PANDEMIC PLANNING:

ARE UNIVERSITIES REALLY PREPARED?

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Planning for a pandemic influenza outbreak at a college or university cannot be done in a vacuum. Like any emergency plan, it needs to be a coordinated effort by a dedicated and unselfish group of individuals at the university pulling together a multitude of people and resources focused on a common goal. There is an ongoing struggle among emergency preparedness coordinators at colleges and universities to know when they have done "enough" in preparing their campus to respond to and recover from a pandemic influenza or some other infectious disease outbreak. Every year new ideas emerge from various governmental, health or emergency response organizations on improved methods to assess the threat of a pandemic and updating response plans. The need to add to or modify existing plans to better ready their institutions of higher learning for such an emergency is ongoing.

In this dissertation, an effort was made to survey key individuals from emergency planning groups at colleges and universities in the U.S. to gather information on what is important in their pandemic flu plans and how they are structured. This survey evaluated whether these collective college or university plans are in substantial agreement with current CDC and WHO guidelines for effectively and comprehensively anticipating, preparing for, responding to and recovering from pandemic emergencies at their institution and in the nearby community. The

data generated from this research study can provide pandemic flu planners with tools for evaluating when their plans are sufficiently robust to meet a pandemic threat and to minimize the impact on their campus in the face of rising costs, shifting university priorities and increasing demands on their time.

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ACKNOWLEDGEMENTS

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GLOSSARY OF TERMS

Emergency Management Models, from FEMA.gov (2013)

All Hazard Approach – Developing an emergency plan that considers a multitude of threats or hazards and the risk each poses to an organization.
Comprehensive Emergency Management – the preparation for and the carrying out of all functions, (except military actions) essential to mitigate, prepare for, respond to, and recover from emergencies.
Command and Control Approach – imposing fixed standards or actions with the force of law behind them to enable a quick non-negotiable response to emergencies.
Homeland Security Model – guiding principles for emergency exercises and a common framework for emergency program management that includes planning, developing, conducting and evaluating disaster drills.
Incident Command System – standardized approach to the command, control, and coordination of emergency response providing a common hierarchy by which responders from multiple agencies can be effectively utilized.
Integrated Emergency Management – refers to the FEMA all-hazard approach for the coordination, direction and control of emergencies independent of their type, origin, size, and complexity.
National Incident Management System (NIMS) – is a systematic, proactive approach to guide agencies from all levels of government, nongovernmental organizations, and the private sector to work together seamlessly and manage incidents involving all threats and hazards regardless of cause, size, and location.
Network-Centric Approach – using a network of experts having the technological advances to analyze complex disaster scenarios or the spread of infectious diseases and to test response strategies such as rescue simulation and evacuation planning.
Haddon Matrix – is a grid of columns and rows showing the agents and/or environmental factors involved, set against the time sequence of an incident such as a disease outbreak. The cells of the matrix illustrate the range of risk or protective factors involved showing the nature of possible interventions.

Planning Models, from Hudson (1979) and Lindblom (1959)

Rational Model – Technocratic or Synoptic Approach: This tradition was well suited to formalized government mandates requiring a set of constrained objectives, budget restrictions and accountability. Comprehensive and systematic; goals clearly stated; alternatives are compared without bias and subject to quantitative analysis; relies on cause and effect theory.
Incremental Model – Pragmatic or Pluralistic Approach: Not comprehensive but simple goals; relies on a few current policies and plan alternatives relative to current experience or past practices; goals, values and alternatives are considered together; analysis is value-laden often relying on inadequate data; feasible decision made after a succession of limited comparisons.

SITAR Blend, from Hudson (1979)

Synoptic Planning or the Rational/Comprehensive Model – has four classic elements that include the following: 1) goal-setting, 2) comprehensive identification and analysis of many policy alternatives, 3) mathematical evaluation of means verses ends, and 4) implementation of rational decisions.
Incremental Planning or the Pragmatic Model – the "Science of Muddling Through" referring to the British bureaucratic decision making process where political maneuvering, past practices, public opinion, human values and less than perfect alternatives are all considered equally important for getting as close to the goal as possible.
Transactive Planning – often involves face to face contact with the people most affected; focused on the importance of human dignity, personal growth, values and generosity in the decision making; financial considerations given little weighting.
Advocacy Planning – Arguments of social justice are used to challenge sensitive plans pointing out unintended side effects; conflict resolution and the just distribution of benefits are key.
Radical Planning – endorses the maximum participation of the people affected in defining and controlling how a plan will be managed; the resolution of social, environmental and political problems are focal to this model with less regard to sustainability.

Planning Practice, from Dooris (2003), Settar (2006), Hartzell (2013), and Kezar (2001)

Strategic Planning – broad in scope considering the organization as a whole, its mission and long range vision for the next 3 to 5 years.
Tactical Planning – supports the strategic plan translating it into smaller, more detailed processes needed to achieve the mission and vision.
Operational Planning – narrow focus implemented over an even shorter time frame containing a high level of detail on individual roles and responsibilities
Contingency Planning – alternative directions to take when a plan fails or unexpected events indicate that the initial course of actions will not work.

Organizational Considerations (From Argyris, 1977; Schon, 1978; Kezar, 2001)

Learning – a process by which institutions, individuals or committees, through their conceptual knowledge about a subject, detect errors in practice or rapidly changing conditions and develop solutions to correct the situation.
Change – cultural and social perceptions or the thought process and values of the individuals cause organizations to change. Many changes occur because leaders, change agents or others simply believed that a change was necessary.
Development – shared organizational culture determining the criteria for leadership and establishing the rules and norms that determine group behavior and development.

ACRONYMS

CDC – Centers for Disease Control and Prevention

CIDRAP – Center for Infectious Disease Reporting and Prevention

CSHEMA – Campus Safety, Health and Environmental Management Association

DHS – Department of Homeland Security

DHHS – Department of Health and Human Services

FEMA – Federal Emergency Management Association

H1N1– Pandemic Influenza Virus

HSEEP – Homeland Security Exercise and Evaluation Program

IOM – Institute of Medicine

NFPA – National Fire Protection Association

NIMS – National Incident Management System

NRP – National Response Plan

PAHPRA – Pandemic and All-Hazards Preparedness Reauthorization Act of 2013.

PPD-8– Presidential Policy Directive 8

PPE – Personnel Protective Equipment

TCL – Target Capabilities List

UKDH – United Kingdom Department of Health

WHO – World Health Organization

1.0 INTRODUCTION

Preparing for a pandemic influenza outbreak on a college campus requires a multidimensional effort by a staff of individuals experienced in the unique ways a university functions. Planning theory and practice, committee organizations, community relations, organizational learning, change and development, risk, human behavior, leadership and emergency management are just some of the disciplines that must be called upon for a campus pandemic flu plan to be effective.

The recent history of natural or manmade disasters at colleges and universities has taught us some hard lessons about insufficient emergency preparedness planning. School buildings and surrounding businesses have been severely damaged or destroyed in fires, floods and hurricanes. Lives have been lost and the safety of faculty, staff and students threatened in many different ways because of storms, shootings and riots. Campus life, academic studies and research efforts have been severely disrupted as a result of these catastrophes. In a few cases, colleges and universities have been forced to terminate programs, lay off employees or even close their doors in the aftermath of these events. A severe pandemic flu outbreak or even the threat of one can have equally disruptive consequences if emergency preparations are not in place as we learned during the 2009-2010 flu season. Many sage authors or speakers have made statements similar to the quote “If we don’t remember where we came from we can’t expect to get where we need to be.” Remembering our shortcomings during any crises of the past can only assist us in correcting our mistakes and making for a better response in the future.

In 2009 a pandemic influenza threat enveloped many colleges and universities throughout the U.S. An influenza pandemic is arguably one of the most life threatening and widespread emergencies that can strike a university campus. Unlike a fire, flood or violent crime that may occur more frequently but are limited in scope, the unknown risks often perceived about the severity and rapid spread of a pandemic influenza, or any infectious disease having the potential to affect everyone on campus as well as their families and friends, is staggering to comprehend.

When a natural disaster or manmade crisis happens on a college campus, injuries or deaths may occur but survivors and others nearby instinctively want to help. University personnel on campus know or have been trained on what to do in response to some emergencies. They know how to protect themselves or others from further harm and who to call for help. Trained first responders (police, fire fighters and paramedics) can be expected to arrive on the scene and take charge to initiate security, rescue or recovery efforts. Other trained professionals and volunteers from the university, outside agencies or the health care community can help implement emergency plans to evacuate people to safe areas, provide food, shelter and medical treatment, facilitate clean-up efforts and begin a return to normalcy.

With a pandemic flu or some other life threatening illness like bacterial meningitis, measles or even a serious seasonal flu outbreak, even though most organizations have a “plan” in place, the unknown health risks, the lack of infectious disease training and the alarming spread and severity of the illness along with the scarcity of effective treatments may limit the response, even among those whose job it is to care for students. Currently, most clinics, hospitals and doctors’ offices prefer that patients with the flu stay home and self-isolate to prevent spreading the illness. Most college and university pandemic flu plans also recommend sending students home for the duration and encourage faculty and staff to stay away from work when they are

sick. However, this practice may not be an option on a college campus particularly with out of state or international students or students too ill to travel.

Because of the “unknowns” associated with these illnesses, especially when otherwise healthy young people are dying, unprepared police and paramedics may be reluctant to transport patients suspected of having the flu to avoid the infection risks (Balicer et al., 2006). Roommates, RAs, custodial personnel and food service staff may express unwillingness to visit or service a dorm room where a critically ill student is quarantined.

Theoretical models of crisis/risk communication speculate that the typical human response to help another person in trouble during a natural disaster or manmade crisis when the risks to self are known or readily accepted may not manifest when unknown risks are present. (Sandman, 2010; Barnett et al., 2010; Balicer et al., 2006). Based on infection data from the swine flu pandemic of 1918, which killed more than 675,000 people in the US, the Centers for Disease Control and Prevention (CDC) warned Americans to expect infection rates around 30% and the death of between 34,000 and 70,000 people nationwide during a swine/avian flu pandemic. Typically in the U.S. between 5% and 20% of the population get the flu each year and around 36,000 die from this seasonal flu or its complications (Duda, 2014). During the 2009-2010 flu pandemic the CDC reported approximately 18,300 U.S. deaths due to the H1N1 virus and the WHO claimed this swine flu virus killed more than 284,000 people worldwide (IB Times, 2015). The CDC has estimated that during the 2014-2015 flu season, as many as 50,000 people in the U.S. may die and more than 200,000 will be hospitalized because of an ineffective vaccine against this years’ strain(s) of seasonal influenza virus coupled with the unwillingness of a large segment of the population to be vaccinated (Bloom, 2013).

Various, strains of avian or swine flu repeatedly pop up around the world infecting small numbers of humans handling those animals, without significant or serious human to human infections, this time. As the FDA, CDC and the WHO confer on next year's seasonal flu vaccine controversy exists as to which strains of flu virus to protect against and how much vaccine to produce (CIDRAP, 2015). Worldwide virus hunters are hoping that the seasonal flu vaccine they just recommended for the northern and southern hemispheres are at least marginally effective against those viruses. These same virus hunters remain vigilant that none of the selected avian/swine/human flu variants, anywhere in the world, mutates in a way that catches everyone off guard creating a pandemic of devastating severity. It is these kinds of biological unknowns coupled with the fact that pharmaceutical companies have no way to mass produce vaccines fast enough to head off a flu pandemic that give college emergency planners much to worry about.

During the 2009-2010 flu pandemic, most colleges and universities throughout the U.S. along with health care, governmental agencies and business organizations scrambled to modify existing emergency plans to address emerging pandemic flu shortcomings. Since that time, hundreds of books, white papers and website publications have been developed providing guidance to organizations on being better prepared to deal with pandemic flu emergencies. Federal, state and local governments, non-government agencies, hospitals, businesses have joined colleges and universities in updating plans, stockpiling emergency supplies, training personnel and conducting drills to more effectively respond to emergencies including pandemics.

Pandemic influenza preparedness planning is necessary at every level of government as well as for large and small business organizations, schools, hospitals and even at the family level. Achieving a high level of preparedness and protection at a college or university requires extensive and focused planning at multiple organizational levels by a dedicated committee of

stakeholders each having a role in managing the prevention, mitigation, response and recovery efforts during a pandemic flu emergency. Joining forces in this fashion should help everyone involved at the local level to more effectively respond to a pandemic, better maintain business continuity and quicken the recovery from a pandemic flu emergency. This document will examine the development of pandemic influenza plans by university and community emergency planning committees, exploring the roles of long standing planning theory and practice within the organizational frameworks necessary to achieve the desired goal of protecting the campus and its occupants during an infectious viral respiratory disease outbreak.

Unfortunately, as time passes and the pandemic threat fails to materialize, human nature allows complacency to set in. Other factors can also shift the focus away from pandemic flu preparations. Perhaps a city, school or organization experiences a natural disaster or has to contend with some other crises or man-made threat causing a change in priorities and the allocation of emergency resources and funding to other projects. In another scenario, Sandman (2010) writes about the lost credibility of the World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC) in overstating the 2009 pandemic threat causing wasted time, effort and resources. Unfortunately, these kinds of miscommunications and risk judgment errors are harsh realities that all organizations, including colleges and universities, have to face and will continue to deal with considering the unknowns surrounding influenza virus mutation. Organizational change and a customized planning theory along with better contingency planning practices may hold the key for higher education. In light of these realities or theories, this document will examine how the individuals tasked with anticipating; mitigating, responding to and recovering from emergencies at colleges or universities can create and maintain more effective yet flexible pandemic flu plans. By surveying administrators of current

pandemic flu plans at several U.S. colleges and universities, perhaps some insight can be gained on when they have done “enough” through preparation and plan modification to create a comprehensive pandemic influenza plan at their institution.

1.1 RESEARCH QUESTIONS

This document is presented in partial fulfillment of the requirements of a Dissertation Overview by Frank Pokrywka for the degree of Doctor of Education. This study will answer the following three guiding research questions.

1. When organizing their Pandemic Flu Committees, do universities optimize representation by departments, campus groups and outside agencies?
2. Do universities’ Pandemic Flu Plans include elements that are comprehensive in scope and content?
3. How does the Pandemic Flu Plan fit into the larger emergency planning framework for ongoing course instruction, research, and business continuity?

1.2 THEORETICAL FRAMEWORK

This project consisted of an e-mail survey of colleges and universities peer to the University of Pittsburgh assessing their committee organization and level of emergency preparedness with regard to flu surveillance, risk assessment, mobilization, counter measures, communications, training and response to a pandemic influenza using an updated preparedness response

framework developed by the Centers for Disease Control and Prevention (CDC) in Atlanta (CDC, 2014). The new CDC framework shown in Table 1 below and issued in September 2014, expanded the 2006 WHO and CDC framework organization from 4 (inter-pandemic, alert, pandemic and transition phases) to 6 phases (investigation, recognition, initiation, acceleration, deceleration and preparation). As recommended by the CDC (2014), "this updated framework provides greater detail and clarity regarding the potential timing of key decisions and actions aimed at slowing the spread and mitigating the impact of an emerging pandemic" (p. 1).

Table 1: 2014 Preparedness and response framework for influenza A virus pandemics

World Health Organization phases	CDC intervals	Federal indicators for CDC intervals	State/Local indicators for CDC intervals
Interpandemic phase: Period between influenza pandemics	**Investigation:** Investigation of novel influenza A infection in humans or animals	Identification of novel influenza A infection in humans or animals anywhere in the world with potential implications for human health	Identification of novel influenza A infection in humans or animals in the United States with potential implications for human health
Alert phase: Influenza caused by a new subtype has been identified in humans	**Recognition:** Recognition of increased potential for ongoing transmission of a novel influenza A virus	Increasing number of human cases or clusters of novel influenza A infection anywhere in the world with virus characteristics, indicating increased potential for ongoing human-to-human transmission	Increasing number of human cases or clusters of novel influenza A infection in the United States with virus characteristics indicating increased potential for ongoing human-to-human transmission
Pandemic phase: Global spread of human influenza caused by a new subtype	**Initiation:** Initiation of a pandemic wave	Confirmation of human cases of a pandemic influenza virus anywhere in the world with demonstrated efficient and sustained human-to-human transmission	Confirmation of human cases of a pandemic influenza virus in the United States with demonstrated efficient and sustained human-to-human transmission
	Acceleration: Acceleration of a pandemic wave	Consistently increasing rate of pandemic influenza cases identified in the United States, indicating established transmission	Consistently increasing rate of pandemic influenza cases identified in the state, indicating established transmission
	Deceleration: Deceleration of a pandemic wave	Consistently decreasing rate of pandemic influenza cases in the United States	Consistently decreasing rate of pandemic influenza cases in the state
Transition phase: Reduction in global risk, reduction in response activities, or progression toward recovery actions	**Preparation:** Preparation for future pandemic waves	Low pandemic influenza activity but continued outbreaks possible in some jurisdictions	Low pandemic influenza activity but continued outbreaks possible in the state

Pandemic flu plans modeled after the CDC framework will include six framework intervals (two pre-pandemic and four pandemic intervals) that are further broken down into eight domains for coordinating Federal, State and Local agency response efforts within each interval. The eight domains include; incident management, surveillance and epidemiology, laboratory, community mitigation, medical care and countermeasures, vaccine, risk communication, state and local coordination. The 2014 CDC framework is not meant to be definitive or comprehensive but is designed to help federal, state and local officials make informed decisions during a suspected flu pandemic.

Focusing on the CDC's local agency response in the 2014 framework and assuming that colleges and universities have established liaisons within their local area, the survey questionnaire attempted to determine if university pandemic plans were comprehensive in scope and content based on the new matrix. The CDC (2014) and CIDRAP (2009) recommend that business or university pandemic flu plans not be made in isolation but rather be developed in conjunction with the local community. These joint campus and community plans, based on a personal level of trust and cooperation, can better rely on the shared use of key resources and the coordinated effort of local businesses, healthcare facilities, emergency services, and volunteer agencies in preparing for and responding to each of the six (6) pandemic intervals.

Scholars in the fields of sociology, psychology, public health and higher education have been researching and discussing the human aspects of school crises for at least 30 years. (Haddow & Bullock, 2003; Quarantelli, 1977; Blanchard, 2005; Sandman, 2010;, Kezar, 2001) A review of several university websites reveals impressive and informative emergency plan response information, directing students, faculty and staff what to do in an emergency. Some schools subscribe to and "all hazards" approach relying on less specific preparation to deal with

a variety of crises while others subscribe to an “Incident Command” model that lays out a distinct chain of command and specific response actions for various emergencies. Most schools rely on a hybrid of the two for their emergency planning efforts.

In a crisis situation such as a fire, an earthquake, a gunman on campus, or a pandemic flu emergency will everyone know what to do, where to go or who to call? Will department heads, faculty, RAs, staff and students react as stated in the emergency plan? Are there departmental response teams? Does each team member know what is in their emergency plan for a given situation; have they studied the plan and shared it with co-workers and students? Have they practiced the plan by conducting drills or table-top exercises, are they really prepared to respond to an emergency? In a crisis situation there may not be time to get the emergency plan off the shelf or to check the website for guidance; the power may be off and computers and phones may not work; communication may be difficult, lives may be at risk for every minute wasted. To be effective during a crisis, emergency responders must know their personnel responsibilities and be familiar with the overall planned response and its implementation.

