of the leads for each of the various teams worked well.

3. Having the prior planning from 2006 was very valuable. Even though imperfect, the efforts provided a good basis from which to refine existing plans to better ones. I credit both our physician and administrative leadership with having the foresight to have invested in the prior planning, which allowed us to react much more effectively when H1N1 arose as a specific issue.

4. The concept of Business Continuity Plans. I cannot believe we didn't have these before. Those involved made the meetings and the work a priority.

5. Incident Management System lead Team and Emergency Management planning groups were varied in their effectiveness, some were good.

6. We had a core group of committed and creative individuals who came together to lead our efforts.

7. Activation of the IMS team, Development of integrated plans, Update of Business Continuity Plans, and Assessment of the environment worked well.

Question 14: What top three challenges did you face during the planning process?

1. Time.

Time.
Time.

2. Rapidly changing activities during the initial phases.
Communicating the right information to staff.
Not enough time. I just simply felt that there was not enough time to devote to all of the issues.

3. 1. Adjusting our ability to rapidly and correctly identify cases, appropriately place and manage H1N1 patients
2. Rapidly and exponentially increase our fit testing ability and level of fit tested faculty and staff to care for patients.
3. Manage fair, equitable and effective distribution of vaccine, in the face of federal, state and local distribution schemes that were simply miserable and an incredible mismatch with our values in terms of protecting staff so that that could confidently continue to care for the public.

4. Getting all of the players at the table in the beginning. There were some territory issues.

6. 1. Product availability was a challenge.
2. Government stockpiling of items such as needles and syringes significantly impact the supply chain/availability of certain products. We just recently have recovered from this.
3. The changing needs to meet the needs of our patients. Again, in our pre-work we had built up a reserve of N95 masks, but in the first wave it was not N95 masks that were needed but rather PAPR machines. So we had to turn our focus to build up our PAPR inventories. In the wave that hit after that, PAPR's were not needed but more typical flu protective gear.

7. Communication in ever changing environment
Supply shortage
Managing modification to standard practices

Question 15: What parts of the planning process would you change?

2. Improve our Surveillance and identify the appropriate trigger. Even though we started planning once we heard about transmission, it still felt like we were behind. I believe that cases were occurring for sometime in Mexico before we took this planning process seriously.

3. More facile and nimble ways to work in groups. In addition to face-to-face meetings, we used conference calling to good advantage. Future efforts might involve web conferencing as a better option, as the technology evolves and become more widely distributed and used.

4. Being the health system that we are, we need to have ongoing preparation for catastrophic events. We need templates and processes that are reviewed annually. This was a huge wake-up call for us, and we better not hit the snooze!

5. Clarify accountability of the Leadership--there were tremendous gaps in the planning process that led to the initiation of an Incident Management System lead team. The Institutional Planning process needs to be evaluated.

6. I established weekly conference calls with 4 of our key suppliers and manufacturers, but in hindsight I wish I had begun those earlier in the process.

7. We need faster decision making, and to be more proactive and less reactive.

Question 16: What was the process missing?

1. This felt reactionary rather than proactive. My hope is that we will take the concerns over the process and system in Human Resources and make appropriate decisions for future pandemic related events. For example, if Ambulatory Care and OCA both need a pandemic system, we should all pool together to work on a common solution. Right now, we have retro-fitted ourselves into Manpower's system, but ultimately we need to address some very real issues; such as the need to upload data to the system rather than manual data entry, how often the data is refreshed, how often units have to revisit their plans and how to identify re-deployable employees, etc.

3. In hindsight, we would move to the limited activation of our Incident Management System sooner. The discipline associated with this structure would have streamlined the earlier planning efforts once the threat emerged in April.

4. Business Continuity Plans were an issue.
Would like to see Human Resources manage a central process of ongoing creation of profiles of existing and new staff so that in the event of a catastrophe, we know who has transferrable skills to assist.

5. Enough allocated staff support to manage the work of ongoing change management and PDCA.

6. I would say we had things well covered

7. Don't know.

Question 17: Is this plan adaptable to other hospitals?

1. Right now, no. But I think we are on to something if we can gather our resources to create a new system.

2. I think the Incident Management System and all plans developed by staffing, pathology, safety, etc are adaptable to other hospitals. It would simply be a matter of adjusting them for scale and size of event and hospital.

3. Yes, we believe large and complex organizations might benefit from our experiences, and many of our plans might be adaptable to others.

4. Yes.

5. Not in the fashion we implemented it, there were tremendous gaps in the planning

process so we initiated the Incident Management System lead team. That means the current process we have is not working and nothing has been done regarding that.

6. Yes.

7. I believe it should be.

Question 18: What advice would you give to other hospitals creating a disaster planning process?

1. Be more proactive and research a system and process well before any looming pandemic or disaster.

2. Identifying the "correct" leads for each team is important. You need individuals who not only know their business, but also can apply their thinking to a potential emergency situation and how might they adapt their plans. So someone who is not only competent in their daily work, but flexible and adaptable and has some knowledge of the Incident Management System.

3. Engaging leadership in reinforcing the importance of the function, and having leadership set forth expectations for participation is invaluable. While it is easy to keep pushing such planning to the "back burner", advance planning is critical to effective performance when crises arise. Incorporating broad stakeholder involvement in planning is also very valuable.

4. Start before the disaster. Don't shy away from getting downright meticulous about the details. I think we have a history of doing that and we still need to keep planning for what we can so that we can use our energies to work on solving what we can't plan or predict.

6. Start early and have a strong leader. It seemed many organizations did not take this event seriously and so were caught scrambling.

7. Plan ahead. In an emergency situation, there is no time to waste.

Question 19: Are there any specific activities that pertain to the planning process that were not covered in the course of this interview? If yes, what were they?