Most university emergency plans also include pandemic preparedness websites that have been in place for several years. Some plans are updated annually but how many people at the intuition actually review the updated information and are familiar with their current pandemic flu emergency plans is unknown. How many universities activated their plans during the 2009-2010 flu season and what plan modifications were made in response to any noted shortcomings? Have individual departments at the university acted to reduce their flu vulnerability or business continuity by preparing departmental specific emergency plans and assigning key individuals to encourage staff to keep current with vaccinations, to cross train on job responsibilities, to stockpile emergency supplies, etc.? These are some of the questions to be explored in this work.

Among the institutions included in the survey were the nation's larger universities based on enrollment that are members of the Campus Safety, Health and Environmental Management Association. These schools are considered by many to be the elite of the doctoral degree granting research institutions in the U.S. many with affiliated medical centers and near urban areas. With their status, security and reputation at stake, one would expect these schools to be most ready to deal with any disaster, natural or manmade. This study will assess the current format of pandemic flu planning at the universities and evaluate the emergency plan's approach as well as the perceived effectiveness of their plans. As the survey data was collected, university names remained anonymous and codes were used to identify each institution for reference and follow-up clarifications.

This study attempted to answers the research questions and to gain further incite for determining the level of pandemic flu preparedness among the selected institutions. In doing so, the author hoped to encourage all institutions of higher education to take a closer look at their programs; particularly their level of training, frequency of drills and overall response capabilities and to make any needed improvements towards emergency preparedness.

Just in the past few years, a number of infectious disease crises have impacted colleges and universities throughout the United States most notably 2009-2010 H1N1 influenza pandemic. Were the emergency scenarios anticipated in their pandemic plans and were the risk/crisis communication, response and mitigation efforts effectively implemented? Did schools have the critical infrastructure in place to maintain resilience and business continuity or did they need more? What did they do right in their response and were there things that could have done better? Did they use the "lessons learned" to modify their pandemic plans thereby enhancing their overall preparedness and resiliency?

2.0 BACKGROUND AND LITERATURE REVIEW

2.1 BACKGROUND

Over the past 10 years, an abundance of practical “how to” information has been provided by federal and state agencies, various law enforcement and fire protection groups and media publications or trade journals on creating emergency plans (CDC, 2014; CIDRAP, 2009; FEMA, 2009). Despite the wealth of information available to deal with emergencies and crises of all types, our nation’s overall response to disasters, from the federal level to the personal level, has been less than desirable in many instances. Government leaders, businesses, education institutions and the general public do not seem to learn what is important for resilience in a disaster until it is too late. Sometimes the response is “overwhelming”, way beyond the needs warranted by the crisis. The ineffective outcomes of many disaster planning programs have resulted in a “tsunami” of opinions on the best approach to emergency preparedness and response, while little is mentioned or done to mitigate hazards, improve response or build-in disaster resilience.

Currently in the literature one can read about the “All Hazard” Approach, Comprehensive Emergency Management, the Command and Control Approach, the Homeland Security Model, the Incident Command System, Integrated Emergency Management, the National Incident Management System and the Network-Centric Approach. Blanchard (2008) has determined that

each of these emergency management systems or approaches, while containing various mixtures of disaster response principles can be categorized into two basic models, the Technocratic Model and the Vulnerability Model, which will be discussed later in this work.

For the past 10 years or so, the Federal Emergency Management Agency (FEMA) and the emergency management research community are promoting an "All Hazards" approach towards crisis preparedness. In this approach, Federal, state and local governments are encouraged to join forces with disaster relief agencies, community law enforcement, emergency services, businesses, medical facilities and institutions including colleges and universities, to establish networks for mutual aid and support. Using this all hazards philosophy, states, cities and local municipalities can assess, plan, build, sustain and improve their capabilities to mitigate against and prepare for disasters. In times of crisis, communities with such an emergency management plan in place are better able to coordinate and integrate all of the activities necessary to cope with, respond to and recover from natural disasters, acts of terrorism or other man-made disasters (FEMA, 2003).

This research project attempted to categorize the crisis management approach at larger universities throughout the U.S. related to pandemic influenza and compared the content institutions emergency plan regarding their facilities, services, and materials needed for the functioning of a campus community during and after an pandemic emergency. It asked the each of the university EH&S Directors to comment on comprehension of their pandemic preparedness plan via a survey questionnaire noting parameters such as transportation, food service, housing, medical facilities, communications, IT systems and utilities (water, heating and power lines) enhancing the university's ability to withstand an influenza pandemic. The study also looked at the university's frequency and type of disaster drills, tabletop exercises and employee training in

order to assess their university emergency plans and practice regimen aimed at preventing, responding to and recovering from a pandemic emergency.

2.2 REVIEW OF THE LITERATURE

2.2.1 The Pandemic Flu Threat and the Need for Planning

As stated earlier, an influenza pandemic is arguably the most life threatening and long-lasting emergencies that can strike a university campus. Unlike a fire, flood or violent crime that occur more frequently but are usually limited in scope and duration, the unknown risks perceived about the severity and rapid spread of a pandemic influenza along with its risk to all campus faculty, students and staff as well as their families and friends is staggering to comprehend.

When a flu pandemic strikes, even though most organizations have a “plan” developed, the health risks, lack of flu trained personnel on campus and the rapid spread of illness along with limited effective treatments all act to heighten concerns about the plan’s adequacy for handling the outbreak. Even among those whose job it is to care for the health and well-being of students, the concerns for dealing with large numbers of flu victims can be overwhelming. Many flu plans state that clinics and doctors’ offices prefer patients with influenza to stay home and self-isolate with the proper medications to prevent spreading flu. As hospital resources may be stretched to extremes, public health officials often request that only the most critically ill seek hospital care to avoid exposing other very sick hospital patients to the flu virus (Colorado State University, 2007; CDC, 2009; CDC, 2010; UKDH, 2007). Given these guidelines and

restrictions, questions arise as to how colleges and universities are supposed to care for their students, faculty and staff as well as maintain school operations without a solid plan in place.

2.2.2 Emergency Planning

For years many college pandemic flu plans have called for closing the campus and sending students home when a flu crisis was approaching (Colorado State University, 2007; Ithaca College, 2012; University of Pittsburgh, 2007). Questions remain, however, on the wisdom of isolating students showing flu-like symptoms on a college campus or arranging for them to return home when they may already be infected with the flu virus. This relocation would be difficult to accomplish safely with students from distant parts of the country and especially with international students. Plans must be formulated to care for these students on campus or at some local facility where they can be quarantined.

Even with the perceived life threatening “unknowns”, police, paramedics and medical staff, will be expected to transport or treat patients suspected of having the flu while trying to avoid the infection risks to themselves and their families. On a college campus, Resident Advisors, custodial personnel and food service staff may be unwilling to provide required services or even visit a dormitory where flu victims are quarantined. How should these concerns, real or imagined, be addressed in a pandemic flu plan? Can universities and other organizations learn from their mistakes and adjust their plans or practices to the ever changing environments that might exist during a pandemic flu? There is need for additional research in this area to answer some of these questions.

Emergency planning and preparedness for large scale disasters go hand in hand. All organizations, whether private, public or governmental, are susceptible to the consequences of a

crisis or disaster and must be prepared (Haddow and Bullock, 2003). From the 1950s to the 1970s, most local agencies prepared for a response to storms, fires and floods, while the focus of emergency planning was primarily a federal function urging citizens to prepare for bigger issues like a nuclear attack from the Soviet Union. In 1979, the serious radiation incident at the Three Mile Island (TMI) nuclear plant demonstrated the need to shift this planning management from a federal function to local responders and the need for better emergency plans that educated, trained and prepared the public in addition to responders for emergencies. Haddow and Bullock (2003) described how the TMI incident was the first real test for the newly created Federal Emergency Management Agency (FEMA) in emphasizing the importance of planning, training and exercising for all levels of government as well as the private sector.

One of the nation's first attempts to develop an emergency preparedness framework was begun in the 1960s by Dr. William Haddon. It was a multidimensional analytical study of traffic safety injury epidemiology and prevention to attain a better understanding of contributing factors related to pedestrian traffic accidents and injuries (Runyan, 2003). Known as the Haddon Matrix, it used a grid of four columns representing the contributing factors to injury in the columns (host, agent/vector, physical environmental and sociocultural environment) and three rows containing the time phases of injury (pre-event, event and post event). By using this matrix, complex issues could be broken down into manageable segments for detailed analysis with each of the 12 cells in the grid corresponding to a policy decision or actionable priority (Barnett et al., 2005).

Realizing that this analytical matrix logic could fit perfectly into the world of public health, epidemiology and infection control (host, agent/vector, physical and sociocultural environments), Haddon (1968) modified his 12 cell grid to describe the primary, secondary and tertiary prevention of polio outbreak. This same matrix grid was more recently applied to study

public health planning and emergency preparedness response during the SARS epidemic in 2002-2003 (Barnett, Balicer et al., 2005). Based on these two public health applications of the Haddon Matrix, it became the starting analytical matrix for the 2004-2006 WHO and CDC Pandemic Influenza Preparedness Plans until they were expanded to the current six phase framework (CDC, 2014).

Preparedness was defined by FEMA as "the leadership, training, readiness, exercise support, and technical and financial assistance to strengthen citizens, communities, state, local and tribal governments, and professional emergency workers as they prepare for disasters, mitigate the effects of disasters, respond to community needs after disasters and launch effective recovery efforts" (Haddow and Bullock, 2003, p. 116). FEMA preparedness focused on 12 emergency functions that must be independently managed but are also highly dependent on each other during an emergency. The 12 functions include transportation, communication, public works and infrastructure, firefighting, information and planning, mass casualty care, resource support, health and medical services, search and rescue, hazardous materials, food and energy (Haddow and Bullock, 2003). These authors also explained an important distinction between preparedness and mitigation of an emergency, both of which are building blocks of emergency planning and key parts of the preparedness cycle. "Preparedness deals with the functional aspects of emergency management such as the response and recovery from a disaster, whereas mitigation attempts to lessen these effects through pre-disaster actions such as creating disaster-resistant communities" (Haddow and Bullock, 2003, p. 117).

According to Haddow and Bullock (2003) effective emergency preparedness called for a systematic approach to planning requiring both ties to academic research traditions and analytical methodologies. Without these pre-established and practiced ties, the authors claim that

coordinating the efforts of multiple responding agencies and organizations would be impossible to manage during an emergency. FEMA's systematic approach to emergency preparedness involves two cyclical planning processes, with one revolving continually inside the other (Haddow and Bullock, 2003). The outer circle is comprised of a four-part cycle that includes planning, preparation, evaluation and assessment. The inner cycle has seven finely detailed steps that involve conducting a threat assessment, gauging vulnerabilities, identifying shortfalls and ways to improve, implementing plan enhancements, training responders, conducting exercise drills, re-assessing preparedness and starting the cycle over again as often as necessary (FEMA, 2013)

Figure 1: FEMA Preparedness Planning Cycle

Source: Adapted by the author from Haddow and Bullock (2003, p. 117).

After the September 11, 2001 terror attack in New York City and the devastation of Hurricane Katrina in 2005, the United States, along with most of the world, was forced to realize the importance of emergency planning and preparedness and the need to continually rework and practice these cycles. In 2002, the Department of Homeland Security (DHS) under a Presidential Policy Directive 8 (PPD-8) developed the Homeland Security Exercise and Evaluation Program (HSEEP), establishing guiding principles for emergency exercises and the common framework for all emergency program management including planning, developing, conducting and evaluating disaster drills (Homeland Security, 2013). The current HSEEP doctrine is a set of fundamental principles framing a common approach to exercises that; 1) are guided by elected and appointed officials, 2) are capability-based and objective driven, 3) use a progressive (advocacy) planning approach, 4) integrate the entire community, 5) are based upon the perceived risk, and 6) use common methods and terminology. In a recently prepared document, Homeland Security (2013) believes that applying HSEEP principles to the planning, development, conduct and critical evaluation of individual and coordinated exercise programs will provide an effective examination of an organization's response capabilities as well as identifying any shortcomings in their planning efforts.

From the HSEEP Initiative came the National Response Plan (NRP), the National Incident Management System (NIMS), the Universal Task List (UTL) and the Target Capabilities List (TCL), which all combined to become the "official" emergency preparedness framework for organizations in the United States. The HSEEP doctrine was intended to be flexible, scalable and adaptable for use by stakeholders nationwide in operational planning for the prevention, protection, mitigation, response and recovery from disaster and emergencies of any kind. If properly incorporated into an institution's emergency plan, HSEEP provided a

strategic mechanism for measuring and sustaining the core competencies of individuals and institutions during emergency response (Brown, 2011).

In December, 2006, President George W. Bush signed the Pandemic and All-Hazards Preparedness Act (PAHPA) intended to improve the federal response to public health and other emergencies (Hodge et al., 2007). PAHPA placed the Department of Health and Human Services (DHHS) rather than Department of Homeland Security (DHS) squarely in charge of leading the federal health and medical response during pandemics, bioterrorism and natural disasters while DHS dealt with non-medical and man-made emergency response issues. Under this Act, DHHS, including the Centers for Disease Control and Prevention (CDC), was instructed to coordinate with state, tribal and local emergency managers to assist and enhance their overall response to pandemic flu issues including rapid vaccine development, fair allocation of resources, volunteer training, health care surge capacity and the protection of privacy during medical surveillance. Hodge et al., (2007), explained that the goals of the PAHPA were to streamline the federal public health response, to hold states and local agencies accountable for their performance, to create a national surveillance structure, to facilitate volunteerism, and to ensure the expedient deployment of medical countermeasures. According to Hodge et al., (2007), critics of the Act contended that it lacked specifics on how these goals were to be met and provided few incentives for state and local agencies to commit resources for improving their public health emergency preparedness.

On March 30, 2011, President Barack Obama signed and released Presidential Policy Directive 8 (PPD-8) along with several revised component policies and the "Implementation Plan" intended to guide everyone in the U.S., from federal responders to private citizens, on how to prevent, protect against, mitigate the effects of, respond to and recover from threats posing the greatest risks to national security, including acts of terrorism, cyber-attacks, pandemics and

catastrophic natural disasters (Brown, 2011). Using a “strategic” National Preparedness System, DHS and FEMA established five separate National Planning Frameworks that each address one of the emergency “mission areas” (prevention, protection, mitigation, response and recovery) in achieving our National Preparedness Goals or the desired “ends” for the plan (FEMA, 2013; Brown, 2011). When adopted, the five combined planning frameworks became the National Preparedness System and the “means” for achieving the “ends” desired before, during and after an emergency or disaster. PPD 8 also requires an annual National Preparedness Report (NPR) summarizing the nation’s progress in building, sustaining and delivering the 31 core capabilities outlined in the National Preparedness Goals for a secure and resilient nation. These core competencies identify specific issues in each of the 5 “mission areas” involving planning, hazard identification, communication, intelligence gathering, risk assessments, safety, supply chain integrity, resilience, response measures, infrastructure preservation and economic recovery to name a few. Two NPRs have been published to date, one in 2012 and another in 2013 to inform Americans how responders were doing with regard to National Preparedness and outlining what more they needed to do (FEMA, 2013). Brown (2012) also points out that PPD-8 revised or rescinded other Presidential Directives on emergency preparedness initiated by Presidents Bush and Regan.

At its core, PPD-8 requires the involvement of everyone, not just the federal government, in a coordinated effort to keep the nation safe from harm and resilient when confronted with natural disasters, terrorism and pandemics (FEMA, 2013). DHS and FEMA are responsible for implementing PPD-8 by coordinating a multi-agency effort to work with individuals, families, businesses, faith based and community groups, non-profit organizations,

and representatives from all levels of government (federal, state, local, tribal and territorial) in assuring that everyone's needs are met (FEMA, 2013).

It is significant to point out that many college and university emergency planning committees incorporate portions of these comprehensive federal preparedness guidelines into their school emergency plans directly or by reference. Eventually these plans will be updated to reflect the six planning/response intervals recently suggested by the WHO and CDC in 2014.

2.2.3 The History and Evolution of Planning

Before one can understand or select the "best" planning strategy to use for effective pandemic flu preparedness at a university, it may be helpful to review the history of "planning" and to compare the planning traditions or theories that have evolved over the years including those used by the federal programs mentioned above. Being familiar with planning history will provide a better understanding of why planning is important to a flu pandemic preparedness at the university level.

Merriam-Webster (2013) defines planning as an act or process of establishing or carrying out a policy or procedure to achieve a goal for a social or economic unit. Hudson (1979), one of the fathers of modern planning theory, defined planning as foresight in formulating and implementing programs and policies. Zhang (2006) defines planning as an institutional arrangement between the government, the marketplace, and society in response to a needed social change in a particular society during a specific time period.

Planning for the implementation of government programs and policies can be found as far back as ancient historical records. Nearly 4,000 years ago, King Hammurabi chiseled his code of laws, which Babylonians were expected to live by, onto a black stone monument.

Interpretations of his “code” divulged the earliest-known example of a ruler proclaiming publicly an entire body of laws, arranged in orderly groups, so that his subjects knew what was required of them. The carved diorite monument, eight feet high and containing 282 laws, was publically displayed to guide citizens on rules pertaining to government operations, contract and liability law, just punishments for offenses, religious beliefs, military service, trade, slavery, the duties of workers, codes of conduct, food preparation, household and family relationships such as inheritance, divorce, paternity and sexual behavior (Biography.com, 2013).

Throughout history kings, tribal rulers, religious clerics or military leaders have used their governing authority and the counsel of perceived “experts” to establish plans for urban design, public works projects, transportation networks and military defense or expanding their empires (Hudson, 1979). These “experts” under the authority of their governing ruler, would often dictate non-negotiable regulations for coinage, trade, and the prevention of disease and disorder (Hudson, 1979; Friedman, 1987). Mannheim (1954), a critical theorist, philosopher and intellectual on the “sociology of knowledge” wrote that before the industrial/scientific revolution (about 1750) many leaders believed that the gods, religion or fate ran the world and that it was not prudent for man to plan or attempt to intervene in events. Since that time, scientifically based, sociological, political and philosophical knowledge about human rights, natural laws and the needs of society has led to the expansion of planning thought and action on how institutions, business organizations, countries and the world in general should be governed (Friedman, 1987).

After WWII there evolved two primary planning groups, rational planners and pragmatic planners. Planners in the 1950s called “Rationalists” considered planning as a bureaucratic goal-setting process based on scientific data and mathematical means verses ends calculations followed by the comprehensive analysis of alternatives as suggested by several authors

(Lindblom, 1959; Friedmann, 1987; Schon, 1971). Pragmatic planners, on the other hand, rejected using natural laws, scientific knowledge and objective principles as their sole planning guidelines, accepting instead practical judgments based on social learning from new ideas or evidence discovered through life's experiences and interacting with others along with their own morals, intuitions and feelings (Healey, 2008; Hoch, 2002).

Planning and preparation have played critical roles in warfare, business, education, sports, emergency preparedness and life in general. Famous quotes have alluded to the importance of planning. Benjamin Franklin was first credited with the saying "by failing to prepare, you are preparing to fail." Hillary Rodham Clinton, in her recent book Living History had a similar quote based on Franklin's, "fail to plan, plan to fail." Finally, General Dwight D. Eisenhower, in strategizing for war, said "In preparing for battle I have always found that plans are useless, but planning is indispensable."

Today, planning can be a complex management function for deciding in advance what needs done to reach a goal or objective, how best to achieve that goal, the time frame required to accomplish the objective and determining who should be involved in the process (Settar, 2012). Settar (2012) also states that planning is a demanding process requiring a delineated course of action, based on a defined purpose, the knowledge gathered on the subject, a cost estimate and time needed to meet the objective.

This dissertation seeks to convey the importance of planning in general and pandemic planning in particular by addressing several modern planning theories along with their intended strategies, similarities and differences as well as the usefulness of each planning level for solving problems situations. In addition, the essay hopes to portray the importance of "fitting" various planning techniques to different situations and how plans can impact the outcome of future

events. Not knowing the history and details of a problem, the planning needs, its advocates or opponents and its proposed outcome, subjects an organization to shortsighted decisions where they are likely to make or repeat mistakes. Planning professionals have concluded that unless a plan is affordable, comprehensive, flexible and able to adapt to meet changing needs, the planner's ability to activate the plan in a timely fashion and sustain it may suffer (Hartzell, 2013; Friedman, 1987; Hudson, 1974).

2.2.4 Planning Theory

Considering the pluralistic nature of modern society, the diverse direction of social developments, and the uncertainty of social and political events along with the non-linear trajectory of planning theory, it is important to develop an understanding of planning theory evolution as well as the diverse and innovative approaches taken by planners to meet social change over the years (Zhang, 2006). From the industrial revolution to the 1950s the focus of formal planning strategies has been about wartime battle plans, social reform or the architectural and civic planning related to the layout and construction of urban and regional communities by professionals and politicians (Stiftel, 2000). During this time period, the predominant planning theory involved a rational, comprehensive tradition often called the Synoptic Tradition or the Technocratic Model. (Hudson, et al., 1979). This tradition was well suited to formalized government mandates requiring a set of constrained objectives, budget restrictions and accountability. Stiftel (2000) states that Synoptic Planning or the Rational/Comprehensive Model has four classic elements that include the following: 1) goal-setting, 2) comprehensive identification and analysis of many policy alternatives, 3) mathematical evaluation of means verses ends and 4) implementation of rational decisions. Beginning in the 1960's planning theory

began to be viewed by some through a moral or social lens with greater emphasis on transparency, inclusiveness and truth-seeking schools of thought (Friedman, 1987). Where Rationalists believe their ideas and data, being logical and precise, provided a better approach when developing plans, Pragmatists followed an approach that considered local customs and morals, social experience, feelings and intuition when coping with problems (Hoch, 2002).

In a classic article on pragmatic planning and policy setting, Lindblom (1959) criticized the dominant belief in public administration of his time, that all problems could be technically or scientifically solved using a rational-comprehensive approach involving complex mathematical models and quantitative analysis while largely ignoring the human dimension, social problems and the public interest of those most affected by the plan. Lindblom (1979) proposed an alternative to the Rational-Comprehensive Model that he called the Incremental Model or the "Science of Muddling Through" referring to the British bureaucratic decision making process where political maneuvering, past practices, public opinion, human values and less than perfect alternatives are all considered equally important for getting as close to the goal as possible. In making his case for the Incremental Planning Model, Lindblom (1959) states that less effort should be made to set comprehensive goals or policies rather, fewer and simpler goals should be set and policies should be considered in relation to current and past practices. A reasonable number of goals values and alternative goals are considered in concert and analyzed based on past experience and solid human values. In the end, decision makers select the most feasible policy alternatives agreeable to all affected parties.

In comparing the Rational Model with the Incremental Model of planning, Lindblom (1959) and Chilton (2003) state that the principles behind the Rational (Technocratic) Model are comprehensive and systematic where each goal is clearly stated and separated from a listing of

alternative goals. The policy makers evaluate the pros and cons of goals and alternatives subjecting each to unbiased quantitative analysis to mathematically determine if the means justify the ends. When all the data have been processed, and decision makers can agree, the best policy or plan that fits the model and will attain the goal is adopted.

The Incremental (Pragmatic or Pluralist) Model discussed by Lindblom (1959) was an alternative to the Rational-Comprehensive planning of the day. This model does not intend to be scientifically comprehensive and establishes fewer and simpler goals. Before setting goals or directives incremental planners look at proposed programs or policies "branching" from past experience or successful current practices. Reasonable end-goals, not mathematical fits, are established considering the time and resources at hand and planners consider each goal along with human values that minimize deviation from the status quo. Limited evaluations are made to consider alternative goals and limited means realizing that there may be public consequences to be dealt with if the plan comes up short. Incremental decision makers tend to agree on a feasible policy that just "suffices" as it is derived from a very human value-laden process described by Chilton (2003)

2.2.5 The Evolution Continues: The SITAR Framework

Combining the synoptic and incremental planning traditions mentioned earlier and adding three other models, Hudson (1979) proposed an alternative planning theory. It was an American theory defined as using foresight in formulating and implementing programs and policies. This planning theory used an acronym based on an ancient musical instrument the SITAR. The sitar is an instrument having five strings that, like this planning tradition, can be played individually or harmoniously combining tones for a more satisfying outcome.

The first string of this planning theory is Synoptic Planning that involves the dominant rational, comprehensive, technocratic and quantitative tradition in setting limited objectives with analytically derived budget restrictions and full accountability throughout the process. With these mathematical limitations always in mind, synoptic planners set their goals but have policy alternatives pre-established if it becomes apparent that the means allocated will not achieve the ends proposed and that an alternative decision must be implemented. The human dimension is typically overlooked in synoptic planning (Hudson et al., 1979).

The second string of Hudson's SITAR approach involves Incremental or Pluralist Planning that uses a free market approach and democratic bargaining to get things done. Not unlike Lindblom's British decentralized approach of "muddling through", incremental planners use intuition and the experience of "experts" to solve problems using their "rules of thumb" (proven practices or successful policies) derived from their past experience. Reportedly, incremental planners often have hidden agendas and are not forthcoming with known shortcomings (Hudson et al., 1979).

The third string of the SITAR model relies on Transactive Planning which involves face to face contact with the people most affected by the planner's decisions. These interactions focus on the importance of human dignity, personal growth, values, cooperative spirit and generosity in planning and making decisions. Financial considerations are given little weighting in transactive planning. (Hudson et al., 1979).

The SITAR model's fourth string is Advocacy Planning which uses the principals of social justice to challenge plans that appear to be too insensitive. It injects normative principals into planning with sensitivity towards the unintended side effects of decisions on the public.

Conflict resolution and the just distribution of benefits are major considerations in advocacy planning. (Hudson et al., 1979).

Radical Planning makes up the fifth and final string of the SITAR theory. It seeks to manage program development in an equitable and community based manner with limited authoritarian involvement. This planning method also endorses maximum participation of the people involved in defining, controlling and experimenting with their own environment via dialog and bargaining. Social and political problem resolutions are two of the focal points of radical planning with less regard to the feasible sustainability of the plan. (Hudson et al., 1979).

Table 2: Relative Emphasis of SITAR Theories Based on Selected Descriptive Criteria (Hudson et al., 1979)

Planning theory **Characteristics**	**Synoptic** **objective & authoritative**	**Incremental** **Intuition & experience**	**Transactive** **Dialog with those affected**	**Advocacy** **Social sensitivity**	**Radical** **Participation to change values**
Descriptive Criteria					
1.Public interest	o	o	o	x	x
2. Human dimension			x		o
3. Feasibility	x	x			
4. Action potential	o	o	o	o	o
5. Substantive theory		o	o		o
6. Self-reflective			o	o	o

x- Major strength or area of concern

o- Partial or one-sided treatment

Cells Left Blank- characteristic weakness

2.2.6 SITAR Criteria

As shown in the Table 2 above (Hudson et al., 1979), none of the SITAR planning traditions completely satisfy all six descriptive criteria deemed necessary for the "perfect" plan. Each of the traditions have at least one major strength and weakness while giving only partial or one sided treatment to the other descriptive characteristics of a plan.

The first descriptive criteria, Public Interest, refer to the theory that there will always be conflicts among groups affected by a plan. Planners must decide how much effort should be made to resolve every conflict before implementing a plan. Hudson (1979) relates that the greater the public interest the more efforts should be made to articulate significant social problems. As shown above, advocacy and radical planning make a maximum effort to address differing opinions while the other traditions do less.

Knowing that personal and spiritual beliefs can be impacted by policy decisions, the second criteria, Human Dimension, refers to the weighting planners should give to subjective realities such as; political, cultural, psychological, historic or sociological concerns as opposed to objective frameworks based on cost benefit analyses or scientific data when making decisions. Only transactive and radical planning considers these human dimensions in trying to facilitate understanding and mutual learning between the planners and their constituency during problem resolution.

The third descriptive characteristic, Feasibility, refers to making planning methods easy to understand without oversimplifying issues especially when there is a lack of convincing facts or trend data. The easier a plan is to understand and apply to a problem, the more practical and adaptable it will be. Synoptic and incremental planning tend to focus on explaining the facts

represented by the data and accounting for possible alternatives while the other traditions largely overlook scientific data and statistics.

The fourth descriptive criteria, Action Potential, refers to the likelihood that once a plan is developed it will be filed away and never implemented. Action potential provides for carrying ideas into practice, building on experience and finding new solutions. All of the planning traditions have some provision for seeing a plan through to implementation. Action plans will vary with each tradition from a detailed plan following through successive stages in synoptic planning to the other traditions where the emphasis may be on implementation through social policy reforms and long range growth rather than formal plan development.

Criteria number five, Substantive Theory, refers to subjectively addressing the resolution of difficult social problems such as poverty, education, housing and industrial development when developing plans rather than just presenting the objective statistics and forecasts. Difficult problems need to be studied and understood so that a process of social change can be enacted. Incremental, transactive and radical planning traditions attempt to provide a moral and sensitive interpretation of these issues while the synoptic and advocacy theories tend to focus on more objective solutions and procedures such as trend extrapolation. .

Lastly, criteria six, Self-Reflective, planning should be self-critical and open to counter proposals. This criterion refers to the tendency of planners to be explicit on shortcomings of the plan making clear the known limitations and what may have been left out of the process. Incremental planners are least explicit in this regard figuring they will muddle through any shortcomings while synoptic planners make an effort to lay deficiencies on the table so they can develop solutions for every contingency using feedback from surveys and recalculations. Transactive planners develop trusting relationships in their planning committees and use dialog

to address shortfalls in the plan. Advocacy planners will mobilize people to challenge decisions and policies that go counter to their collective interest. Radical planners will call for ideas to be tested in action with the intentions of permanently changing institutional norms or values. (Hudson et al., 1979).

2.2.7 Planning Practice

One of the main functions of management today is planning. Whether it is a business, a school or a governmental function, managers make plans on a regular basis to achieve an organizational goal, to establish a program, or to avert a crisis (Hartzell, 2013). Four levels of planning practice are generally discussed in the literature, they include; 1) strategic plans, 2) tactical plans, 3) operational plans, and 4) contingency plans (Zubair, 2006; Hartzell, 2013; Settar, 2012). Each of these planning levels can be characterized by their size, focus, scope and timeframe to determine which level or levels would be most effective to establish an emergency or pandemic flu plan. An effort will be made in this essay to discuss planning level hierarchy and determine the criteria most adaptable to a university campus and its many stakeholders.

Before moving forward with a pandemic flu planning process, it is important to become more familiar with the content of the four planning levels to decide which practice best fits the needs of the university stakeholders, including the administration, faculty, students, parents and staff as well as the larger community in which they live and work. For example, when selecting individuals to serve on the planning committee, it is important to know what each person might contribute to the plan given their skills and area of expertise. It is also important to know something about the preferred method of planning within the university organization as well as any sociological, cultural, political, psychological issues or historic concerns that need to be

addressed in the plan (Hudson et al., 1979). Organizational learning and the ability to detect and correct errors or shortcomings in a plan and perhaps realizing what they know about a situation requires a complete change of direction is often critical to a successful planning committee (Argyris, 1977).

2.2.7.1 First Level Strategic Planning

Strategic Planning experienced its greatest popularity in business during the 1960s and 1970s. Prior to that time, its primary use was the rational planning strategy concentrated in military planning, corporate growth and international development (Dooris, 2002-2003; Werrell, 2011). Colleges and universities took a closer look at strategic planning in the 1980s and by the 1990s its use was widely emphasized in higher education as a rational tool for orderly, systematic school management (Dooris, 2002-2003). Strategic Plans are generally broad in scope taking into consideration the organization as a whole, its mission and long range vision for the next 3 to 5 years as perceived by top management. In their descriptions of strategic planning, Schmidtlein (1981), Hartzell (2013), Werrell (2011), and many other planning professionals discuss the importance of scanning the external environment surrounding an organization and assessing the opportunities and threats existing there and how these factors may impact the long range vision and mission.

In addition to scanning outside the organization, strategic planners look internally at organizational strengths and weaknesses for operating in their current environment and how these can be optimized to achieve desired goals and objectives. Strategic planners aim to create an image of the desired future and design ways to make the plan a reality (Tomey, 2004). Marquis et al., 2003, presented a 12 step list of what should be considered in a strategic plan.

1. Analyze the organizations internal and external environment (SWOT analysis).

2. Assess the stakeholders.
3. Define the purpose of the organization, its mission and vision.
4. Clarify the values important to the organization.
5. Set the organizations goals and objectives.
6. Communicate the goals and objectives to constituents.
7. Identify strategic pathways and set timelines for each task.
8. Establish and allocate resources.
9. Develop and communicate a marketing or business plan.
10. Establish system for implementing and monitoring policies, procedures and rules.
11. Establish a system for exchanging information and building consensus.
12. Provide a mechanism for evaluation and change.

Two major steps in strategic planning involve analyzing the internal and external environments of an organization using SWOT and PEST analyses. The acronym SWOT, referring to strengths, weaknesses, opportunities and threats, is a useful analysis and decision making tool that an organization or business can use to develop a long range plan. It requires a critical inward look at an organizations strengths and weaknesses including its resources, assets, people, experience, knowledge, finances, culture, attitudes, and reputation. It also requires looking outward at opportunities and threats that could enhance or interfere with planning efforts and must be dealt with for successful implementation. In addition, it is often helpful when strategic planners conduct a PEST analysis looking at political, economic, sociological, and technological issues that can impact the plan externally or internally. The PEST analysis usually lays the groundwork for factors to consider and plan around during a SWOT analysis (Chapman, 2012).

In the 1990s, critics of strategic planning questioned its usefulness long term and many found it too formal, outdated and counterproductive based upon its complexities and rigid structure (Dooris, 2002-2003). Current proponents of strategic planning find it most useful in avoiding surprises and providing an overall picture for setting management goals, overcoming problems, measuring performance and estimating budget needs within an organization (Fairholm, 2009).

Long range strategic planning serves as the framework for two lower level planning types (tactical and operational) in considering the direction an organization wants to go and making plans to get there. According to Hartzell (2013), these lower stages of planning should involve each level within an organization so that everyone understands their significant role in the plan. At the tactical and operational levels, planners and strategic thinkers (leaders) can also use the organizations vision, mission, values and philosophy to break out department and unit priorities and to establish implementation timelines, policies, procedures, budgets and marketing strategies for enacting a plan (Tomey, 2004). The strategic plan is periodically revisited by strategic thinkers at all levels to evaluate how the organization or institution is doing, to see if they on the right path to achieve their goals and if changes or additional financing are needed to improve the strategic plan (Fairholm, 2009).

2.2.7.2 Second Level - Tactical Planning

Tactical Planning has a moderate scope with a shorter but extended time frame supporting the strategic plan by translating it into smaller but more detailed programs and processes needed to achieve the mission and vision of the organization (Hartzell, 2013). While strategic planning helps organizations determine what they are trying to accomplish, tactical planning helps them determine how they are going to accomplish their goals. Strategic plans are

an organization's guideline for setting actions to perform while tactical plans provide the details on how to implement those actions and determining who will be involved with the process. Managers use tactical plans to outline what each team in an organization must do in the short term (<1 year) to implement the strategic plan successfully (Olsen, 2012). Tactical planning is often done mid-year after a strategic plan is enacted affirming the current plan or redirecting portions of it for the coming year (Zubair, 2006). Tactical plans tend to focus on people and action, covering issues such as staff performance, adding resources or employees to a task and personnel development to enhance strategic plan implementation (Hartzell, 2013; Settar, 2006; Zubair, 2006). Group managers within the organization use tactical planning to outline what their various groups must do over the next year delegating specific responsibilities to supervisors for them to act upon to reach specific goals and objectives within their area of responsibility. Tactical plans are also concerned that each unit has the necessary infrastructure personnel and resources needed to support the overall program (Olsen, 2012).

2.2.7.3 Third level - Operational Planning

Operational Planning has an even narrower focus than either strategic or tactical plans and is implemented over an even shorter time frame. (Hartzell, 2013; Settar, 2006). Sometime called "business plans," they can be standing plans or single use plans initiated by middle managers and executed by front-line managers. Operational plans contain a high level of detail on individual roles and responsibilities and are designed to stand the test of time being modified as needed to meet changing circumstances. Operational or business plans often define the day-to-day activities performed at the unit or department level that support the higher level strategic and tactical plans. Single use plans are designed to be used only once or a limited number of times to handle a very specific problem or event. Both standing and single use plans can be developed as

a policy, procedure or rule. Policy statements or guidelines aid managers or employees in understanding their responsibilities within an organization regarding performance, disciplinary actions or training. Procedures typically refer to step-by-step details for carrying out tasks such as ordering supplies, scheduling personnel or assessing problem situations. Rules provide employees with guidelines for behavior within an organization. Zubair (2006) and Travers (1992) define the seven steps in operational planning as follows:

1. Setting objectives – determine what you wish to do.
2. Setting priorities – distinguish between what is important and urgent.
3. Stating assumptions – list your expectations.
4. Reviewing any and all limitations – anticipate possible problems.
5. Developing back-up plans – have a good plan and prepare for any possibilities.
6. Implementing the plan – act decisively and set time limits.
7. Setting up a control system to follow progress towards results, making corrections and establishing new objectives.

2.2.7.4 Fourth Level - Contingency Planning

Contingency Planning provides organizations with alternative directions to take when a plan fails or unexpected events indicate that the initial course of actions will not work (Hartzell, 2013; Settar, 2012). Following through with step 5 of an Operational Plan, Zubair (2006) notes that contingency planning can be reactive or proactive in doing what is necessary to manage problems that interfere with getting the work done. Adding that contingency planning is issue specific for determining optional policies or actions needed to resolve anticipated or unanticipated problems (Zubair, 2006).

Contingency plans, involve extra work for managers (strategic thinkers) but provide flexibility to an organization and can be invaluable when realizing the unexpected. Hartzell, (2013) compares a contingency plan to a skydivers reserve parachute in that "it is better to have it and not need it than to need it and not have it" (p.3). In summary, contingency plans can save an operational plan during a crisis; operational plans get the work done needed to attain tactical planning goals and tactical plans lead to the success of the greater strategic plan (Hartzell, 2013).

The Presidential Policy Directive (PPD-8) discussed earlier in this essay, helps illustrate the relationship between Strategic, Tactical and Operational Planning in emergency preparedness (Brown, 2012). If one imagines the National Preparedness Policy as a pyramid, the top of the pyramid is strategic planning represented by the main PPD-8 document, its Implementation Plan and the National Preparedness Goals. These three FEMA documents present the policy objectives (mission and vision), the goals to be reached and the overall guidance for achieving preparedness. In the middle section of the pyramid, tactical planning is represented by the National Planning Frameworks and the other managerial elements of the National Planning System. These management documents spell out the roles and responsibilities of the federal government along with those of their interagency partners as they begin to shape the operational plans where delegation of tasks or actions by the participants will be detailed and integrated. At the wide base of the pyramid is operational planning that would be beyond the scope of any PPD-8 policy but would involve local organizations. (At the level of operational planning, the National Planning Frameworks are used to translate the "vision" of the National Preparedness Goals into a more detailed set of directions for stakeholders on how to prepare for and implement the emergency plan) (FEMA, 2010; Penn State, 2011).