4. Can't think of any.

6. No.

7. Don't know.

Appendix E

Intake Script

Intake Script

Use the following script as guidelines when taking requests from units:

1. Ask questions regarding background:

- Number and type of personnel needed (A, B, C, D)
- Background on the situation that caused the need (i.e. type of illness causing absences)
- How is the unit operations impacted by the absences

2. Education and Coaching

- Explain the business continuity plan. Fill needs from Unit then Cluster then Labor Pool
- Review local/deparmental emergency operation plans and staffing
- If A then OCA, B then CSR, C then Labor Pool
- Coach units about how to adjust/adapt to absences
    - example: increasing hours on the part of part-time staff

3. Order Detail

- Ask about what the unit will want to do with the redeployed staff
- Ask about what specific skills are needed
- Ask about how long the staff are anticipated to be needed

4. Prioritization. Assign prioritization based on:

- Unit criticality
- Number of absences
- Other situational factors

5. Take Order / Conduct Matching

Appendix F

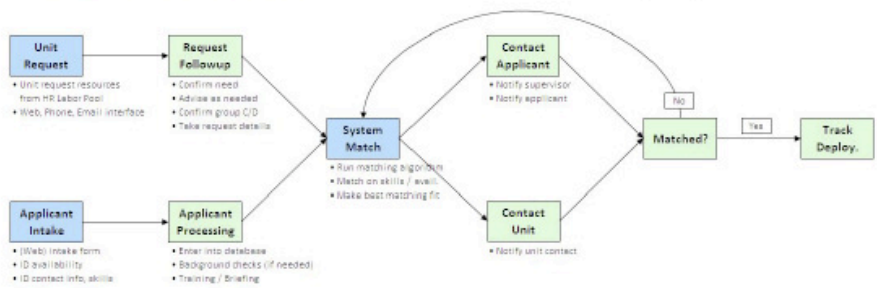Labor Pool Operations

Labor Pool Operations

Concept:

- This section deals with the incremental Labor Pool that HSHR is responsible to operate in the case of a severe pandemic emergency

- The Labor Pool is responsible for
  - Identifying internal and external personnel resources available for re-deployment to critical functions in the organization
  - Handling requests from units with personnel needs
  - Matching deployable personnel with the appropriate assignment
  - If necessary, conducting screening, training and orientation associated with the new assignment
  - Reporting on current organizational staffing situation to IMS

- Labor Pool operations has three phases
  - Pre Phase: pandemic event has not occurred, identify potential staff for redeployment
  - Limited Phase: early portion of pandemic event, UMHS is able to operate more or less normally with some effort towards pandemic
  - Full Phase: late portion of pandemic event, UMHS is operating with impairment, focused on emergency and critical functions only
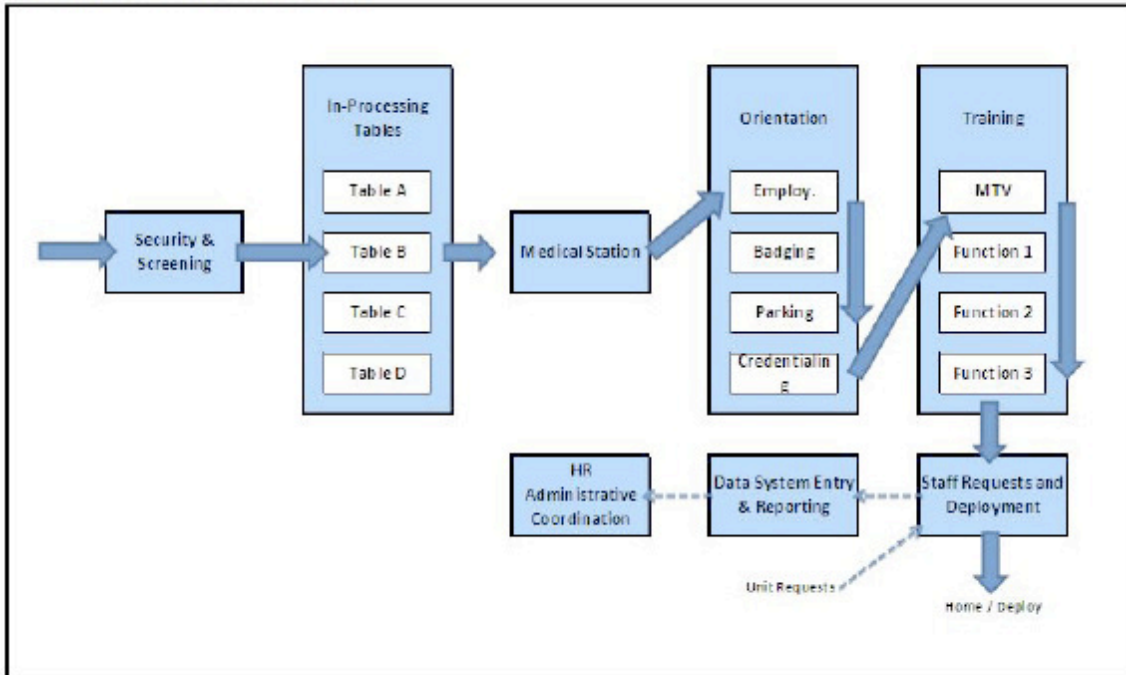
PRELIMINARY LABOR POOL PROCESS
For Planning Phase of Labor Pool Operations

Note: This is a simplified version of the HR Labor Pool Operations process. The HR Labor Pool team is using this diagram to conduct planning and proofing of the process.

Process:

FULL HR LABOR POOL OPERATIONS

Pre-HR Labor Pool Acitivities

Data System Entry & Reporting

Limited HR Labor Pool Acitivities

Data System Entry & Reporting	HR Administrative Coordination	Staffing Requests & Deployment

Full HR Labor Pool Acitivities

Data System Entry & Reporting	HR Administrative Coordination	In-Processing Tables	Medical Station	Orientation
Security & Screening	Staffing Requests & Deployment	Training		

Appendix G

Matching Process

Matching Process

1. Based on a skills-criteria search, the system will return a list of people with those matching skills.

2. Time permitting, the staffing coordinator will look through the list to prioritize the list based on other factors such as availability and background.

3. The staffing coordinator will call the "giving" supervisor (or contact) to confirm availability

   - Keep calling down the list until either the list is exhausted or the order has been filled

4. Call "receiving" unit supervisor (or contact)

   - If the order is filled, confirm this information
   - If the order is not filled, determine resolution (close the order, continue to fill with different criteria)

5. Send confirmation email to giving supervisor, matched employee, receiving supervisor about the assignment.

   - Have the receiving supervisor follow up with the matched employee about follow-on instructions.
   - Include contact information such as phone number

6. Send page to receiving supervisor with the list of matched employees.

Appendix H

HR & Labor Pool Pandemic Operations

HR & Labor Pool Pandemic Operations

Purpose

The purpose of this site is to coordinate HSHR Labor Pool operations in the event of an emergency event such as a pandemic. In the event of the emergency, HSHR would be responsible for business continuity of existing critical HR functions, operating the organizational labor pool, and coordinating organizational staffing and personnel reporting.

Planning and Operations

Areas of HR Operations

Business Continuity	Labor Pool Operations	UMHS Organizational Coordination

Staffing & To Do

Labor Pool To Do	Personnel Deployment Matrix

Operating Assumptions

INCIDENT MANAGEMENT SYSTEM PRIORITIES

1. Safety of staff, faculty and patients
2. Continuation of patient care within the concept of the greatest good for the greatest number
3. Conservation and effective use of resources

PLANNING PRINCIPLES

1. Not business as usual: in the event of a pandemic or major disaster, some services will need to be stopped and others will be provided in a different manner.
2. Plans should leverage existing resources and mechanisms.
3. Redeployment of staff should be done in a tiered manner: first redeploy within your own department, then redeploy to and from your partner departments/unitsand lastly pool from other internal/external resources (i.e. Labor Pool).
4. Redeployment of staff will be balanced between the critical needs of your own department and the critical needs of other departments.
5. Staff with clinical skills should be utilized in some clinical capacity.
6. Internal staffing will be approached differently than external/volunteer staffing.

WORKING ASSUMPTIONS

1. Actual presentation of a pandemic may not be known in advance. High volumes of flu patients coming through clinics and ED, and/or direct transfer of patients with acute respiratory disorders coming into intensive care units can be expected.
2. Event is expected to be a protracted with 12-week waves over several years.
3. Staff absenteeism estimated at 30-40% due to sick staff, staff caring for family members, or fear of infection can be expected.

Appendix I

UMHS Pandemic Planning Staffing & Labor Pool

UMHS PANDEMIC PLANNING

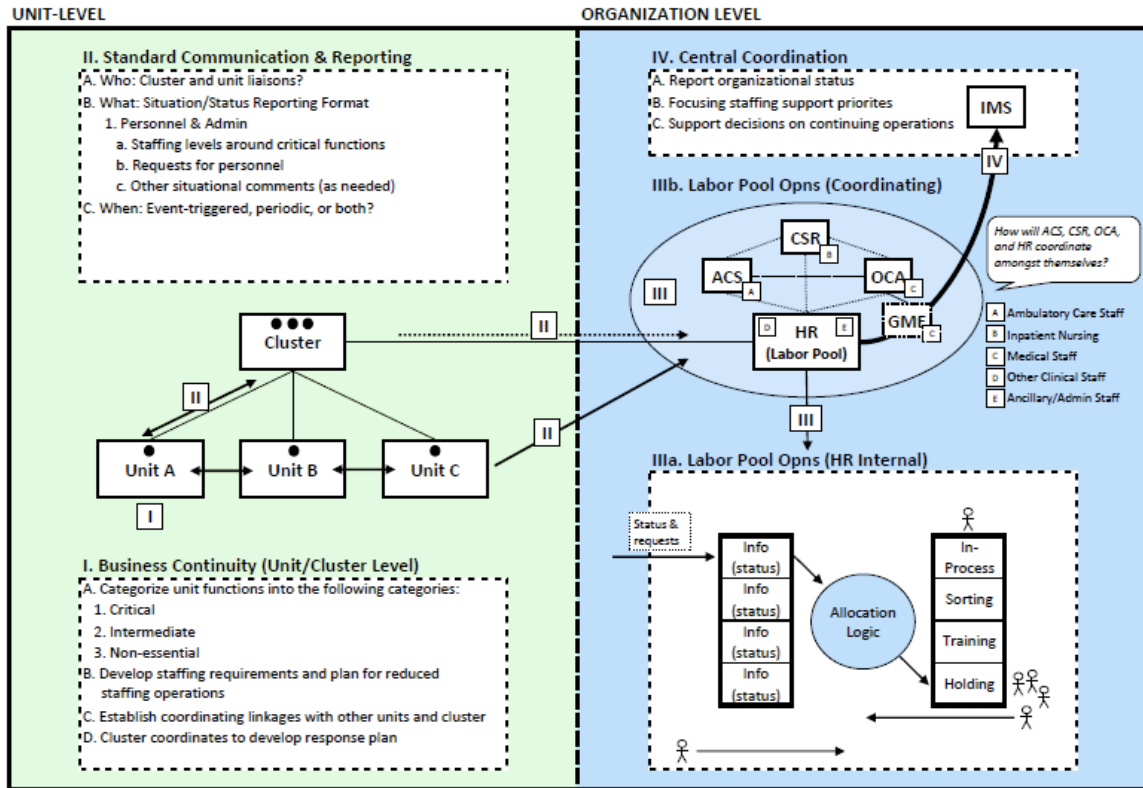Staffing & Labor Pool (Conceptual Process)