2.2.8 Transitioning from Planning Theory into Practice

In 1984, philosopher and sociologist Jurgen Habermas wrote a landmark book entitled the *Theory of Communicative Action,* in which he provided the framework for a new planning theory that he claims emerges from the study of planning practice (Innes, 1995). According to Habermas (1984) communicative action re-constructs (emancipates) the concepts of reason and social or cultural understanding that are developed via the communication of human action, experience, and perceptions, rather than reliance on objective and rational knowledge. With regards to planning theory, Innes (1995) explains how communicative action closes the gap between theory and practice allowing planners to use the questions and puzzles arising from their study of practice to develop "real" solutions to "wicked" problems rather than trying to develop plans based on hypothetical information. Communicative action planners apply an intellectual lens to illuminate what they see in the community or the political arena and to actively communicate these needs in their planning practice (Innes, 1995). Not only is this method of planning more interesting to planners, it allows them to become more accessible, even embedded in the communities that they serve.

In the 1970s, some American planners revived the Pragmatic Planning Theory that utilized philosopher John Dewey's concept of human action to bridge the gap between doing good and being right (Hoch, 1984). In comparing Rational planning with Pragmatic planning, Hoch (2002) argues that while rationalists may offer objectivity and precision to plans, they do so sacrificing context and continuity. "A pragmatic outlook embraces context and seeks continuity among diverse viewpoints. It avoids the separation between analysis and action. The Rationalist asks, how can I be sure that my analysis is correct and certain? The Pragmatist asks, what must I know to cope with this problem" (p. 54)?

Healey (2009) also identified the important dimension of the pragmatic planning tradition in its common sense approach to social learning that draws upon the human ability to make practical judgments on learning and discovery through life experience and the expertise of others involved in the process. Hoch (1984) goes on to describe three common elements of pragmatic planning used in some way by all other planning theories in attempting to be right and do good. The first of these pragmatic concepts is problematic experience. A pragmatic person is sometimes willing to use whatever means possible to achieve a good end even if it involves doing something wrong or immoral. Pragmatic people learn the truth of things from the consequences of their actions whether justified or not. Justification must come from prior experience through which we learn what counts as a problem or a solution. The second pragmatic concept described by Hoch (1984) is experimental inquiry that involves testing plans of action to determine which plan works best and meet one's needs. Through this experimentation one learns something about the plan and "knows" what is right and good. The third pragmatic concept discussed by Hoch (1984) involves democratic participation and pragmatic truth whereby a body of knowledge is rarely developed by individual inquiry. The more likely outcome, as Healey (2009) points out, is that knowledge and truth are more often socially learned via the intelligent and reflective transactions of a democratic process involving bargaining, negotiating and persuasive argument.

Yet another model of planning, Progressive Planning occurs when a group of advocacy planners takes a more radical turn believing that a current American institution no longer meets the needs of the poor and a new arrangement is needed (Davidoff, 1965; Grabow and Heskins, 1973). Progressive planners advocate public land ownership, promotion of industries to absorb more unemployed, and a bottom-up approach in planning process. This movement named

"progressive planning" established social justice, public participation, and planning legitimacy as their goals.

The previous discussion of planning models illustrates how difficult the use of only one planning tradition or theory can be when addressing a problem, especially within a diverse university group, each having their own agenda, goals, budget restrictions, core beliefs and philosophies. One can appreciate how playing all five "strings" of the SITAR planning tradition and adopting parts of the modern planning traditions aimed at putting plans into practice can result in outcomes addressing multiple sides of the problem and greater satisfaction among affected parties. Zhang (2006) believes that planning theory will continue to evolve with societal innovations in a changing world and also with the changing demands of institutional arrangements planning to live in that world.

In summary, Hudson et al. (1979) pointed out that planning is not simply a technical or mathematical manipulation of objective data, skill set, procedure or institutional "knowledge". Equally important are the moral, social and political philosophies of the planner, the sponsor and the constituency affected by the plan. The authors go on to state that in some instances it may be sufficient to assess the objective needs and to deliver solutions to the target community but in most cases, "it is necessary to understand the problems needing resolution through face-to-face interactions with those affected" (p.395). In these instances the planner must establish open communications between the planning team and the clients so there is mutual understanding of value choices, political sensitivities and other important viewpoints (Hudson, et al., 1979).

2.2.9 Committee Organization, Learning, Change and Development

This dissertation ultimately will attempt to address the complex problems posed by flu pandemic planning on a college campus and why it requires a special type of planning committee as well as a commitment far beyond the normal responsibilities of managers committed to watching over the needs of students, faculty and staff in a University system. The planning committee make-up, core competencies possessed by select members of the committee, organizational learning and a change strategy will be crucial to developing a successful plan.

2.2.9.1 Committee Organization

Committee organization is generally a management function commonly used in planning development. Settar (2012) defines the management function as a process through which human skills and material resources are made available and effectively directed within a plan to accomplish the goals and objectives of an organization. He goes on to state how managing the committee requires the execution of supervisorial acts involving conceptual, technical, human and conjoined skills that are both the art and science of organizing people, providing them with resources, making necessary changes to beliefs or attitudes and working with them as a leader to assist the organization in achieving its goal.

2.2.9.2 Organizational Learning

Organizational Learning is an important concept that plays a major role in developing successful planning committees, particularly in a university setting. Organizational learning, as defined by Argyris (1977), is a process by which institutions, individuals or committees, through their conceptual knowledge or learning about a subject, detect errors in practice or rapidly changing

conditions and develop solutions to correct the situation. In his view, organizations learn through the actions of individuals that are part of the organization. Huber (1991) constructs four components that are essential for organizational learning: 1) knowledge acquisition, 2) information distribution, 3) information interpretation and 4) organizational memory. He states that this learning does not have to be conscious or intentional and that it may not increase the learner's effectiveness or change behavior immediately but, if the individual does learn something, the potential for change exists. Some confusion has been created by several authors who use the terms organizational learning and learning organizations (referring to a particular group) interchangeably (Steininger, 2010). Steininger (2010) goes on to provide a simple clarification that a learning organization is one that is good at organizational learning. Senge (1990) also defines a learning organization as group of people continually enhancing their ability to create what they want to create by having an ingrained philosophy for anticipating, reacting, and responding to change, complexity and uncertainty within the organization.

Argyris and Schon (1978) and others have used a model describing three levels or "loops" of organizational learning. The first level is referred to as "single loop learning." This occurs when individuals within a group detect errors and correct them without significantly altering the organization's plans or practices. The second level, "double loop learning," takes place when the organization recognizes that the errors are significant and they require major changes to the organizations underlying policies, goals and objectives along with their ways of thinking and doing business. The third level of organizational learning, called "deutero-learning," takes place when members of an organization, realizing that their current method of knowledge acquisition is insufficient, learn to improve their learning process (Steininger, 2010). Argyris and Schon (1978) suggest that deutero-learning often results in an organization

modifying their values, strategies and expectations. Despite several different approaches to organizational learning most authors can agree on the five shared principles listed below (Burns, 2009).

1. An organization's survival depends on its ability to learn at the same pace or faster than changes in its environment.
2. Learning must become a collective process relying on several key individuals within an organization.
3. There must be a fundamental shift toward systems (or triple loop) thinking and learning within an organization.
4. By adopting organizational learning, an institution acquires both the ability to adapt quickly to changing circumstances, and to quickly transform itself when necessary.
5. Having the ability to transform itself an organization can adapt to, influence and even transform its environment.

2.2.9.3 Organizational Change

Organizational Change: Early theories and observations about "change" in an organization focused on why a change occurred, what physically changed in the organization, how the change came about and the resultant outcomes of the change (Kezar, 2001). These theories often failed to capture the cultural and social perceptions behind the change or the thought process and values of the individuals behind the change. Many changes occur because leaders, change agents or others simply believed that a change was necessary. Kezar (2001) explains in detail the six main categories of change models and offers how reviewing these theories can assist in our understanding, describing and developing insights about the change process. Each model has a

distinct set of assumptions on why and when the change occurred, how the change process developed, how long the process took and what the outcomes were.

The six organizational change theory categories as summarized by Kezar (2001) include:

1. Evolutionary change – a response to an external environment, demand, circumstance or situational variable. The change occurs slowly over time in a rational, linear fashion as an organization attempts to adapt to the changing environment hopefully resulting in new plans, structures, clients or processes.
2. Teleological change – also occur as the result of a rational, linear plan modeled by individual leaders inside the organization with a formal purpose to change an internal structure or environment also resulting in new structures and reorganized principles within the organization. Organizational Development, Strategic Planning and Re-engineering processes fall into this change model.
3. Life Cycle change – this change model focuses on the natural stages of growth, maturity and decline that usually occur within an organization or in individuals within that group. It is perceived as a natural and systematic progression resulting from training, motivation, behavior modification and institutional identity. This change strives to achieve a new organizational identity and improves employee social habits, attitudes and personal identity within the group.
4. Dialectical change – a political model that characterizes change attributed to human interaction resulting in tension and clashes of ideology, values, norms or patterns of behavior. Change processes involve bargaining, raising awareness, persuasion, discipline, influence and power. A new organization ideology is the outcome goal. Collective

bargaining, empowerment, political organizations and Marxist theory are examples of this change model.

5. Social cognition change – this model describes organizational change as being tied to common sense and other mental reasoning such as appropriateness or dissonance. The change process occurs as individuals see a need to grow mentally learning new ways of doing things or changing their behavior or way of thinking as they look through different lenses or use alternative thought paradigms.
6. Cultural change – occurs slowly over a long time period as human environments are changed along with values, beliefs, myth and rituals within an organization. Changing an organizational culture is a non-linear and unpredictable process that if successful can result in an improved social culture within a group.

Kezar (2001) concludes in this categorization of organization change theories that many of the assumptions from these models can coexist in other theories and that combining several theories may be necessary to better understand organizational change.

2.2.9.4 Organization Development within a University

Kezar (2001) further describes the importance of understanding the nature of Higher Education as a key to successful organization development and change at a college or university. Overlooking the unique nature of university organizations may lead to using a planning concept and change strategy that is foreign to the institution. This in turn may lead to a failure to engage university leaders critical for accomplishing the goal or the bringing about a needed change. The following characteristics unique to university organizations must be considered when assembling a committee to accomplish an important task such as pandemic planning, especially if the task involves functioning outside normal university operations.

Thirteen characteristics of higher education institutions, as defined by Kezar (2001), describe these organizations as:

1. Interdependent
2. Relatively independent of their surroundings
3. Having the unique culture of the academy
4. Striving for Institutional status
5. Values driven
6. Multiple power and authority structures
7. Loosely coupled system
8. Organized, anarchical decision-making
9. Professional and administrative values
10. Shared governance
11. Employee commitment and tenure
12. Goal ambiguity
13. Image and success

Because of these distinctive organizational features, Kezar (2001) suggests that affecting change within institutions of higher learning might best be accomplished by following the more cooperative, social, humanistic and values driven theories of cultural, social-cognition and dialectical change.

Schein (2004) in another description of organizational development writes that effective groups or committees in any business need to have a shared organizational culture. At a university, this shared culture determines the criteria for leadership and establishes the rules and norms that determine group behavior. In a university setting, leaders must perceive and strive to

understand the functional and dysfunctional elements in the institutional culture. Very often, universities perform work and planning within the scope of committees. Managers work within these committees when trying to change the necessary elements to accomplish the task at hand. Effective committees at a University need the commitment of top administration and participation by unit managers with the authority to make things happen.

2.2.10 Organizing a University Emergency Planning Committee

To assist university administrations in developing Emergency Planning Committees, the Centers for Disease Control and Prevention (CDC, 2012) and the Federal Emergency Management Administration (FEMA, 2013) included guidelines for committee development in their published recommendations for schools. The CDC and FEMA recommend that university pandemic flu committees in conjunction with the institution's emergency management committee, like many other institutional planning groups, need the buy-in from the administration and ongoing cooperation of all department stakeholders at the school including; Student Affairs, Academic Affairs, Employee Relations, Housing, Food Service, Facilities Management, Student/Employee Health and Environmental Health and Safety.

When organizing this multi-disciplinary committee, working groups should be established within the committees to begin detailed planning for student considerations, research continuity, academic considerations and administrative operations. The committee should also maintain liaison with local, state & federal or international agencies involved with pandemic planning, health care and other emergency management operations.

Many universities, along with the communities in which they reside, have been involved with emergency planning for many years to address other events such as fires, floods, storms and

other natural or man-made disasters that affect the campus. Managing these kinds of emergencies, although somewhat different from a pandemic or campus health crisis, can provide a solid framework for pandemic flu planning. Blanchard (2005) discusses a general framework of 10 competencies that all organizations, including universities and colleges, that are involved in emergency management planning should include to enhance program development. He considers it a mistake for an organization to appoint individuals to emergency management leadership positions who do not have a solid understanding of these competencies.

1. Comprehensive Emergency Management Framework or Philosophy – A comprehensive emergency management plan takes an "all hazards" approach to planning developed by the FEMA that includes provisions for dealing with a broad range of hazards likely for that organization to encounter (weather, fires, violence, pandemics, etc.). These provisions and individuals should be adaptable to a variety of disaster scenarios during all phases of an incident response taking into consideration the hazard mitigation, prevention and readiness needs of each.
2. Leadership and Team-Building – Building a good emergency management team and installing a competent leadership structure is critical for effective response in a crisis. Blanchard (2005) discusses the importance choosing a strong leader in an organization who can quickly establish a command presence along with demonstrating vision, compassion, flexibility, resolve and courage. These leaders must surround themselves with competent and enthusiastic team members who are able to think and act quickly and decisively to break down bureaucratic barriers for moving people and resources to where they are needed. Probably one of the hardest jobs of an emergency plan leader is to convince the administration how important it is to commit the time, money and resources

to developing a plan, ordering supplies, training people and conducting practice drills. Without this commitment, even the best paper plans will fail when the disaster hits.

3. Management – No matter how good the Emergency Plan leader may be they will always need to have a good organization behind them to perform effectively. During a crisis, Blanchard (2005) reiterates the importance of strong group leaders, each competent in their area of responsibility and supported by a team of well trained and experienced staff drilled on their roles during a crisis. The members of this emergency management team may vary to some extent depending on the emergency response needed but a core team of all hazard planners consisting of key organization leaders should be maintained capable of coordinating and managing responders from both inside and outside an organization.
4. Networking and Coordination – Within an organization, Blanchard (2005) admits that the designated Emergency leaders along with their core management team usually have other duties not involving emergency planning or response. This is true of most private and public organizations as well as federal, state and local governments and non-government organizations like the Red Cross or Salvation Army whose job (role) it is to provide assistance in crisis situations. Many of these organizations are used to dealing with minor emergency situations on a regular basis, having the staff and resources at hand for a quick response without outside help. However, the need for ongoing networking and coordination becomes apparent when a major crisis or widespread disaster occurs. So often in these situations the lines of communication become crossed and responsibilities are blurred leading to confusion, over-reaction, mismanagement and ill feelings during and after the fact. Blanchard (2005) recommends that all organization have provisions in their emergency plan to network with other agencies in their community and beyond

sharing their capabilities and resources that may be called upon in a crisis situation. This networking plan should include the names and contact information for groups or individuals that can be called upon when needed. Frequent contact with these individuals is recommended along with periodic joint disaster drills that should be planned so everyone knows their role when an emergency arises providing a reliable and coordinated response.

5. Integrated Emergency Management – Effective emergency management, especially during a major disaster or wide spread crisis goes beyond the organization's planning committee and public safety responders. Sometimes, as Blanchard (2005) states, an effective response and recovery plan requires the integration of other groups both inside and outside the organization. Companies or volunteer organizations involved with public works, utilities, transportation, housing, food service and medical care may be needed to deal with infrastructure breakdowns, equipment and supplies or large numbers of displaced persons. Also it may be necessary to call upon crisis management specialists to handle ongoing planning, mental health interventions, vaccine development and administration or relocation demands.
6. Emergency Management Functions – Numerous functions are typically rolled into the emergency management plan and may change (increase or decrease) frequently due to an evolving crisis. Blanchard (2005) lists a number of critical functions that should become central to any organizations emergency plan. The first function involves completing a risk assessment to prioritize the hazards most likely to be encountered by an organization. The next step is to develop a comprehensive plan for dealing with the higher risk scenarios incorporating prevention, protection, mitigation, response and recovery plans

into the organizations emergency operations. A third step requires committing time, manpower and resources into training personnel and conducting emergency drills and table-top exercises to assess capabilities and identifying shortfalls. Next, every organization must establish a formalized command structure to clearly establish responsibilities, expectations and lines of communication. Based upon this organizational structure and function, a centralized command center should be established as a secure base of operations housing all of the emergency plans, alternate power supplies, computers, radios, back-up communication equipment and other infrastructure necessary to managing a crisis scenario for an extended period. Finally, emergency managers must keep current with emergency research and the lessons learned by other organizations experiencing a crisis as well as updates to federal, state and local emergency management programs.

7. Political, Bureaucratic, Social Contexts – As with almost every aspect of life in the U.S. Emergency Managers and their organizations must deal with the political, bureaucratic and social aspects of emergency planning. Remembering the SITAR planning theory, every plan developed no matter how comprehensive and well-conceived will be open to criticism and perhaps to demands that key provisions be changed to make them more politically correct and socially acceptable to influential groups. Blanchard (2005) cautions that emergency planners must be sensitive to these issues, realizing that they may be required to operate under certain constraints understanding how some individuals or groups might react to disasters.
8. Technical Systems and Standards – Organizations and individuals involved with emergency preparedness must become familiar with the language, key regulations,

federal documents and technologies that have become integral parts of emergency management. Some of the principle documents and legislation include; the National Incident Management System (NIMS), the National Response Plan (NRP) and the National Fire Protection Association (NFPA) 1,600 "Standard for Disasters and Emergencies." Various competency exams and certifications in emergency management are available to demonstrate proficiency in these areas. In addition, advances in computer software programs, geospatial technologies (GPS and GIS) and satellite communication systems are available to help emergency managers and planners keep track of resources and instantly communicate with responders or others during a crisis. Even advances in social media via cell phones and the Internet such as Facebook, Twitter and others can be used and has proven useful to communicate emergency messages, warnings and instructions to persons likely to be in harm's way during a crisis.

9. Social Vulnerability Reduction Approach – In almost every disaster scenario there is always a group of individuals considered to be the most vulnerable in a crisis. Advocacy and radical planners would tend to focus their efforts on assuring that the vulnerable groups are considered a priority. While most other planning theorists would not exclude these vulnerable groups from their planning efforts, many, especially the synoptic and incremental (technocratic) planners might focus more on assuring that greater numbers survive a disaster by making effective use of the resources for that purpose. Blanchard (2005) alludes to a technocratic "label" that is often given to emergency management instruction by academic programs based on their teaching responders to rely on the traditional governmental management of disasters. Many of the federal standards listed in No.8 above call for maximizing technological and engineering solutions to disasters

while reducing emergency risks that lean towards maximizing benefits often ignoring the more vulnerable populations.

10. Experience – Blanchard (2005) expounds on FEMA's three keys to emergency management as education, training and experience (preferably disaster experience). One fact that all emergency managers must learn is that the standard bureaucratic operating methods, taught in academic classes and FEMA courses, might not work in all disaster scenarios and that it is often necessary to operate outside of the normal business constraints to achieve better objectives in a disaster response. Learning alternative emergency response techniques usually happens through first-hand experience and several agencies including FEMA and the Red Cross are helping academic institutions to develop this experiential learning through internships, FEMA service learning, exercise participation and volunteer training by disaster response organizations.