Table 1

Emergency Preparedness Planning Model Citations: Anticipate

Criterion: Determine Environmental Factors

Survey Responses	Respondent	Entry
1.	Administrative Lead	Our entire planning effort contemplated ICS as an overarching management tool. We went into a limited activation of our Incident Management System in June 2009 to effectively manage our continuing response. This plan served us very well.
2.	Staffing Team Lead	The main element of NIMS we used was the concept around central command and control. We discussed how information should flow and how the Staffing Team Lead needed to ensure that sufficient data/information was relayed to them so they could appropriately interact with the Incident Commander or Disaster Command Center accordingly.
3.	Project Manager of Staffing Pandemic Team	The IMS group spent a significant amount of time understanding the ever-changing environment. The IMS group used various sources of information, including Subject Matter Experts from the university, national groups like the CDC and OSHA, state and local groups like the state OSHA branch, the Health Department, professional groups like nurses and physicians associations, practices from peer institutions, and general public news sources like New York Times, CNN, etc. to understand the environment.
4.	Staffing Team Lead	We carefully evaluated how the community was reacting to the pandemic by reading newspapers, watching the news, etc.
5.	Administrative Lead	The potential for staff absences was also considered as a potential issue. High daily census in hospital facilities also posed major challenges.
6.	Supply & Equipment Management Lead	Much of our early work centered on how would we handle our own operations should we experience high absences due to our staff and their families being impacted by H1N1.

7.	Staffing Team Lead	(In regards to gaining a comprehensive understanding of the environment) Staff fears of contracting H1N1 and simply not showing up to work. The 80%+ female population in our environment who are primary caregivers at home, so sick children and/or closed schools could significantly affect our capabilities.
8.	Administrative Lead	Having the prior planning from 2006 was very valuable. Even though imperfect, the efforts provided a good basis from which to refine existing plans to better ones.
9.	Volunteer Team Lead	(In regards to business continuity plans) I can't believe we didn't have these before.
Documents	Document Title	Entry
10.	Labor Pool Operations	(Three phases of Labor Pool operations) Pre-Phase, Limited Phase, Full Phase.
11.	Task Calendar	(Pandemic planning urgency level scale determines which job tasks are to be completed according to the urgency level scale.)
12.	Intake Script	Obtain background on the situation that caused the need.

Table 2

Emergency Preparedness Planning Model Citations: Boundaries

Criterion: Proper Problem Definition

Survey Responses	Respondent	Entry
1.	Project Manager of Staffing Pandemic Team	For purposes of the staffing plan, we clearly defined the problem as "How to maintain essential operations while facing a potential 40% absenteeism rate".
2.	Nursing Services Lead	(In regards to steps taken during the planning process) Identify problem to be solved.

Documents	Document Title	Entry
3.	HR & Labor Pool Pandemic Operations	The purpose (of this site) is to coordinate HSHR Labor Pool operations in the event of an emergency event such as a pandemic. In the event of the emergency, HSHR would be responsible for business continuity of existing critical HR functions, operating the organizational labor pool, and coordinating organizational staffing and personnel reporting.

Criterion: Proper Problem Specificity

Survey Responses	Respondent	Entry
4.	Project Manager of Staffing Pandemic Team	Planning for the pandemic required thinking outside the box and preparing to behave in ways we are not used to behaving. This required a lot of communication and detail to help people think differently.
5.	Supply & Equipment Management Lead	The documents we prepared for how we would manage our operations were very detailed and then we got into specifics about how departments could collaborate to ensure continued service to our patients.
6.	Project Manager of Staffing	We provided a lot of detail to the institution to frame the situation. This allowed staff to understand what we were preparing for and how we were preparing.

	Pandemic Team	Planning for the pandemic required thinking outside the box and preparing to behave in ways we are not used to behaving. This required a lot of communication and detail to help people think differently. Many new guidelines had to be developed and others had to be modified to guide behavior.
7.	Staffing Team Lead	We divided (the work) into departments (and created planning principles).

Documents	Document Title	Entry
8.	Labor Pool Operations	(Regarding Full HR Labor Pool Operations Flowchart, describes the steps taken to deploy volunteers to assist in the hospital during an emergency event.)
9.	Intake Script	(Guidelines when taking staffing requests from units) Ask questions regarding background, education and coaching, order detail, prioritization, take order, conduct matching.
10.	Department Specific Staffing Plan	(Details the function triggers/dependencies, current performance standards, skill level required, and work redesign and redeployment strategies for each department.)

Table 3

Emergency Preparedness Planning Model Citations: Create Solutions

Criterion: Generate Multiple Solutions

Survey Responses	Respondent	Entry
1.	Volunteer Team Lead	The meetings I attended were filled with a constant back-and-forth of feedback and ideas.

Table 4

Emergency Preparedness Planning Model Citations: Design

Criterion: Evaluation of solutions prior to implementation

Survey Responses	Respondent	Entry
1.	Human Resources Systems Lead	We identified limitations of the system we chose and continued to reevaluate those as we moved through the process.
2.	Administrative Lead	We found a need to circulate the draft more broadly, and received additional anticipatory feedback from those not yet affected by the actual placement challenges.

Documents	Document Title	Entry
3.	Pandemic Planning Staffing & Labor Pool	Pandemic Staffing Labor Plan depicted in conceptual process map form.
4.	Department Specific Pandemic Staffing Plan	Tasks and duties ranked in order based upon criticality
5.	HR & Labor Pool Pandemic Operations	Represents final Incident Action Plan created by health system.

Table 5

Emergency Preparedness Planning Model Citations: Execute

Criterion: Evaluation of solutions prior to implementation

Survey Responses	Respondent	Entry
1.	Human Resources System Lead	The final meeting was a run-through of the process and how to use the system by doing a sample order and match process.
2.	Staffing Team Lead	We performed tabletop exercises on our pandemic staffing process to test our process and assumptions, and identify strengths and weaknesses in our plan.
Documents	Document Title	Entry
3.	Emergency Management Event	Lists the pandemic committees of the health system; one of which was the Training committee.

Table 6

Emergency Preparedness Planning Model Citations: Feedback

Criterion: Use of Feedback Loop

Survey Responses	Respondent	Entry
1.	Staffing Team Lead	(In regards to individuals receipt of feedback) Yes, via the table-top planning process.
2.	Volunteer Team Lead	The meetings I attended were filled with a constant back-and-forth of feedback and ideas.
Documents	**Document Title**	**Entry**
3.	Emergency Management Event	(Critique document details objective, accomplishments, challenges, and improvements for several hundred tasks regarding emergency planning.) An exercise critique meeting was held on Tuesday March, 8, 2010.

Figure Captions

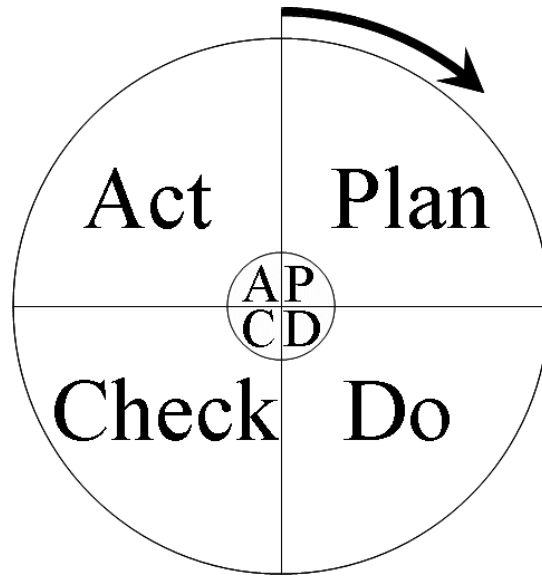*Figure 1.* Deming's Plan-Do-Check-Act-Cycle (Deming, 1982)

Figure 2. Kepner-Tregoe Problem Solving Cycle (Kepner & Tregoe, 1965)

Figure 3. Sample Haddon Matrix (Haddon, 1968)

Figure 4. Organization Chain of Command Emergency Reporting Chart

Figure 5. Proposed Pandemic Planning Model

Figure 6. Proposed Pandemic Planning Process Map

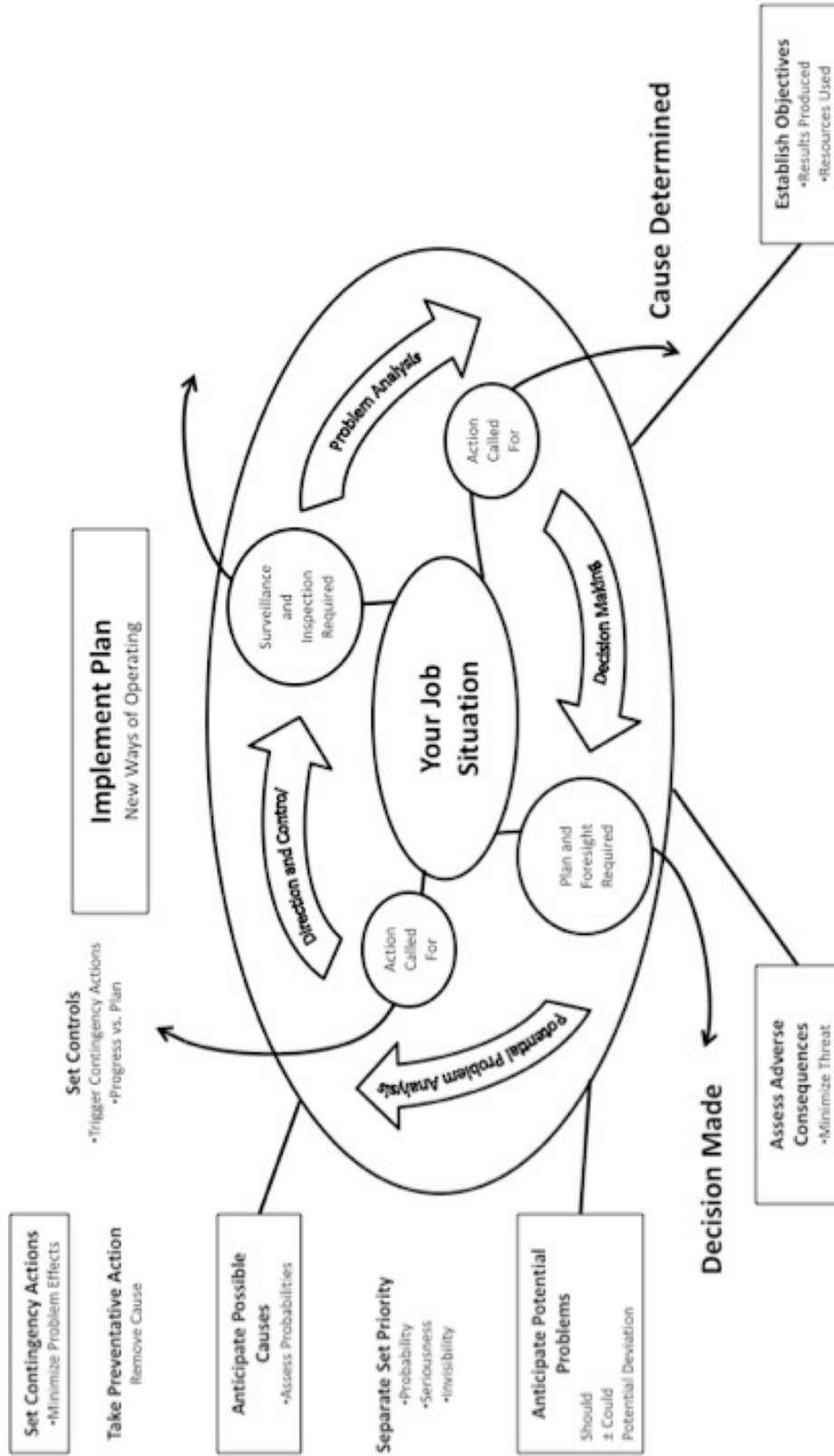*Figure 1*. Deming's Plan-Do-Check-Act-Cycle (Deming, 1982).