2.2.11 Emergency Planning Framework (10 Principles)

In their book on emergency planning, Perry and Lindell (2003), discuss how important it is for emergency planners in the U.S. and elsewhere to focus less on the plan as a written document and more on the planning process itself. While a written plan can serve as the basis for training programs and revising or expanding the plan to meet other needs, emergency planners should continually be involved in a process to 1) expect the unexpected, 2) plan for contingencies, 3) evaluate the University's or Community's ability to respond to various disaster scenarios and 4) consider the application of more than one organizational change theory or planning tradition to achieve a better plan.

Quarantelli (1982), along with Perry and Lindell (2003), developed a framework of 10 principles to assure that organizations had guidelines to follow for maintaining an emergency planning process. The first principle states that the emergency planning process should be "based upon accurate knowledge of the threat and the likely human response" (p.340). This principle may be accomplished via a thorough hazard assessment and vulnerability analysis assuming that sufficient information and technology is available to establish a credible risk. Insufficient data and speculation can result in faulty predictions, over or underestimated hazard assessments and wasted resources. In estimating the human response during disasters, several myths should be dispelled (Perry and Lindell, 2003). Despite what is often perceived by the general public, the media and public officials, disaster victims usually act rationally once given information about the disaster. "As a familiar saying goes, the problem is not so much that people do not know what is true, but what they do 'know' is false" (Perry and Lindell, 2003, p.341). In an emergency situation, the majority victims do not flee in panic, wander aimlessly in shock, or comply docilely with instructions from first responders. In an emergency, victims or citizens will more likely make their own decisions on when and where to evacuate, how to seek assistance or when to provide help. Statistics show that after a disaster, panic and civil disobedience can often be controlled if people are given clear, trustworthy information by emergency personnel, officials or the media (Perry and Lindell, 2003).

A second planning principle encourages quick, appropriate actions by emergency managers. Quarantelli (1982) argued that an appropriate response, based on valid information, was more crucial than an impulsive one done quickly. Perry and Lindell (2003) added that an accurate threat assessment is critical to assure an appropriate response and that the assessment should be initiated during the planning phase and continued throughout the disaster period.

Rushing into a dangerous situation based on bad assumptions or incomplete information can result in an ineffective response at best, or worse, to serious injury and death of unprepared emergency crews. The discipline among emergency responders created by an effective planning process where the hazards and the response techniques are well known and practiced may save both lives and property (Perry and Lindell, 2003).

The third principle for effective emergency planning states that it is impossible to cover every contingency given the dynamics situations created during an emergency. Planning instead should focus on the "principles of response" rather than trying to detail a specific response for every situation (Perry and Lindell, 2003). The planning process should emphasize flexibility among crews along with preparations and sufficient training to enable responders to adjust to changing conditions during an emergency or disaster. In addition to the difficulties of trying to address every contingency with an elaborate written plan, experience has shown that many details can become outdated quickly. Also, an overly detailed plan often is too complex and confusing to responders and difficult for managers to implement making it an unreliable plan in an emergency and difficult to use for training exercises.

Given the facts that an emergency situation or disaster may involve multiple outside agencies including law enforcement, hospitals, public health departments, the military, the Red Cross and other emergency managers, the fourth planning principle calls for the plan to address inter-organizational coordination (Perry and Lindell, 2003). Ideally, all of the participating organizations will know their roles and will work together so that each can successfully complete their responsibilities during an emergency. This coordination among responding organizations will more likely function well if each group is aware of each other's mission, structures, capabilities and limitations that have been vetted during the planning process and enhanced via

joint training exercises. During the crisis situation it is important that the plan has clearly established the chain of command and that the incident commander knows who is on scene and has good lines of communication with each group to effectively allocate their skills and resources where most needed.

The fifth emergency planning principle presented by Perry and Lindell (2003) details the importance of integrating all single hazard plans likely to impact a community or organization into a multi-hazard plan better enabling comprehensive plan management. Quarantelli (1992) describes how the same emergency response functions can be utilized in many different emergency scenarios and by consolidating these functions into a multi-hazard plan can simplify training, eliminate redundancy and reduce costs.

The sixth disaster planning principle describes the importance of every emergency plan having a training component. Because of the many different individuals and organizations that may be involved in a planning process either directly or indirectly, it is critical that provisions of the plan be explained to everyone involved in the response (Perry and Lindell, 2003). In addition to administrators and employees of response organizations participating in training exercises, it will be necessary to share planning provisions with elected officials, the business community as well as private citizens explaining what might be expected of them in an emergency. This public notification is especially critical to educate non-responders to inform them of anticipated risks or safeguards that they can take when preparing for an emergency such as stocking supplies, sheltering in place or evacuation details.

The seventh planning principle calls for frequent emergency drills and exercises to enable plan managers to critically evaluate response operations for various types of disasters (Perry and Lindell, 2003). These disaster response examinations also bring each of the agencies and teams

together to test their capabilities, efficiencies, personnel, equipment and procedures. The drills also provides an opportunity for these groups and individuals to become familiar with each other, perhaps establishing lasting personal or professional relationships that may enhance their emergency response capabilities.

The eighth emergency planning principle proposed by Perry and Lindell (2003) stresses that this process be a continuing effort. No planning process can be static as situations are always changing and it becomes critical to address the changes in every emergency planning effort. Planning is never complete as threats change, equipment improves, personnel move on, organizations change, available funding disappears and lines of authority are moved. While planning does involve written documentation and threat probabilities, procedural checklists resource lists, agreements and records need to be defined, the plan always need to be more than a paper document on a shelf. Perry and Lindell (2003) describe elements of the emergency planning process that are difficult to put into writing such as, developing first-hand knowledge and experience, knowing the available resources of government and private experts, honing skills for anticipating demands and matching them to available resources, establishing workable links across organizational gaps and having the people skills to resolve personnel conflicts and getting people to work together. Treating the written plan as an unyielding end product risks creating the illusion of being prepared for any emergency when that may not the case (Quarantelli, 1977).

The ninth principle for emergency planning cautions that it is almost always conducted in the face of conflict and resistance (Quarantelli, 1982). Many politicians and citizens avoid thinking about the negative consequences of disasters hence they often remain badly unprepared. Politicians and some organization officials are prone to state that preparing for an unforeseen event consumes precious resources that prevent improvements to areas that they perceive as

more important to the organization or community (Perry and Lindell, 2003). Unfortunately, most of these politicians or managers control the purse strings and emergency managers trying to free-up money to complete a planning process or training exercises are in for a struggle.

Finally the tenth principle for emergency planning proposed by Quarantelli (1985) and others states that the emergency plan should recognize that planning and management are two separate functions and that the true test of a plan will occur when it is activated during an emergency. Quarantelli (1985) goes on to state that planning reviews and revisions are crucial to preparedness requiring planners to continually;

1. Identify the hazards most likely to impact the community.
2. Evaluate the seriousness and probability of these impacts.
3. Define the geographical area or population at greatest risk.
4. Identify the demands that a disaster would have on emergency responders and
5. Estimate the resources (personnel, facilities, equipment and materials) required by the organization during the emergency.

Management of an emergency, by contrast, involves performance during the event as measured by how well implementing the emergency plan has provided the corrective, protective, response and recovery actions demanded by the emergency (Perry and Lindell, 2003). These afore mentioned authors go on to state that having a written plan does not assure preparedness, but that by going through the planning process, an institution can begin to realize where the main threats lie and how to effectively organize the knowledge, guidelines and resources that can be used to prepare for and manage an emergency response to a variety of crises.

2.2.12 Pandemic Planning Guidelines for Colleges and Universities

Over the decades, comprehensive (Synoptic) pandemic influenza plans have been established by many governmental or health management organizations at the international, federal, state and local levels (IOM, 2008; WHO, 2009; CDC, 2010; DHS, 2006; PA DOH, 2013; ACHD, 2002; UPMC, 2006). Each year the Institute of Medicine (IOM), The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) hold discussions about the coming influenza season (IOM, 2008). Based on these discussions and the forthcoming recommendations, state and local health departments, medical institutions and other organizations rework their influenza plans. Details of the planning include the specific design and availability of this year's seasonal flu vaccine, mandates for hospital staff immunizations, the management of significant staff illness and how to avoid the deaths from seasonal flu of between 20,000 and 40,000 people nationwide resulting in billions of dollars of lost productivity. Also included in these discussions are the possibilities of a pandemic influenza, which have occurred every 10 to 50 years since the 1890s resulting in even greater losses of life and enormous costs (IOM, 2008).

Influenza season in the northern hemisphere typically runs from November to May. Two groups of flu viruses (designated A and B) are responsible for causing seasonal flu infections in humans. All pandemic influenzas to date have been caused by Type A viruses. All flu viruses consist of only eight genes, two of which make the antigenic proteins on the surface of the virus (Kaplan, 2015). Influenza A viruses are further broken down into subtypes based on the number of antigenic proteins hemagglutinin (H) and neuraminidase (N) present on the virus's surface. The H protein allows the virus to attach itself to the cell membrane and enter the cell where it goes on to replicate. The N protein allows the replicated viruses to break out of the host cell

spreading to other cells. Currently there are 18 different hemagglutinin and 11 different neuraminidase viral subtypes (Kaplan, 2015). The predominant flu virus subtypes that have recently sickened humans are influenza A (H1N1) and Influenza A (H3N2) (Minnesota DOH, 2011).

Influenza viruses like many microorganisms frequently undergo slight mutations forming novel subtypes that can infect humans as well as birds and other animals. This can occur rapidly when the influenza viral proteins realign by a process known as antigenic drift creating a completely different strain of flu virus. When these mutations occur, manufactured vaccines for that flu season are rendered ineffective, opening the door for a serious seasonal flu epidemic or even a worldwide pandemic (Minnesota DOH, 2011).

In 2003, the seeds for an influenza pandemic were planted when a highly pathogenic avian flu virus (H5N1) from Asia began infecting poultry and pigs and killing numerous people processing these animals. (Barnett and Balicer et al. 2005). Migratory birds were also found to be spreading this same virus throughout Europe and Asia elevating the risks of even more protein re-assortment possibly setting the stage for another swine flu pandemic (H1N1) that occurred in 2009 (Kaplan 2015).

Since then, the avian flu virus H5N1 has been joined by several newly detected bird flu strains (H5N2, H5N3, H5N6 and H5N8) presently spreading around the globe (IB Times, 2015). In 2013, doctors in China discovered yet another new strain of avian flu (H7N9), which has killed more than 30% of the people it infected. As this strain has recently been confirmed of also infecting people in Malaysia and Canada, scientists believe this avian virus has great potential to cause the next influenza pandemic. (Kaplan, 2015).

In 2006, The Department of Homeland Security (DHS) developed a landmark 78 page document entitled “Pandemic Influenza Preparedness, Response and Recovery” as part of the US Government’s national pandemic preparedness strategy. It was a comprehensive guide to identifying critical infrastructure and key resources to aid communities and businesses in developing their pandemic contingency plans and preparedness actions (DHS, 2006). This guideline assembled many primary national and international flu references and other background information into one document with the hopes of stimulating the private sector business community to develop their plans for influenza preparedness, response and recovery. The document also tabulated the WHO pandemic flu phases alongside the U.S. Federal Response Stages to compare the recommended response actions to be taken during each phase of a pandemic outbreak (DHS, 2006).

Given their assessment in 2005 that 85% of critical infrastructure resources are controlled by the private sector and realizing that few business contingency plans had identified pandemic flu as one of their major concerns, the U.S. Government realized the need to alert the business sector about the extreme health impact and the inadequacies of their current emergency plans (DHS, 2006). In this pandemic influenza guidance document, the business community was informed of their roles and responsibilities during the flu outbreak and told how important it was to protect critical infrastructure, key personnel and resources essential for maintaining priority services for themselves as well as their community partners. Private sector planning must be well coordinated and critical information shared with both private and public entities throughout the community if they expect to achieve a good outcome during an influenza pandemic (DHS, 2006).

Another, comprehensive (synoptic) pandemic influenza response plan was formalized into law by Congressional passage of an updated Pandemic and All-Hazards Preparedness Reauthorization Act (PAHPA) of 2013. As discussed earlier, the goals of the PAHPA were to further streamline the federal public health response, to hold states and local agencies accountable for their performance, to facilitate volunteerism, and to ensure the expedient deployment of medical countermeasures where needed (Hodge et al, 2007). According to Hodge et al. (2007), critics of the Act contended that it lacked specifics on how these goals were to be met and provided few incentives for state and local agencies to commit resources for improving their public health emergency preparedness.

Since 2003, many colleges and universities have utilized portions of these synoptic (comprehensive) government designed influenza plans in concert with their own planning traditions to address specific goals, policies, traditions, values, sensitivities and budgets of the academic community (Pitt, 2007; CSU, 2009; Ithaca, 2009). As previously mentioned by Dooris (2002-2003), comprehensive strategic planning became popular on university campuses during the late 1980s into the 1990s. Since that time, university administrators have realized that "what comes up is as important as what is planned," especially regarding emergencies, and that links to multiple levels of planning may be necessary (Schmidtlein, 2001, p.418). With this idea came the realization that strategic planning, focused on the overall mission and vision of the university, may be too long range and complex to meet the goals, objectives and flexibility of undefinable emergency and pandemic influenza plans. Given the unpredictability of pandemic influenza and the fluidity of responses required, a blend of tactical, operational and contingency planning may be better suited to fill the rapidly changing needs of a pandemic threat.

In keeping with the goals of strategic planning, Pirtea, Nicolescu and Botoc (2009), in their article on that subject, point out that higher level planning can highlight an organization's unique strengths and weaknesses "enabling it to pinpoint new opportunities or the causes of current or projected problems" (p.956). Recognizing that tactical, operational or contingency plans driven by the long-range perspective of strategic planning and utilizing the tactics of internal and external scans plus SWOT analyses focused on the school's ability to respond to a pandemic emergency as being invaluable (Pirtea, et al., 2009). It would be shortsighted for any college or university not to take a close look at the strengths, weaknesses, opportunities and threats both within the school itself and in the surrounding community when making their plans for dealing with a pandemic flu emergency (Zubair, 2006). The CDC's (2006) pandemic flu checklist for colleges and universities identifies several SWOT issues to consider when planning:

1. The availability of on campus medical facilities and staff
2. The expertise and dependability of key stakeholders expected to execute the plan
3. The logistics of promoting and administering flu vaccinations
4. Stockpiling quantities of non-perishable foods and other needed supplies
5. Budgeting and financing for a pandemic influenza outbreak
6. Responding to outside pressures brought by government authorities
7. The adequacy of facilities to house, feed and care for sick students and staff
8. Maintaining adequate staffing to operate the university and care for sick students
9. Deciding when to shut down university operations
10. Contingency plans for research involving animal housing and care

Another key point that all colleges and universities must consider in their pandemic influenza planning is how to link the plan to their budget. Schmidtlein (2001) relates that

different levels of planning have differing budget implications. Given the unknowns surrounding pandemic flu planning, this issue has proven difficult for some academic institutions particularly at the strategic levels of plan management. Budgeting becomes easier at the operational level of the plan where short range objectives are established and prioritized. Once the short term objectives have been set and the goods and services needed for each department or program determined, including some contingency funds, the budgeted resources can be estimated and the source of revenue determined. As with any budgeting process some of the plan's stakeholders will not be satisfied with their allotted funds requiring the plan managers to negotiate and reconcile competing claims with the available resources (Schmidtlein, 2001).

In 2005 the World Health Organization (WHO) developed a global influenza preparedness plan from which most state and local health department along with many colleges and universities as well as businesses and health systems utilized in their plans (MacKellar, 2007; WHO, 2005). The WHO Plan divided the influenza cycle into three periods and six phases as follows (MacKellar, 2007, p. 433, Colorado State, 2007).

1. The Inter-Pandemic Period
    i. Phase 1 - Animal cases somewhere in the world but low risk of human cases
    ii. Phase 2 – More animal flu with higher risk of human cases
2. Pandemic Alert Period
    i. Phase 3 – Animal to human flu cases but limited human to human transmission
    ii. Phase 4 – Evidence of increased human to human transmission
    iii. Phase 5 – Significant human to human flu transmission
3. Pandemic Period
    i. Phase 6 – Efficient and sustained human to human flu transmission.

The first test of many U.S. pandemic flu plans occurred in March, 2009 when the CDC and WHO declared a flu emergency in Mexico (CDC, 2010). During the 2009 flu pandemic, implementation of influenza preparedness plans at many colleges and universities identified a number of shortcomings that could seriously impact a plan's effectiveness (CDC, 2012). Factors that the CDC stated must be considered during future flu pandemics at a college or university included:

1. Infection rates among college students living in dorms and attending crowded classes approaching 40% will seriously affect student housing, food preparation and other school operations.
2. Virulence rates and duration will be unpredictable but, with this H1N1 flu strain, young adults age 16-24 are expected to be in one of the higher risk groups.
4. Plans for communicating flu risk to faculty, staff and students around the U.S. will range from non-existent to over reactive leading to panic, uncertainty, apathy, mistrust, perceptions of incompetence waste, and a lack of empathy.
5. Frequent false alarms with mild flu outbreaks will lessen the impact of warnings and the call for protective measures when the "real" pandemic hits.
6. Protective masks, gowns and hand sanitizers were in short supply at some schools in 2009 and now unused stockpiles are likely to deteriorate in storage.
7. Infected students and others who begin shedding the flu virus two days before they begin showing symptoms will increase flu spread and make relocation or isolation plans ineffective.
8. Flu vaccines and anti-virals, initially in short supply in 2009 and stockpiles of future vaccines could prove ineffective depending on the next flu strain and its likely mutations.

9. Students, faculty and staff will continue to be reluctant to receive vaccinations fearing side effects or negligent in their responsibility and willing to take the risk of getting sick.
10. CDC recommendations for "social distancing" and quarantine of infected persons may not be followed consistently or effectively when the next flu hits.
11. Absenteeism of faculty and staff due to illness, care of family members or fear of being exposed to sick students will threaten to close institutions or seriously impede school operations.
12. While some faculty, staff and administrators may not be essential, especially if school operations are suspended, Key personnel, such as healthcare employees along with service workers and security personnel may be critical to care for sick students and others not able to return to their homes after the pandemic hit. These personnel will be relied upon to implement the school's Pandemic Plan and carry out key functions of the university.

"Being ready for an influenza pandemic requires "having the necessary resources to minimize morbidity and mortality" (IOM, 2008, p. 171). The IOM (2008) suggests that the use of personal protective equipment (PPE), including the development of a next generation of comfortable and serviceable PPE, be advanced so that workers "will feel secure enough to come to work, work effectively, and return to their loved ones during an influenza pandemic" (IOM, 2008, p. x).

Addressing the need for a pandemic plan and preparing for the unknown the IOM further recommends a coordinated planning approach that incorporates local, national and international thinking to fill the numerous gaps in preparing for pandemic influenza including local healthcare team development, coordination of federal and state efforts and a renewed commitment to better

network international research on the transmission and prevention of pandemic influenza (IOM, 2008).

Several more lessons were learned from the 2009 Pandemic Flu Outbreak (Low & McGeer, 2010).

1. While the death toll from the HINI pandemic flu was no higher than a typical seasonal flu, the years of life lost were higher because of the young age of the victims.
2. This communication of risk to the public was not emphasized or widely accepted.
3. The development and production of flu vaccine was slower than projected.
4. When there was an adequate supply of vaccine available, miscommunication about its safety and the waning risk factors slowed its distribution and administration.
5. Most of the flu vaccine produced went unused resulting in a waste of money.
6. Flu planning efforts at all levels must focus on learning to deliver a consistent, truthful and believable assessment of risk to affected populations.

Organizations worldwide, particularly colleges and universities must learn from these lessons and modify their emergency plans accordingly to prepare for the next pandemic that is coming.

2.2.13 University Business Continuity during a Flu Pandemic

No discussion of emergency planning, pandemic influenza planning or planning practice in general would be complete without mention of business continuity, i.e. maintaining the critical operations of an institution during times of trouble. Not only is business continuity important during a flu pandemic on a university campus but many aspects of a continuity plan would be essential the same for all businesses or institution during many kinds of emergencies and

disasters, natural or man-made. On a college campus, fires, floods, winter storms, explosions, shootings or the threat of an infectious disease can be equally devastating, requiring the shutdown of buildings, key utilities, and disruption of class activities or communications and essential services making it necessary to partially or completely close down university operations.

Comprehensive coverage of business continuity on a college campus is very complex and would require a dissertation of its own, which is not the intention of this document. But failing to mention it at all as part of university emergency preparedness discussion would be equally unacceptable, so critical aspects of maintaining business continuity during a pandemic flu on campus should be included.

As discussed by CIDRAP in 2009, maintaining the operation of a college or university during a flu pandemic will require the combined efforts of most members of the emergency planning committee, especially representatives from, human resources, legal services, facilities management, safety and security, faculty and research compliance to address the following issues.

1. Setting HR policies to minimizing unauthorized absenteeism while separating sick and healthy employees.
2. Maintaining safe and clean housing and adequate food services for students and essential personnel remaining on campus.
3. Providing medical screening, training, protective equipment and infection control supplies and treatments to students and employees as need.
4. Establishing and enforce policies on social distancing, quarantine, medical screening, travel and communication with the media.

5. Deciding when it is time to send healthy students home before the first wave of flu hits.
6. Arranging with faculty and IT personnel to expand off campus learning capacity and establish rules for attendance, class participation, exams and grades.
7. Cross training employees to provide ongoing coverage of essential jobs and services.
8. Maintaining open lines of communications between public health officials, community partners, medical personnel, employees, faculty, students and their families.
9. Setting activation triggers to close child care facilities, shut down campus buildings, suspend classes, stop research activities, postpone athletic events and cancel social gatherings as the pandemic wave accelerates.

Unlike many other campus emergencies due to natural disasters, human resource departments will have some of the more difficult personnel tasks surrounding a pandemic flu on campus.

2.2.14 Working Model for a University Pandemic Preparedness Plan

This "Pandemic Preparedness Plan" was initially developed in 2007 as an appendix to the "University's Emergency Response Guidelines." The University's plan was based on a 2006 DHS/CDC pandemic flu planning checklist for colleges and universities, which has been updated each year to address changing needs at the school, evolving CDC recommendations and the latest worldwide pandemic threat assessments. The initial working group, under the guidance of the Executive Vice Chancellor and supervised by the Director of Environmental Health and Safety (EH&S), was tasked to develop a pandemic flu plan that was broad enough in scope that it could also be used for any infectious disease outbreak on campus. The multi-disciplined Pandemic Workgroup, consisting of stakeholders at the University and beyond, was divided into

four subgroups to closely examine and develop key segments of the plan dealing with 1.) Student Preparedness, 2.) Research Continuity, 3.) Academic Considerations and 4.)Administrative Operations.

Each workgroup was asked to identify "triggers" that would initiate various responses of the plan in their segment of responsibility. Realizing the likelihood that clearly defined triggers may not be apparent in all flu outbreaks, a continuum of increasing response decisions (stages) was established that could be invoked dependent on several factors including;

1. Government advisories or travel restrictions
2. Disease outbreak near a University campus
3. Disease severity
4. Death or morbidity rates
5. Response by the public
6. Degree of social unrest
7. Timing within the academic calendar
8. Peer institution reactions and positioning
9. Response or reaction of local institutions.

Each trigger could evoke a dynamic response by the committee as needed by the circumstances. The University Pandemic Preparedness Plan identifies five Response Levels (A through E) based on the six WHO Phases and Federal Government Response Stages as defined by the Department of Homeland Security (2006) and the Centers for Disease Control and Prevention (2014). The pandemic flu response levels and actions include:

A. Planning Level; anticipation that a pandemic flu outbreak is possible will prompt;

- Updates to emergency contact information for students, staff, faculty and their families.
- Continual tracking of WHO and CDC influenza surveillance activities.
- Opening discussions with Working Groups on a flu plan review.
- Considering options for an enhanced flu vaccination program.
- Updating portions of the University's Emergency Plan as needed.
- Consideration of table-top exercise to test flu preparedness on campus.

B. High Alert Level; confirmed cases of human to human pandemic flu transmission anywhere in the world may initiate;

- Updating the University website linking the University to influenza experts at WHO, CDC, the county or state health department and the local medical center (s). .
- Focused attention to government directives, travel advisories and reports on flu severity to include identifying faculty, staff or students traveling on University business. This alert may also call for travel restrictions, alerting individuals to the concerns and screening or quarantine of individuals prior to returning to campus.
- Fortifying lines of communication between students, parents, staff and faculty to include website updates, print, e-mail, cell phone alerts, posters and select social media sites with a telephone hotline to include options for parents locating students, academic schedules, travel restrictions and health advisories.
- Reviewing the "Preparedness Guide for Researchers" questionnaires that were completed by PIs or Lab Managers to analyze their research activities and

determining the requirements that may arise during a pandemic needing departmental attention to maintain research continuity as much as possible.

- Preparing periodic responses to address media questions on preparedness.

C. Full Alert Level; Heightened fears over confirmed reports of pandemic flu transmission spreading locally between humans within driving distance of any University campus will initiate;

- Social distancing considerations to reduce the spread of illness that may involve cancelling extracurricular activities and the temporary suspension of lectures and classroom sessions.
- Efforts to reduce the demand for on campus housing, food service and medical care will be made. Those living off campus will be encouraged to shelter in place avoiding crowds and leaving apartments unnecessarily.
- Encouragement of local students to return home if possible, maintaining coursework activities via distance learning where practical. Alternative plans for well students unable to return home may require special dormitory isolation or relocation to off campus homes of friends or relatives.
- Efforts to care for out of state or foreign students living in campus housing will be made with minimal food and housekeeping services provided. If possible, accommodations will be made to allow parents to retrieve their students from campus by methods similar to the “arrival survival” process, a coordinated effort that takes place during student move-in/move-out days.
- Modification of absenteeism policies during this period anticipating staff and faculty absenteeism between 10 and 25%. Essential personnel have been

identified and these individuals will be expected to work if at all possible. Any University employees showing sign of flu-like illness will be asked to leave campus and not permitted to return without a medical clearance.

- Modification of academic policies by the Chancellor, Provost, Deans, and others taking into consideration the point in the academic year when the social distancing mandate was enacted, scheduling of classes, student matriculations, available distance learning technologies, tuition reimbursement and the ability to disseminate information to students.
- Activation of the emergency command center for University Officials at a secure pre-established facility to enable enhanced communications with faculty, staff, students and parents via the University's emergency notification service and home page. In addition, activation of the command center will permit better coordination with local, state and federal officials responsible for implementing community wide response and recovery efforts during a pandemic emergency.
- A decision to officially suspend classes will be made by the Chancellor, Provost and regional campus presidents when the risk of contagion is deemed unacceptable or when student or faculty and staff absenteeism reach levels that no longer support academic endeavors. Even if classes are cancelled, faculty may be expected to continue teaching and research activity to the extent possible per University policies. Class credit and grades may be decided by individual faculty members and their deans or department chairs depending whether classroom assignments can be satisfactorily completed by alternate means.

- Students who become sick or are affected academically by the suspension of classes will be given multiple opportunities to complete their course work via distance learning or on line programs. Students choosing not to continue with classes in this fashion can withdraw from the class and be reimbursed or take a G grade that allows them to complete the class in the future. Other options for students exist and can be discussed at the department level given these circumstances.
- Faculty or staff who become ill or take off to care for a sick family member must comply with defined University sick leave or family medical leave policies.
- Some academic and business operations such as distance learning and study abroad programs may be unaffected by the pandemic allowing these efforts to proceed normally.

D. Pandemic Period; when pandemic influenza or another illness is efficiently spreading at the University or in nearby communities this response level will include provisions for;

- Suspension of University operations to the minimal levels required to maintain security, to support students remaining on campus, to sustain research projects and to protect buildings or critical infrastructure.
- Departmental planning to perform minimal operations with 40% or less staffing for a period of 6-12 weeks to sustain minimal operations. Additional absenteeism can be assumed due to illness at home and fears of 5% mortality from not practicing social distancing on the commute to work.
- Maintaining research continuity while seeking extensions of grant funding and agency reporting requirements due to unavoidable disruptions related to the

pandemic. Specific issues such as controlling critical environments, regular monitoring of research subjects and caring for research animals are critical to maintaining research continuity. The University will endeavor to establish criteria for allowing some levels of research to continue during the suspension of operations as defined in this plan. These issues will be clarified with University officials and the grant agency.

- Maintaining and securing University building throughout a pandemic period will fall to Facilities Maintenance, Public Safety, Housing and Property Management personnel deemed essential staff. Heating, cooling, water supplies, computer networks, communications and emergency systems and sanitary facilities for faculty, staff and students remaining on campus along with research animals are considered essential functions needing to be maintained in working order and secure.

E. Management of Flu Cases on Campus includes the following provisions;

- Faculty, staff and students who become ill should utilize their individual health care plans if possible going home and staying isolated until they are no longer infectious.
- If there are sick students in campus dormitories who are unable to return home during this period and local medical facilities are unwilling to accept them, the University will relocate them to small residential facility where they will be isolated and cared for by Student Health Services personnel along with support from Housing, the University Police and Environmental Health and Safety.

- Students living outside of university residence halls will be referred to the city, county or state health department for case management. Visitors to the University campus who become ill and can't return home, will be referred to the local health care network for treatment and case management.
- If the number of students diagnosed with the flu exceeds 20, the university is prepared to utilize a larger dormitory to isolate and quarantine sick students. This facility should have the capabilities to provide food services, security and housing for several hundred individuals who can be isolated in separate areas of the building depending on their degree of illness. This residence hall should be close to medical facilities to enable critical treatment of seriously ill students.
- Student health care, housing, food services, security, etc. will be provided as necessary at this isolation dormitory. Food services should be able to provide an 8 week supply of food, water and disposable supplies as needed during this period.
- The local medical center nearest to campus and many other community organizations have entered into an agreement with the University to provide mutual aid during an influenza pandemic. This agreement would allow the community surrounding the University to utilize the designated campus buildings as an overflow triage facility for the hospital. Large gymnasium or dormitory facilities should also be considered as a place for rest, shelter, food and showering for university, city or hospital staff and volunteers involved with the pandemic emergency. In addition, other university facilities can be identified as possible sites to care for recovering flu victims from the city or regional area.

- The local or state health department has coordinated with the University to organize and train volunteers to assist in a number of ways during an influenza pandemic. A point of distribution for health department services, medications and vaccines for the local area near the University should be designated.

In reviewing this model plan and taking into consideration all that has been discussed concerning planning at the organizational level, it can be can be concluded that any well-developed pandemic flu plan for a university, especially one that is part of a larger urban community, should draw on the planning theory or combination of theories that best enables the university to put theory into practice. The Pandemic Plan should be based on a rational analysis of the facts and science provided by federal, state and local authorities along with knowledge learned from past experience having the flexibility and motivation to quickly resolve problems both practical and emotional unique to a college campus. The University's Pandemic Flu Program should be developed and practiced to an operational level containing the details necessary to activate the plan based upon the federal Pandemic and All-Hazards Preparedness Act framework. It should be written in a style that also borrows and incorporates effective sections from applicable city, state or county operational and tactical plans adding its own contingency planning elements throughout to meet the changing needs at the university or in the surrounding community (University of Pittsburgh, 2009).

3.0 METHODOLOGY

3.1 INTRODUCTION

The topics discussed in the literature review for this dissertation center on the importance of emergency planning at colleges and universities in the event of a pandemic influenza. The review begins with the history of planning, modern planning theory and the evolution of the SITAR framework which blends multiple planning philosophies into a single plan perhaps best suited to the organizational culture at institutions of higher learning. The literature review also discusses the uniqueness of college and university committees especially in the way they develop, evolve, learn and accept change based on the organizational culture at that institution. (Schein, 2004; Kezar, 2001) Currently there are few published comparative studies on the state of pandemic flu preparedness at universities and this study will contribute to the body of knowledge in this subject area.

Connecting planning and organizational theory to the real world practice of pandemic influenza planning at a university is a goal of this dissertation that I hope to achieve in answering my research questions. In reality, making this connection may not be as difficult as one first imagines if the numerous planning challenges are broken down into smaller tasks each addressed by a cooperative “team” of individuals experienced in problem solving at their institution. Hudson (1979) writes of two abiding planning principles enabling committee members to “sell”

their ideas for purposeful action as mainly those of labeling and packaging. Drawing in and blending the diversity (sometimes conflicting, sometimes complimentary) offered by Hudson's SITAR planning traditions can be beneficial to a university committee seeking to compromise individual or departmental differences on budgets constraints, social sensitivities, philosophies, language, accountabilities and traditions. "Fuller possibilities can be created by the use of each theory in conjunction with the others" (Hudson, 1979, p.340).

A critical factor in pandemic flu planning is the understanding by the organizing committee that the "operational plan" is going to change during the emergency once the epidemic is declared by the CDC, WHO or some other agency. Rapid reaction times by the university planning committee may be required on multiple fronts to quickly modify the plan and re-direct activities towards an effective response. When planning for contingencies, pandemic committee leaders, indeed all of the members, must realize and understand;

- the strengths and weaknesses of individuals and groups relied on by the committee,
- the dominant style of thinking and problem solving used by committee members,
- the importance of empathy, trust and integrity when making decisions,
- the impact that the leader's operating style and attitudes may have on the committee.

University pandemic committee members, especially the leadership, who have a good understanding of the organizational learning, development and change culture at their institution, can see a problem developing, will anticipate the contingency needed and convince others to react quickly to changing circumstances, more effectively controlling situations as they develop.

3.2 RESEARCH DESIGN

The design of this study was primarily a survey-based research project with quantitative descriptive analysis of data from the survey questionnaire responses received. An e-mail survey was sent to Environmental Health and Safety Directors at selected large universities across the U.S. assessing their Emergency Preparedness Committee organization and their level of pandemic influenza preparedness in comparison to an updated response framework developed by the Centers for Disease Control (CDC) in Atlanta (2014). The design of the questionnaire and proposed data analyses attempted to provide the university plan coordinators with a metric informing them when they have "done enough" i.e. have a comprehensive plan in place for a pandemic emergency on their campus relative to other universities and in substantial agreement with CDC guidelines.

My hypothesis was that many larger universities have let some of their pandemic preparedness efforts lapse in the six years since the last declared flu pandemic. The collected survey data was reviewed in an effort to compare the level of emergency preparedness for each plan with regard to pandemic flu surveillance, risk assessment, continuity preparedness, community participation, counter measures, communications, training, and overall response to an influenza pandemic as recommended by the CDC and others. This evaluation was achievable due to the updated pandemic planning materials from the CDC that provided a means of comparison.

Table 3 below provides a matrix indicating which survey questions can be applied to the three research questions derived for this study based on the organization of the Pandemic Flu Committee, the contents of the Flu Plan and coordination of the Plan with regards to business continuity.

Table 3: Matrix Relating the Survey Questions to the Research Questions

Pandemic Flu Preparedness Research Question	Survey Questions Pertaining to these Research Questions
1. When organizing their Pandemic Flu Committees, do universities optimize representation by departments, campus groups and outside agencies?	1, 2, 3, 5, 6, 7, 11, 14 & 16
2. Do universities' Pandemic Flu Plans include elements that are comprehensive in scope and content?	8, 10, 11, 14, 15, 16, 17, 18, 19 & 20
3. How does the Pandemic Flu Plan fit into the larger emergency planning framework for ongoing course instruction, research, and business continuity?	4, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,19 &20

In addition to the descriptive analysis performed on most survey questions, comparative statistical analyses were going to be applied to a number of questions based on enrollment figures, the percentage of students housed on campus and the population density surrounding the main university campus collected in the first three survey questions. Unfortunately, there were not enough replies to some of the categories in these questions to enable meaningful statistical comparison.

The Likert scores for the final three questions on pandemic flu preparedness were totaled from survey replies, to define a "metric" for comparison of campus pandemic programs. Comparison of these metrics between institutions could provide a theoretical measure that universities have invested in their emergency preparedness plans to the degree that might enable them to put forward an actionable response during a pandemic crisis. The basic statistical parameters of mean, variance and standard deviation were calculated for these questions along with the confidence intervals based on the number of survey respondents.

3.3 RESEARCH SUBJECTS

The primary source of quantitative survey data were Environmental Health and Safety (EH&S) Directors at larger doctoral degree granting universities across the country having a total student population exceeding 10,000 including both undergraduate and graduate students. Initially, 156 universities were e-mailed the survey questionnaire. All of these universities were members of the Campus Safety Health and Environmental Management Association (CSHEMA) to which the researcher has access to telephone and e-mail addresses for their EH&S Directors. No on-line universities or community colleges were included in this survey as they are unlikely to have on-campus housing. For logistical reasons, doctorate granting institutions that were CSHEMA members with total student populations under 10,000 were initially excluded from the survey. However, due to the low initial survey response, 60 smaller CSHEMA universities were added to the survey some with less than 10,000 students. Bachelor and master's degree granting colleges and universities were excluded from the survey.

As an EH&S staff member at one of the larger CSHEMA universities, I was particularly interested in learning how other peer institution having similar complex administrative structures with multiple school, departmental and facilities issues would organize their pandemic plans. The logic of excluding smaller universities and using total student populations later revealed two significant flaws in the study that will be discussed later in this document.

In all, 216 CSHEMA universities met the study criteria and were included in the survey mailing as shown in Appendix C. Each EH&S Director received a Survey Request Letter, via e-mail asking if they were the representative of their campus best able to complete this questionnaire. If not, they were asked to pass the survey along to the individual(s) more familiar with the applicable section of their pandemic plan. A response received e-mail for questions was

elicited. Table 4 below tabulates the number of universities included in this survey along with those responding and those completing more than half (>10) of the survey questions who were included in this study.

Table 4: Response Rate for Target Universities.

Target Universities Sent Questionnaires	216
Universities Opening Questionnaire	114
Surveys Returned via Qualtrics® Software	44
Completed Surveys	36
Survey Response Rate	36/216 =16.7%

Forty-four universities returned their questionnaires via Qualtrics®. For the purposes of this research, 8 universities were excluded from the study as their information was incomplete. The rationale behind this exclusion is that the research data could not be applied to any university not answering at least 50% of the questions. Thirty-six universities, completing more than 50% of the questions, were in the study. Table 5 in Chapter 4 contains a breakdown of the 36 universities completing each question. Descriptive statistics (percentages) applied to responses listed in the survey tables was calculated using the number of universities answering that question as the denominator.

While answers from the 8 excluded universities were not used in the statistical evaluations, their lack of answer to the remaining survey questions did provide some insight to the survey's shortcomings. Most of those universities not completing the survey indicated in their responses to questions 4 and 5 that they either did not have a Pandemic Plan or a Pandemic Committee.

3.4 DATA COLLECTION

Following IRB approval, EH&S directors and/or Public Safety professionals at the target universities who were members of CSHEMA were contacted by e-mail via the Qualtrics® survey system to determine if they were the best person to complete the survey and explaining the purpose of my research project.