Figure 2. Kepner-Tregoe Problem Solving Cycle (Kepner & Tregoe, 1965).

	Personal Factors	Vector or Agent Factors	Physical Environmental Factors	Social Environmental Factors
Pre-event				
Event				
Post-event				

Figure 3. Sample Haddon Matrix (Haddon, 1968).

Organization Emergency Chain of Command Reporting Chart

Incident Commander

Incident Commander

Incident Command Team

| Incident Commander Back-Up | Public Information Officer | Safety Officer | Medical Director | Nursing Director | Supply Unit Leader | Ambulatory Care Services (ACS) Director & Designees (2) | Emergency Department Unit Leader | IMS Special Project Support | IMS Team Coordinator & Back-Up |

Pandemic Teams (Leaders)

Data Modeling	Scarce Resource Allocation	ED Triage	Pandemic Urgent Care	Outpatient Capacity	Inpatient Capacity	Respiratory Care
Home Care	Mortuary Services	Chain of Command	Communication	Departmental Business Continuity Plans	Education	Employee Health
Employee Mental Health	Infection Control	Laboratory	Pharmacy	Patient Support	Staffing	Supply

(Staffing) Pandemic Team Members

| Human Resources Systems Lead | Training Coordinator | Administrative Lead | Staffing & Volunteer Services Lead | Nursing Lead | Supply & Equipment Management Lead | Project Manager |

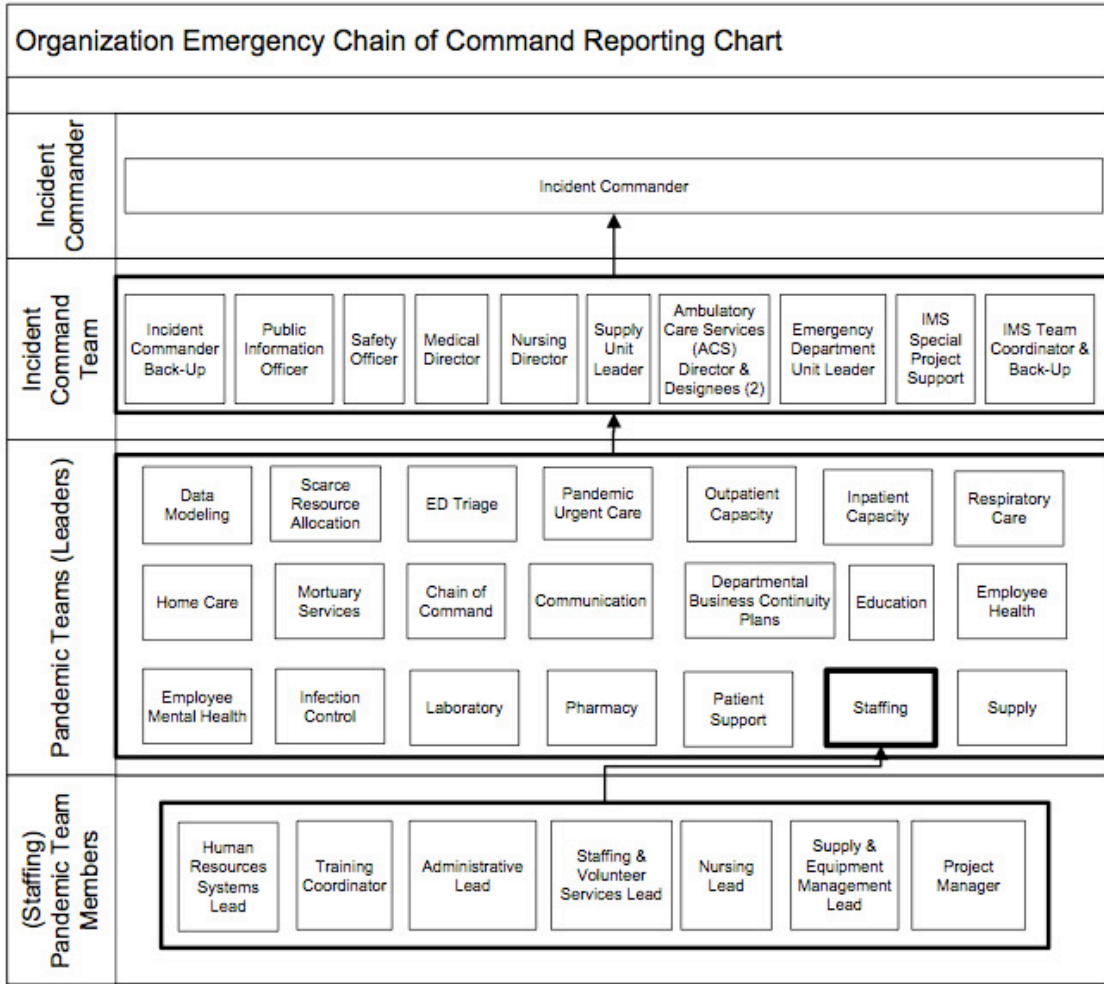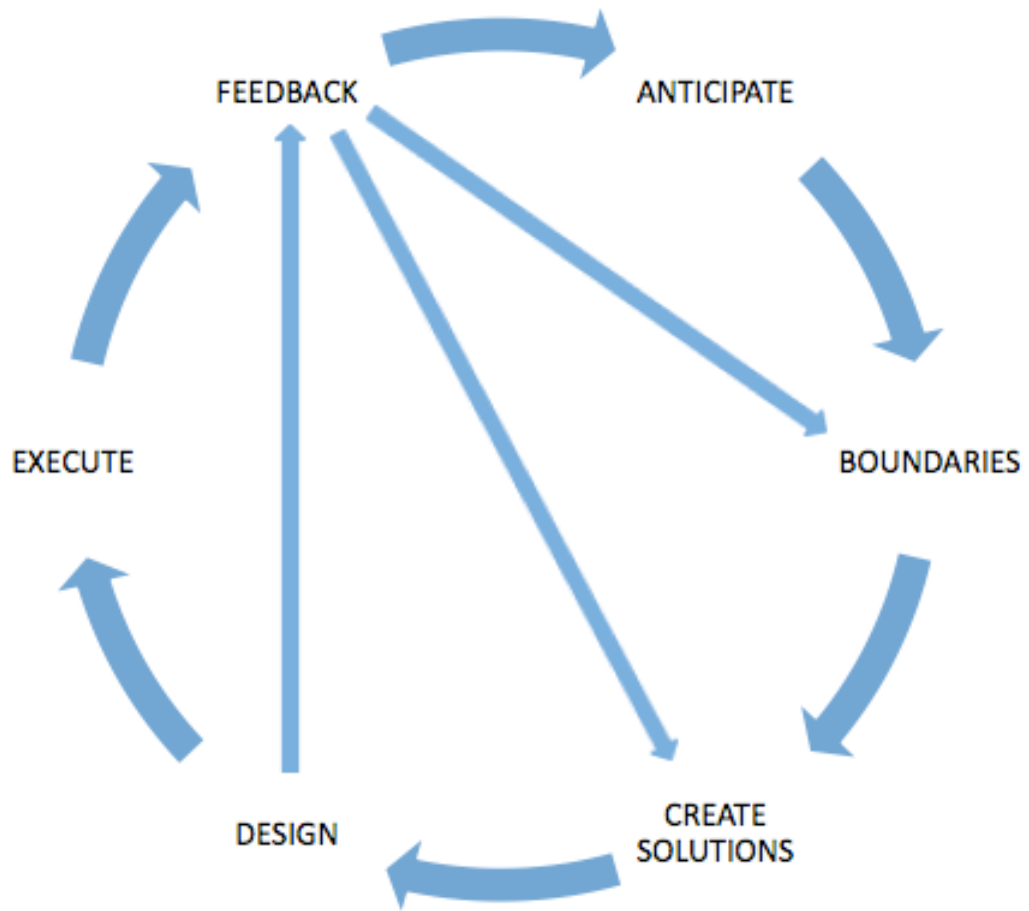*Figure 4.* Organization Chain of Command Emergency Reporting Chart.