After determining valid e-mail addresses, the survey questionnaires were forwarded along with a cover letter explaining the importance of the study and confidentially assurances. In addition, the letter included instructions for completing the survey, the deadline for responses, directions for its return and information on getting copies of the survey results if they are interested.

Institutions not responding by the stated two week deadline were sent a follow-up e-mail reminding them of the importance of this survey, asking them to respond and assuring them of the confidentiality of their reply. Two follow e-mails were made to EH&S directors who did not respond to determine if they received the survey packet and asking them if they would reconsider completing the survey. Thank you e-mails were sent to those completing the survey.

3.5 DATA ANALYSIS

Qualtrics® software was used as the e-mail survey provider and some of its data analysis capabilities were utilized when applicable. Available statistical services at the University were also called upon to obtain suggestions for data reductions and survey response analysis. One question required a short written answer as to which department at the school provides the

Chairperson for the Pandemic Flu Committee. A few of the initial questions ascertained the existence of a pandemic flu plan and active committee participation. Additional questions inquired as to the universities overall emergency management approach, their preferred blend of planning theory and their ability to adapt quickly to changing circumstances.

The first three questions in the survey inquired about the demographic characteristics of the institution. This information on enrollment at the school, the percentage of students in on-campus housing and the degree of urbanization of the main campus were to be used for some comparative analysis with survey questions 8 through 13. Unfortunately the low response numbers prevented meaningful statistical comparisons. Measures of central tendency such as the mean, variance and standard deviation were calculated for three questions where applicable along with the confidence intervals based on the number of survey respondents.

Nine of the survey questions involved a descriptive analysis of various university planning measures checking “all that apply” to their Pandemic Plans. The percentage of responders checking the applicable circles for each question were also be used for program comparisons between the universities and model Pandemic Flu Program created by the CDC.

For three questions (18-20), a five point Likert scale (0-4) was used to quantify the emphasis given to critical emergency preparedness characteristics in their Pandemic Flu Plan with regards to general, human resource and medical aspects of the plan producing a “numerical grade”, if you will, for these portions of their program. The Likert scores for the final three questions may also define a “robustness quotient” for campus flu programs providing a theoretical measure by which universities can considered and compare critical aspects of their emergency preparedness plans to other universities.

These three Likert Scale questions in the survey were answered using a 0 to 4 score asking the responder to rate the emphasis placed on key aspects of their pandemic flu plan as described in the instructions below.

Instructions: The numerical scoring of questions 18-20, asked the respondents to assign a numerical grade that best matches their opinion of that aspect's importance in their Pandemic Plan.

- Grade 0 if your plan does not mention of this issue.
- Grade 1 if your plan mentions this issue but it is given a low priority.
- Grade 2 if your plan places a moderate priority on this issue.
- Grade 3 if your plan places a high priority on this issue.
- Grade 4 if this issue is an essential element of your plan.

The following descriptors were included in the survey instructions to help guide responders in their numerical grading of the questions elements.

- Low priority- mentioned but no one assigned to follow up.
- Moderate priority- someone assigned responsibility for this issue.
- High priority- someone assigned responsibility, budget allocated.
- Essential element- assigned responsibility, budget allocated, issue stressed during drills.

3.6 LIMITATIONS

As with any research study, certain factors remain beyond the control of the researcher. With any e-mail survey there is always the possibility that inaccurate information may be represented or that individuals may be overstating or understating the facts known to them. The possibility also

exists that the individual responding to a question may not be the most knowledgeable person to participate in the survey at that institution.

Every effort was made during the development of the survey questionnaire to limit bias in the survey or interview questions and to make clear the information being sought. Efforts were also made, via the survey cover letter or via e-mail inquiries to clarify the intent of the survey, to stress its non-threatening nature and to find the most knowledgeable person at that college or university who can best respond to the proposed survey on pandemic flu preparedness.

The researcher contacted some EH&S colleagues to pilot the survey questionnaire for clarity and comprehension. In response to comments received from a pilot survey, 10 questions were eliminated shortening the survey making it more attractive to respondents.

4.0 RESULTS AND DISCUSSION

The participants targeted for this research study were doctoral degree granting universities with total graduate and undergraduate populations exceeding 10,000 students. All of the universities selected were members of the Campus Safety Health and Environmental Management Association (CSHEMA) to which the researcher has access to telephone numbers and e-mail addresses for EH&S Directors. The survey became active on September 22, 2015 and was sent to 156 universities, with a reminder e-mail sent on September 28th. On October 7th the survey was sent to an additional 60 CSHEMA universities in an effort to increase the number of responses. This second panel of universities included 26 universities with total student populations reported as less than 10,000. A second reminder e-mail was sent to both panels on October 19th with a final reminder following on October 27th. The survey was deactivated on November 5, 2015.

In all 216 universities were contacted via e-mail and asked in a cover letter about completing the survey. CSHEMA maintains a directory of Environmental Health and Safety Directors who were each sent a survey link via the Qualtrics® Survey Software that is required by the University of Pittsburgh for doctoral dissertations. All but two of the surveys reached their destinations successfully as reported by Qualtrics®. Just over half of the surveys e-mailed, (53%) were opened by the recipients. Of the 114 surveys opened, 44 (39%) submitted them via Qualtrics® with 36 completing more than half of the questions.

4.1 SURVEY QUESTION FINDINGS

Table 5 summarizes the number of EH&S Directors responding to each of the 20 survey questions along with a brief accounting of the key responses. Detailed findings are addressed in the result and discussion sub-chapters for each question.

Table 5: Summary of Survey Questionnaire Responses

Question Number	Subject of Question	Number of Respondents	Key responses
Q-1	Number of students on main campus	36	74% reported >10,000
Q-2	Percentage of students living on campus	36	Average36%, could not use 3 answers in the descriptive statistics
Q-3	Location of main campus metropolitan, urban, suburban or rural	36	75% metro. & urban; 19% suburban, 6% (2) rural campuses
Q-4	Have a written Pandemic Plan?	36	30 yes; 4 no; 2unsure
Q-5	Have a Pandemic Flu Committee?	36	26 yes; 10 no; 0not sure
Q-6	Departments on Pandemic Committee	26	Top 5 (police, housing, student affairs, Facilities, EH&S)
Q-7	Who chairs Pandemic Committee?	29	Police, Student Health, EH&S, Executive
Q-8	How often was Plan updated since 2009?	36	Annually (22%), 1-3 yrs.(30%), once (33%), never (14%)
Q-9	Which Emergency Management Approach used?	36	58% All Hazard; 25% Incident Command; 17% Combination
Q-10	Which SITAR Models used?	36	39%S; 28%I; 28%T; 0% A; 3% R
Q-11	Speed of Learning, Development, Change	35	1 day <24%; 2-6days >42%
Q-12	Plans revised after 2009 Pandemic?	36	72% yes; 25% no; 3% unsure
Q-13	What changes were made to plan?	30	80 changes were indicated by respondents
Q-14	EH&S responsibilities in Plan	35	Modification, development, pick committee, stockpiles, drills,
Q-15	Critical Supplies Stockpiled	32	N-95s, hand sanitizer, gloves, cleaners, wipes, masks, food, water
Q-16	Outside Agencies Included	32	Local & State Health Depts. Local Hospital, Local Admin, Police, EMS, Food & beverage vendors
Q-17	Social Media Used	32	Twitter 91%; Facebook 91% ;Linked-in 34%; All others <16%
Q-18	General Flu Planning Aspects in Plan	33	Top 5- Identify leaders & key personnel, feed & house students; communications, plan to close campus, quarantine plan,
Q-19	Human Resource Aspects in Plan	33	Top 5- Maintain staff communications Suspend operations, faculty & staff needs, close campus, restrict travel,
Q-20	Key Medical Aspects in Plan	33	Top 5- Hand hygiene, Stay away when sick, vaccinations, communicate with hospitals and health departments, inform committee of CDC guidelines

4.1.1 Question 1 – Student Population on Main Campus

In this question, survey respondents were asked to estimate the total student populations on their main campus. Thirty-six universities responded to this question and proceeded to answer most other survey questions. The results for Question 1 are listed in Table 5 below.

Table 6: Total Student Populations at the Main Campus

Estimated Population at University	**Number of Universities Responding to this question**	**% of surveys received**
less than 10,000 students	9	25%
10,001 to 20,000 students	7	19%
20,001 to 30,000 students	13	36%
More than 30,000 students	7	19%
Totals	36	99%

Nearly 74% of the universities responding to the survey reported having a total student population exceeding 10,000 students, while 25% reported less than this number on their main campus. Total student populations included both undergraduate and graduate students. Universities not offering doctoral degrees or having only undergraduate students were intentionally excluded from this survey.

Survey questions 1, 2 and 3 were intended to establish the basic demographics of the responding universities; namely the total student population, the percentage of students living on campus and the rural vs. urban environment of the university's main campus. A decision to exclude smaller colleges and universities from the study was made initially to allow a comparison of pandemic flu programs among larger universities (populations >10,000 students).

When the first round of responses from 156 universities surveyed was low, an additional 60 CSHEMA universities were added to the cohort. The belief that this second cohort would include many institutions with student populations smaller than 10,000 was in error however, as many of these institutions actually had student populations larger than the original 156 universities. As shown in Appendix C, 34 of the 60 added institutions reported having total student populations exceeding 10,000 students on their website. Only 26 of the 60 universities selected in the second cohort were under the 10,000 total student population numbers and nine (9) of these universities responded to this survey question.

4.1.2 Question 2 – Percentage of Students Living on Campus

Question 2 asked respondents to estimate the percentage of students living on campus. By obtaining these percentages, the researcher hoped to gauge the number of individuals that the university would be responsible for during a pandemic. These responsibilities would include housing, isolating sick students, providing medical care, feeding, housekeeping and security. During the early stages when a pandemic is declared, most universities encourage their students to return home for the duration if it is safe and possible to do so hopefully lessening the spread of disease and lowering the amount of care needed.

Of the 36 respondents to this question, only 30 of the data points for Questions 2 could be used in the calculation of central tendency as six universities either responded with actual student numbers or did not know the percentage of students living on campus. The range for students living on campus was between 10% and 80%. Calculating a mean for the 30 usable entries indicated that 36% of students at the universities surveyed lived on campus. The median number of students living on campus was 30% and the mode was 25%.

The percentage of students living on campus at the 36 responding universities could not be determined based upon the manner in which six universities responded to the second survey question. Question 1 had asked survey respondents to position their universities into one of four total student population categories ranging from less than 10,000 to more than 30,000. While the survey question 2 asked for a percentage of students living on campus, some respondents gave the actual number of students without providing a percentage and therefore disallowing inclusion of those universities in statistical analysis. In hindsight, the survey question could have focused on the university's undergraduate populations as these students are more likely to live in on-campus housing thus remaining the responsibility of the university during a pandemic emergency. Graduate students, even junior and senior undergraduates in many cases, would likely live in off campus housing not affiliated with the university or would commute from home. Some of the students living off campus would presumably become part of the community's response to a pandemic emergency, with many having private healthcare options, and not necessarily be included in the university's response during a pandemic emergency.

Most of the students living in off campus housing, even graduate students would likely be enrolled in a university healthcare plan and could however remain the responsibility of that institution, further complicating statistical or even descriptive analysis. Certainly, students unable to return home during a pandemic because of national or international travel restrictions would likely look to the university healthcare system for treatment and support during a pandemic illness. It is imperative that university Pandemic Planning Committees have an estimate of the number of individuals likely to remain on or near campus during an influenza outbreak, This number will be critical in determining many other factors in the Plan such as,

where sick individuals could be housed or quarantined, the quantities of critical supplies needed to be stockpiled and the support staff needed to care for this number of sick individuals.

Beyond the legal, budgetary and public health requirements of being responsible for individuals sickened during a pandemic, moral and ethical consideration would likely influence universities to care for affiliated individuals as much as possible. This response is reflected in the next survey question describing the geographical surroundings of the universities and the available resources in or near the campus community.

4.1.3 Question 3 – Location of the Main Campus

Question 3 asked survey participants to describe the location of their main campus based on the USDA County Rural-Urban Continuum Codes. Thirty-six universities responded to this survey question. The four codes used in this survey included Metropolitan, Urban, Suburban and Rural based on the population of the integral or surrounding communities. Table 7 below indicates the location mix determined by this survey. More than 75% of the universities resided in metropolitan or urban settings containing more than 20,000 people from this analysis. The remainder fell into the suburban or rural USDA code locations.

Table 7: Location of Main Campus in Relation to Population Centers

USDA County Code Description	USDA Code Criteria	Number of Universities responding	Percentage in Category
Metropolitan	Within a city having population >250,000	15	42%
Urban	Within a city or town having a population between 20,000 and 249,999	12	33%
Suburban	Adjacent to town or city having a population between 20,000 and 249,999	7	19%
Rural	Adjacent to suburban area with a population between 2,500 and 19,999	2	6%

By describing a university's geographic setting, it was intended to establish criteria for statistical comparisons of other survey responses based on whether the universities were located in metropolitan, urban, suburban or rural settings. The small number of responses (2) from rural universities did not lend itself to meaningful statistical comparison with the other locations. In reviewing several articles on "town & gown" relationships, land grant universities in a rural setting often have a stronger sense of community than a large university in a metropolitan area (Martin et.al. 2005, Seifer, et.al. 2003, Bruning et.al. 2006). Due to limited resources available in the community, rural universities are often more self-reliant out of necessity. Sharing facilities or economic resources and providing mutual aid with the local populace, regardless of the universities geographic location, makes for better community relations and emergency response outcomes (Steinacker, 2004, Martin et.al, 2005).

Metropolitan universities were more likely to experience the ongoing problems of noise, traffic, student disorder, higher crime, non-support of local business and the alleged ruination of communities by constant campus expansion (Bruning et.al. 2006, Lindsay, 2015). In response to

these factors, some universities put up walls and fences, distancing themselves from the surrounding city's politicians, local businesses, emergency services and even the local health care system thereby creating a competitive environment rather than one of cooperation (Martin et.al. 2005). While the emergency preparedness plans at many universities and those of the community do recommend mutual aid agreements, it will be interesting to see how these evolve when a real emergency strikes and the need to share resources becomes a reality.

A consideration for future research could review the question if the isolation of rural universities makes them less vulnerable to pandemics in the first place. Or, on the other hand, would it raise questions about the lack of community resources or support from off campus making for a difficult response to and recovery from a pandemic emergency. Articles by Larson (2007), Leggat, et.al. (2009), Gholipour (2013), and Ferguson et.al. (2005) have determined that pandemic strains of influenza virus are more likely to emerge in remote tropical areas of Africa, Asia and Latin America usually in poultry raised by villagers in these areas. Pandemics flu strains originate when the infected birds pass a mutating virus to other animals or to humans. Normally these flu strains are contained to the areas where they originated but on rare occasions can spread rapidly through the community and beyond when infected individuals board airlines traveling internationally to other cities. These authors also explained that the next populations to become infected by this rural outbreak would be large metropolitan areas due in part to the crowded conditions on trains, busses and shopping areas. Hopefully by this time, the spreading flu pandemic would be recognized by health officials and steps initiated to encourage isolation, social distancing and other infection prevention measures to contain the virus. Rural universities should be spared this initial spread of the flu virus until infected individuals travel to that location which certainly can occur given the international activities of modern institutions.

4.1.4 Question 4 - Written Pandemic Preparedness Plans

Survey question 4 asked the universities Directors if they had a “written” Pandemic Preparedness Plan. Of the 36 Directors answering this question, 30 (83%) responded in the affirmative and 4 (11%) stated they did not have a written Plan. Two University Directors were unsure if they had such a written plan in place or not.

The fact that 83% of the responding university Directors indicated they had written Pandemic Preparedness Plans implies that the CDC guidelines are familiar and being followed. For the six universities indicating they did not have or were unsure if they had written pandemic plans, one possibility might be that their pandemic plan is incorporated within a larger Emergency Preparedness Plan, perhaps an All Hazard Plan.

4.1.5 Question 5 – Pandemic Preparedness Committees

Survey question 5 asked EH&S Directors if their university had a Pandemic Preparedness Committee. Thirty-six replies were received of which 26 universities (72%) responded yes and 10 (28%) responded no. Of the 36 EH&S Directors answering this question, 10 universities (28%) responded that they did not have a separate pandemic committee.

Once again, it may be that the Emergency Preparedness Committee at that university incorporates pandemic issues as part of their responsibilities. This higher negative response, however, raises the question that pandemic concerns may have fallen to a low priority during the past six years and that pandemic preparedness is rarely discussed as part of the emergency planning process. Such actions could result in the university being totally unprepared to respond

in case of a pandemic emergency increasing the detriment to business continuity and delaying recovery of the campus community.

On the other hand, the fact that 72% of the universities responding to this question did have Pandemic Committees is a positive indicator that most campus leaders remain cognizant of the need for vigilance in dealing with emerging pathogens in our communities and elsewhere.

4.1.6 Question 6 –Departments Represented on Pandemic Committee

Survey question 6 asked university representatives to list each of the departments represented on their Pandemic Preparedness Committees. All 26 universities responding "yes" to Question 5 also responded to this question listing 24 different departments with participation varying on the committees as summarized in Table 8 below. Campus Security/Police (100%) was most often represented on the Pandemic Preparedness Committee followed by Housing (92%), Student Health (88%), Physical Plant (85%) and EH&S (85%). The 10 universities responding no to this question did not list Committee participants.

Having good working committees, with key departments represented, is the best way to anticipate university or community needs, to brainstorm ideas and to establish workable plans for getting critical tasks done during a pandemic emergency. In setting up such a committee of qualified and dedicated individuals can help assure that the "right" people are assigned to the duties that might arise during a pandemic emergency. It is essential that committee members are annually re-committed to their tasks. Were a pandemic emergency to impact a university, each of the 24 departments listed in Table 8 could become involved in some way to an escalating situation on their campus.

Table 8: Departments Represented on Pandemic Preparedness Committees

Number	University Department Designation	Universities with this Department Represented	Percentage of Responders
1	Campus Security (Police)	25	96%
2	Housing Services	24	92%
3	Student Health	23	88%
4	Physical Plant (Facilities Mgt.)	22	85%
5	Environmental Health & Safety	22	85%
6	Human Resources	21	81%
7	Student Services	21	81%
8	Executive Offices	19	73%
9	Employee Health	19	73%
10	Public Affairs	19	73%
11	Communications	19	73%
12	Academic Affairs	17	65%
13	Risk Management	17	65%
14	Information Technology	17	65%
15	Faculty Representative	16	62%
16	Legal Services	15	58%
17	Food Service	15	58%
18	Registrar	10	38%
19	Emergency Management	3	12%
20	Health System/Medical School	2	8%
21	Global Affairs	1	4%
22	Auxiliary Services	1	4%
23	Business Continuity	1	4%
24	Chaplain	1	4%

Even if a department does not have a representative on the actual pandemic committee, they should be kept informed of the committee's directives and fully committed to their role and responsibilities should the Pandemic Plan be activated. Preparations for such an event would require a commitment of budget, personnel, planning and practice to assure an effective response and recovery by a university community. Good committee leadership is essential in keeping all of its members as well as key members of the campus and community updated and prepared.

4.1.7 Question 7 – Leadership of the Pandemic Committee

In Question 7, survey respondents were asked to indicate the title and department of the person chairing the Pandemic Preparedness Committee. There were 29 respondents to this question with the "Director of Emergency Management" or someone with a similar title, usually at a Director level (40% of responses) occurring most frequently. Most often the person with this title resided in the Public Safety or Environmental Health and Safety Department. Other departments mentioned in decreasing order of frequency included; Student Health, Health Services, Administration and Operations, Risk Management, Human Resources and Business Continuity.