Figure 5. Proposed Emergency Preparedness Planning Model.

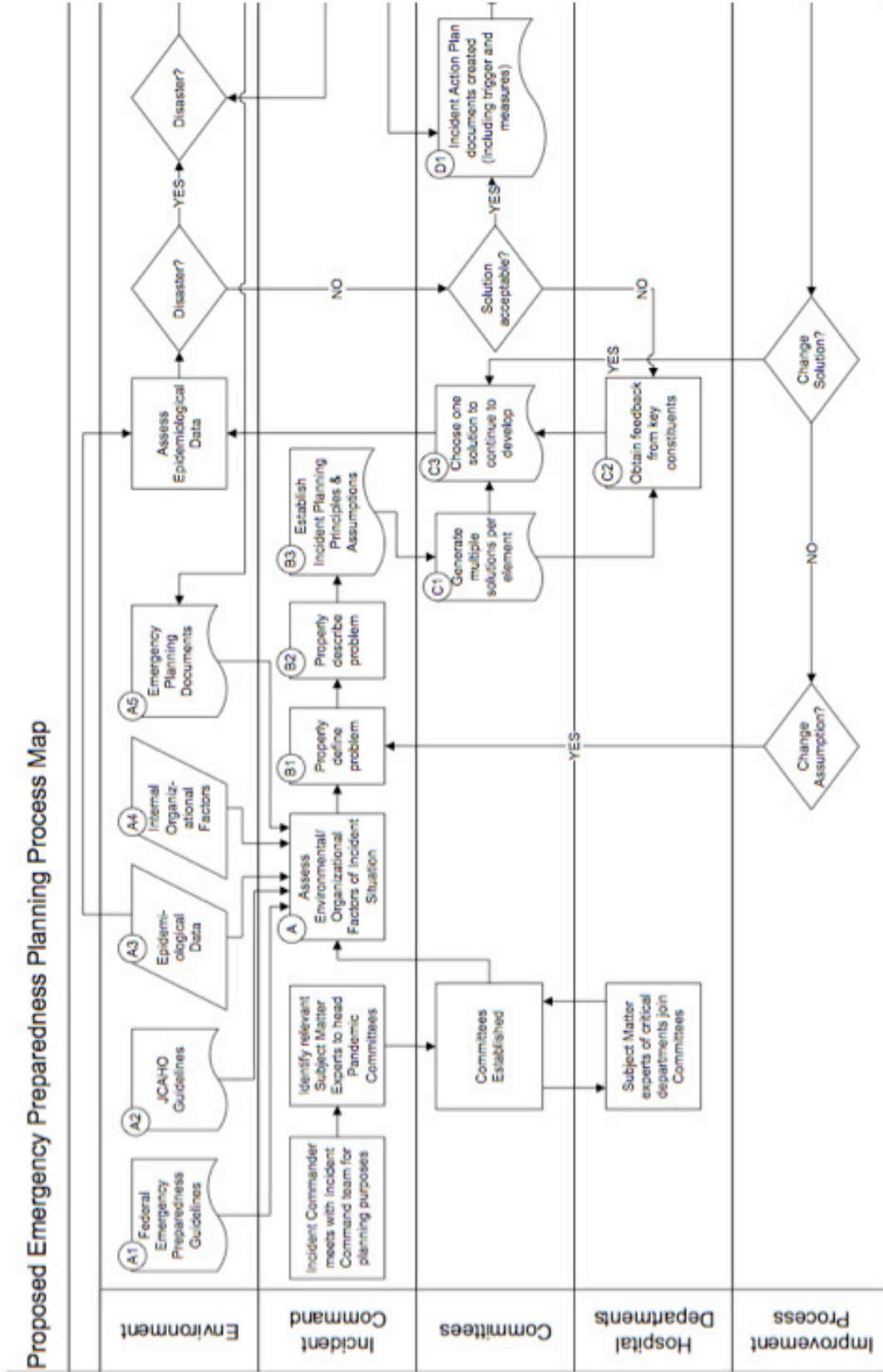Proposed Emergency Preparedness Planning Process Map

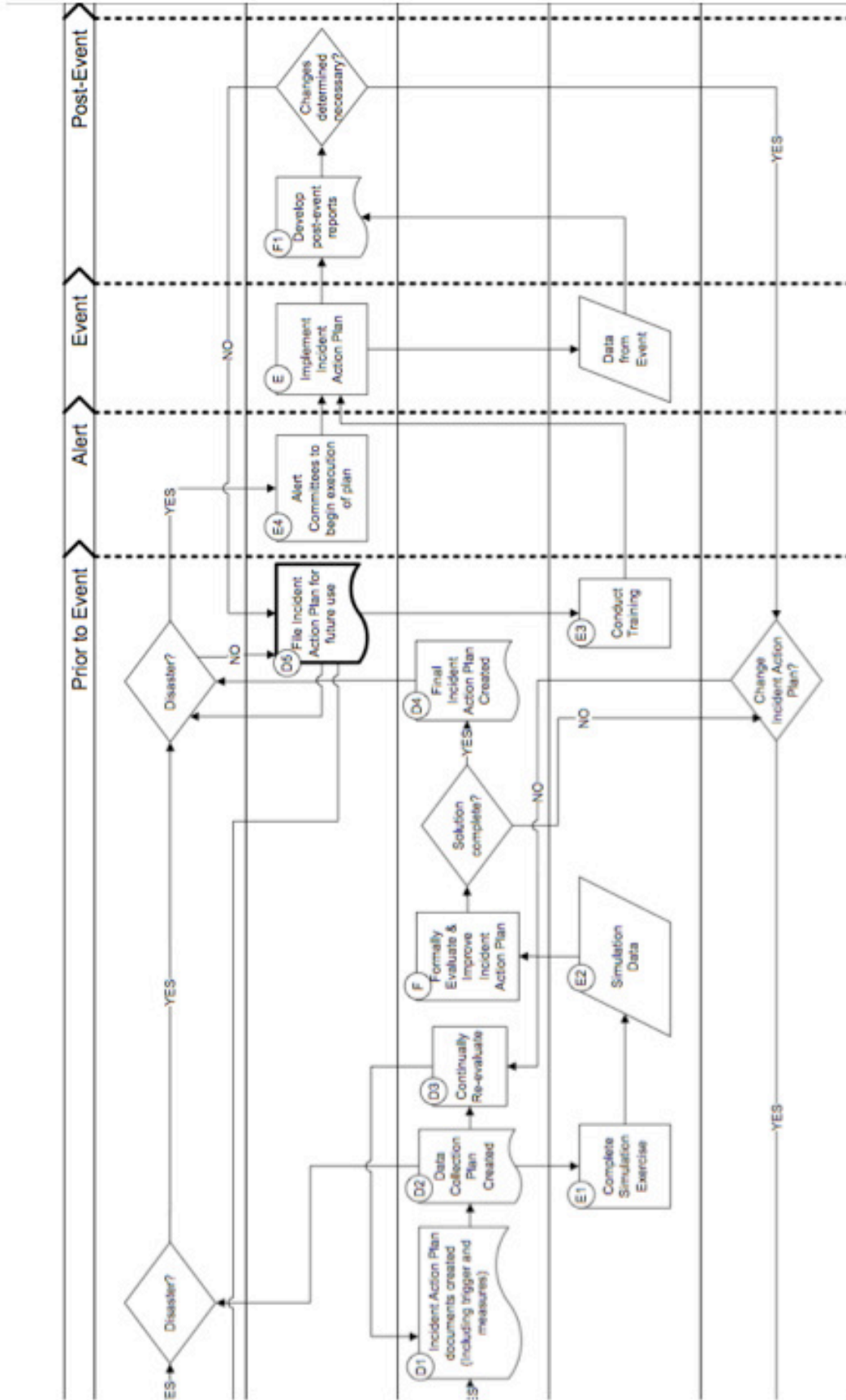*Figure 6.* Proposed Emergency Preparedness Planning Process Map.

Figure 6 (cont.). Proposed Emergency Preparedness Planning Process Map.

Vita

Ariel R. Grosshuesch was born in Ann Arbor, Michigan. She graduated high school from Community High School in Ann Arbor, Michigan. Ms. Grosshuesch graduated with honors from Western Michigan University in Kalamazoo, Michigan with a Bachelor of Science degree in Psychology in April 2008. She then went on to receive a Master of Arts degree in Industrial-Organizational Psychology and Human Resource Management from Appalachian State University in August 2010. During the course of her graduate education, Ms. Grosshuesch completed an internship at the University of Michigan Health System in Ann Arbor, Michigan.

Following her education, Ms. Grosshuesch intends to pursue a career in external consulting.