Other titles reported with less frequency than "Director" included, Vice Presidents, Vice Chancellor, Vice Provosts, Risk or Emergency Manager, Dean of Students, Incident Commander and Public Health Nurse or Doctor.

Respondents to Question 7 made it apparent that the responsibility for chairing a Pandemic Preparedness Committee resided at a fairly high level of administration. As previously mentioned, Pandemic Committee chairs typically held Director level positions or higher, even to the level of Vice President, Vice Chancellor or Vice Provost. Obviously, in the case of a rapidly evolving emergency like a pandemic, unquestioned decision making is essential and best left to high ranking university leaders having the ability to get things done quickly.

Also apparent from the survey responses, the departments most often tasked with chairing the pandemic committee were staff or service functions rather than faculty or academic units. While academic departments play a critical role in deciding when and how to cancel classes or how best to maintain instructional business continuity via online instruction or distance learning, staff and service departments are important for maintaining brick and mortar functionality as well as assuring the campus can function effectively during the pandemic period

for as long as possible. High level personnel from all sides of the university community should be represented on the committee and be willing to act in a collaborative manner conducive for rapid pandemic response and recovery.

4.1.8 Question 8 – Pandemic Preparedness Plan Updates

Question 8 asked survey participants how many times their Pandemic Preparedness Plan had been updated since 2009, the year of the last declared influenza pandemic in the US. Of the 36 respondents to this question, 12 (33%) reported that their plan had been updated one time. Eight others (22%) reported updating their plan annually since 2009. Seven universities (19%) reported updates every two or three years and two other knew it was updated but were not sure how often it had been revised. Five universities (14%) admitted that their plans had not been updated since 2009.and two others (5%) did not have a Pandemic Preparedness Plan.

The fact that there has not been widespread discussion about major influenza outbreaks or other pandemic illness in the mainstream media has lessened the priority for pandemic preparedness in the US as a whole and on universities campuses as well. That this survey indicates 74% of the universities answering this question have updated their Pandemic Preparedness Plans within the past three years, indicates a good level of preparedness and vigilance at those academic institutions..

Even without widespread discussion about major influenza outbreaks or other pandemic illness in the mainstream media since 2010, 74% of the universities polled during this survey have updated their Pandemic Preparedness Plans. Perhaps the periodic news stories about minor infectious disease outbreaks on campuses and elsewhere since 2009 such as MRSA, SARS, MERS, bacterial meningitis, measles or mumps and most recently the Zika virus have kept

university officials vigilant to an ever present pandemic risk. The tendency for medical epidemiologists, news media outlets and social media to report infectious disease outbreaks around the world may be keeping most of our campus communities alert to coming events.

4.1.9 Question 9 – Emergency Management Approaches to Planning

Question 9 asked survey participants which emergency management approach best describe their Pandemic Preparedness Plan format. The three response options included, “Incident Command System”, the “All Hazard” approach or another planning approach. Thirty-six universities responded to this question. The majority (21 or 58%) selected the All Hazard approach that was earlier described as a “bottom-up” planning format using a comprehensive committee driven approach incorporating both vulnerability and pragmatic planning models as described in Sections 2.2.2 - 2.2.4 of this document.

The second choice, Incident Command System (ICS), was selected by 9 universities (25%) involving a “top-down” approach recommended by the National Incident Management System (NIMS) sponsored by the Department of Homeland Security. This system uses a detail oriented, technocratic approach to emergency planning where everyone involved has a specified role with assigned duties dictated by the Incident Commander who takes charge and relies on his chain of command to assure things get done as required.

Four university representatives (11%) responding to the question indicated they had “another approach” to pandemic preparedness planning mostly involving a combination of all hazard planning with incident command components for specific emergencies. Two university planners noted that they did minimal emergency planning preparations.

For this survey question, 21 universities (58%) selected the All Hazard approach to emergency planning. Advantages of choosing the All Hazard Approach (Burton, 2010) include;

- It provides a basic framework for dealing with a wide variety of business interruptions,
- It is more cost effective in terms of time and resources,
- It requires less effort to keep plans current.
- It better suites organization less knowledgeable of business continuity.

The disadvantages to All Hazard Planning are that it tends to lack details on the scale of response and recovery for more likely or predictable events, instead focusing on high profile or worse case scenarios and the resulting facility damage or loss of business continuity. All Hazard Plans, lacking specific details about the responsibilities of key personnel, strategic use of facilities, communication pathways and documented procedures, will often increase the overall response and recovery times and costs for most organizations (Burton 2010).

The second choice for emergency preparedness, the Incident Command System, was selected by 9 universities (25%). The IC system involves a “top-down”, comprehensive approach to emergency planning recommended by the National Incident Management System (NIMS) sponsored by the Department of Homeland Security. This system uses a detail-oriented, technocratic approach to emergency planning where key personnel are identified, each having a specified role with assigned duties dictated by the Incident Commander who takes charge during an emergency and relies on their chain of command to assure tasks get done as required.

According to the Department of Homeland Security (2016) the advantages of the Incident Command System for organizations are;

- It is a comprehensive, nationally recognized and systematic approach to incident management,

- It provides a core set of doctrine, concepts, principles, organizational procedures for all kinds of hazards,
- It lays out the essential principles for a common operating picture and mandates the interoperability of communications and information management,
- It standardizes resource management procedures for coordination among different jurisdictions and organizations,
- It is scalable and applicable for all types of incidents and emergencies,
- It enhances organizational and technological interoperability and cooperation across jurisdictional boundaries,
- It institutionalizes professional emergency management and incident response practices.

Some colleges and universities may find the Incident Command System disadvantageous to their core doctrines in that ICS tends to be authoritarian, lacking in compassion, collegiality and the cooperative spirit conducive to an academic environment. However, in dire emergency situations an IC system has proven its effectiveness time and again in preparing for, responding to and recovery from crises or disasters of all kinds (Blanchard, 2008, FEMA 2003).

The remaining six university representatives (17%) responding to this question either indicated they had “another approach” to pandemic preparedness planning with four involving a combination of All Hazard planning to deal with more likely problems at their universities such as storms, fires, or floods with Incident Command components added for specific emergencies like active shooters, or riots. Two university planners in this final grouping noted that they did minimal emergency planning preparations, realizing they would be forced to make last minute and probably less than ideal decisions during a pandemic emergency more in keeping with Hudson’s Incremental planning method for “muddling through” and incident or emergency.

While an All Hazard Plan approach was selected by most universities, it may not be as effective during a pandemic event when the situation calls for a hard decision to be made by a person in authority especially if that person may be overruled. In this case, the Incident Commander, preselected for their expertise in handling these situations may more effectively make that decision provided that person knows the facts and possible repercussions of their decision. In a university setting and depending on its chain of command structure, the expertise there-in and the situation at hand, it might be conducive to have the President or Chancellor of the university as the final decision maker based on the advice of "experts" sitting on the pandemic committee. Perhaps a blend of the planning systems would work best in a university setting; an All Hazard Plan for its simplicity and flexibility but having key individuals having the authority and the organization of the Incident Commander.

4.1.10 Question 10 – SITAR Model used for Pandemic Planning.

Question 10 asked survey responders to indicate which of the SITAR Planning Models were used when preparing their Pandemic Preparedness Plans. Each of the five planning models (Synoptic, Incremental, Transactive, Advocacy and Radical) were described using their component characteristic as detailed by Hudson (1979). Respondents were asked to select all of the planning model components that were used in preparing their plans.

All thirty-six university Directors in the study responded to this question, seven selecting more than one model. Fourteen (39%) indicated Synoptic planning characteristics were incorporated into their plan including; comprehensive goal setting and qualitative descriptors with technocratic central control, feasible policy alternatives, cost /benefit analysis all used to develop a detailed action plan.

Ten responses (28%) indicated Incremental planning characteristics entered into their Pandemic Plan including, partisan intuition, past experience, democratic decision making, incremental response, consultative views, wait and see decision making, muddling through problems if and when they arise.

Ten responses (28%) were also recorded for Transactive planning that included dialog with those most likely to be affected during an emergency. This planning style places more emphasis on the human dimension of personal or organizational development and economic self-interest.

No one selected the advocacy planning model and only one (3%) picked Radical planning. Advocacy planning characteristics includes an adversarial defense of the public interest, social justice considerations and sensitivity to unintended environmental, social or financial side effects. Radical planning characteristics include self-reliant activism relying heavily on mutual aid provided with a cooperative spirit free from outside manipulation and utilizing more decentralized operations. Eleven other responses (31%) recorded for this questions indicating that none of the SITAR characteristics entered into pandemic preparedness planning at their university.

Twenty-five of the responding university Directors incorporated at least one or two of the "S" (synoptic), "I" (incremental) and "T" (transactive) characteristics of Hudson's (1979) SITAR model into their emergency plans. No responding university incorporated any of the "A" (advocacy) model characteristics and only one used "R" (radical) planning characteristics in their plan. Eleven universities (31%) responding that none of the SITAR characteristics entered into pandemic preparedness planning at their university indicated to this researcher either a failure to carefully read the question or to comprehend the SITAR model. Even a cursory understanding of

SITAR descriptions would lead one to realize that any planning exercise must incorporate some if not many aspects of the SITAR characteristics into their plan dependent on the goals, philosophies and attitudes existing among the planners. Hudson (1979) summarizes these characteristics as follows:

- Synoptic planning involves comprehensive goal setting, central control, quantitative analysis, feasibility studies, policy alternatives, cost benefit analysis and detailed action plans.
- Incremental planning relies more on partisan intuition and past experience, democratic decision making and an incremental responses to events. This model uses consultative discussions with experts and adopts a wait and see attitude as they "muddle through" events.
- Transactive planning uses the interpersonal dialog with those to be effected when deciding on a path forward. It places emphasis on the human dimension of personal and organizational development as well as economic self-interests.
- Advocacy planning involves an adversarial defense of the public interest while incorporating aspects of social justice in decision making. This planning model is also sensitive to unintended but likely environmental, social or financial side effects.
- Radical planning incorporates self-reliant activisms into its decentralized operations relying on mutual aid and a cooperative spirit free from outside manipulation.

University emergency planners must be decisive and capable of making good decisions rapidly in a crisis situation. This will involve serious consideration of each of the SITAR model components during the emergency planning stages even if they are not labeled as

such. Each university must decide which emergency planning approach and which blend of SITAR models will work best for their institution during a pandemic emergency.

4.1.11 Question 11 – Pandemic Committee's Capability for Rapid Learning, Development and Change

Question 11 asked respondents to describe the speed with which their Pandemic Preparedness Committee could learn the facts about an impending crisis, develop contingency plans to react to that crisis and implement change in their response plan when faced with a pandemic emergency. Thirty-six universities responded to this question presented as a 5-point Likert scale in Table 9.

Table 9: Pandemic Committee's Capability for Rapid Learning, Development and Change

Question Characteristic	Slow >2 weeks	Somewhat Slow 1-2 weeks	Neutral 1 week	Somewhat Fast 2-6 days	Fast 1 day or less	Number of Universities responding	Mean Variance Std. Dev.
Likert Rating	1	2	3	4	5	xxxxxxx	xxxxxxx
Learning	3	4	5	14	10	36	3.67 1.54 1.24
Development	4	3	5	18	6	36	3.53 1.46 1.21
Change	4	4	7	12	9	36	3.50 1.69 1.30

Based on the figures shown in Table 9, 67% of the 36 university Directors responding to this question believed that their Pandemic Preparedness Committees are capable of both learning and flu response development fairly rapidly, in less than 7 days. Fifty-eight percent of respondents felt they could also complete the necessary program changes within that time frame. Approximately 33% of the universities responding believed that they may require more than a

week or two to complete their pandemic learning and development and 42% may need that amount of time to complete the necessary program response changes.

When an influenza pandemic or some other infectious disease is declared by the Centers for Disease Control and Prevention (CDC), rapid decision making by the university's Pandemic Preparedness Committee may be required as an emergency situation develops. Institutions will have to learn and understand what is likely to happen based on the information available, modify their preparedness plans and develop specific response protocols to meet various contingencies and be able to change their response actions quickly as new facts are learned and changing conditions dictate.

The faster a university pandemic committee can make educated decisions about an impending infectious disease threat, the more likely they are to assemble the needed resources and direct actions for a multifaceted response leading to an effectively managed emergency. As stated earlier, approximately 2/3's of the universities responding believed they would be able to learn about, develop alternatives and change their plan in less than 6 days to meet a pandemic crisis.

4.1.12 Question 12 – Revised Flu Plans after the 2009 Pandemic Declaration

Question 12 asked university Directors if they revised their Pandemic Preparedness Plans after the 2009-2010 pandemic influenza declaration by the CDC/WHO. Thirty-six university Directors responded to this question with 72% (26) responding yes and 25% (9) responding that they had not modified their plans. One Director (3%) was unsure of their Plan revisions

The fact that 72% or the university Directors reported modifying their Pandemic Flu Plans may indicate a realization that many universities and communities had been poorly

prepared to respond to the 2009-2010 pandemic flu initially. In some communities where the first flu cases were reported, increased absenteeism became a problem as people were instructed to avoid crowds and practice social distancing to slow flu transmission. Fortunately the CDC /WHO declared flu pandemic of 2009-2010 was much less severe than predicted (CDC 2010).

Several lessons should have been learned from the "near miss" during the 2009-2010 flu pandemic. One key lesson was that universities and other organizations need to perform an annual review of their emergency plans. Planners should at least assure that all contact information for key individuals and critical services are current and that planning members are still at the university and willing to remain active on the pandemic committee. In addition any plan shortcomings, failures or items overlooked at the university, in their communities or elsewhere during the "near miss" should be highlighted by the pandemic planning committee and the plan modified as needed.

4.1.13 Question 13 – Changes to Plans after 2009 WHO Pandemic

As a follow-up to Question 12, respondents were asked to check off a list of Plan modifications made since the last declared flu pandemic in 2009. Thirty universities responded to Question 12 by listing a combined 80 modification to their Pandemic Plans as shown in Table 10. The six universities not having or not knowing about their Pandemic Plans did not respond to this question.

As shown in Table 10, the most frequent modifications that universities made to their Pandemic Plans was to update contingency plans addressing some of the problems encountered by universities and other institutions during the 2009-2010 flu pandemic. Seventeen of the 30 Universities (57%) responding listed this change as the most common update to their plan. The

second most frequent plan update was the adoption of a more aggressive flu vaccination programs (40%), followed by changes to emergency supply stockpile priorities (27%). Added travel restrictions (27%), more practice drills (23%) and more committee members (23%) were among the most common reported updates to University Pandemic preparedness Plans.

Table 10: Modification Made to University Pandemic Preparedness Plans Following the 2009-2010 Pandemic Flu Declaration

Pandemic Plan Modification by Universities who made Changes	Number of Respondents Making This Change	Percentage of Respondents
Updated contingency plan	17	57%
More aggressive flu vaccination policy	12	40%
Changes to stockpiling priorities	8	27%
Added travel restriction policies	8	27%
More practice drills	7	23%
More committee members added	7	23%
Revised vendor contracts	5	17%
Revised agreements with local hospitals	4	13%
Additional Job cross-training	3	10%
Enhanced flu screening policy	2	7%
More detailed instruction	1	3%
Administrative updates	1	3%
Public health, isolation/quarantine agreements	1	3%
Included additional diseases	1	3%
Memorandum of Understanding with local Public Health officials	1	3%
No assigned responsibilities in plan	1	3%
Plan was specific for 2009-2010 pandemic, no changes made	1	3%

In answering this question 30 university Directors identified 80 changes made to their pandemic plans after the WHO declared influenza pandemic in 2009. Fifty-seven percent of the universities needed updates to their contingency plans as they realized their plan's shortcomings during the flu's spread. Forty percent of respondents also realized weaknesses in their "voluntary" influenza vaccination campaigns due to misinformation spreading about the safety

and ineffectiveness of the current vaccine. Flu vaccinations became even more problematic when the flu threat increased and medical communities were faced with vaccine shortages and a controversial choice between the traditional flu shots verses a new nasal spray. By the time drug manufacturers ramped-up vaccine production early in 2010, the flu threat declined resulting in millions of vaccine doses going to waste (Coffey, 2014).

These same "shortage to surplus" scenarios repeated for protective gloves, suits, masks and hand sanitizers as manufacturers, unable to meet the demand early during the pandemic, increased production only to realize a market glut as the flu threat subsided. Many universities placed these surplus supplies into emergency stockpiles in preparation for the next pandemic that never came. Now, as the 5 year shelf life of these supplies has past, universities are scrambling to sell, donate or discard these items with the realized financial loss as well as having to replace them in preparation for the next pandemic threat.

The fourth most frequent change reportedly made to university emergency plans was mandatory travel restrictions during declared pandemic periods. While no specific details were collected during the survey, one can surmise the changes included developing protocols to discourage or prohibit faculty, staff and students from travel to countries where pandemic illness is likely. Changes were also made to ensure clearer communications with faculty, staff and students studying or working abroad to better keep everyone apprised of changing conditions. In addition, study abroad and other department staff were instructed to pay close attention to pandemic alerts as well as other political or environmental threats in countries where university personnel may be located. Finally, making provisions as to when and how to evacuate university staff and students if disease threats appear eminent and to do everything possible to facilitate their return home were also noted.

4.1.14 Question 14 – Pandemic Plan Responsibilities Assigned to EH&S Departments

Question 14 asked the EH&S Directors at surveyed universities to list all of the responsibilities assigned to them during Pandemic Preparedness Planning from a checklist of 14 tasks. Thirty-five universities responded to this question with 80 selections documented. Table 11 is a compilation of those selections in order of their prevalence.

As seen in Table 11, 50% of the universities responding EH&S had the responsibility for modifying the Pandemic Plan, presumably based on decisions made by the committee. For just under half (44%) of respondents, EH&S also had responsibilities for Plan development and maintenance as well as coordinating practice drills and training.

More than one third of the Universities responding indicating that the EH&S Department was responsible for selecting individuals to serve on the committee and for maintaining stockpiles of pandemic emergency supplies. As shown in Table 11, only two of the 36 universities responding to this question indicated their EH&S Department performed bio-waste disposal. Seven universities uniquely listed duties described in Table 11 as performed the EH&S department probably indicating shared responsibilities by other departments on the Pandemic Preparedness Committees.

As an Environmental Health and Safety (EH&S) professional at one of the responding universities, an assumption was made that the EH&S Department would predominate leadership of any Emergency Planning Committee and certainly a Pandemic Preparedness Committee as it does at my university. However, as this survey indicated in Table 8, EH&S placed fourth in Pandemic Committee leadership, 3 to 11 percentage points behind Campus Security, Housing Services, Student Health, tied with Physical Plant departments and just slightly ahead of Student Services, Human Resources and the Executive Officers at participating universities.

Table 11: Pandemic Preparedness Responsibilities Assigned to EH&S Departments

Assigned Responsibility	Number of Universities Indicating this as EH&S Duty	Percentage of Respondents
Pandemic Plan Modification	17	49%
Plan Development and Maintenance	15	43%
Consideration of Drills and Training	15	43%
Committee Selection and Coordination	12	34%
Maintain stockpiles of masks, gloves, suits and other pandemic emergency supplies	12	34%
No assigned responsibilities for Pandemic Plan	6	17%
Bio Waste Disposal	2	6%
Business Continuity	1	3 %
Employee/Public Risk Assessment	1	3 %
Coordination with local public health agencies	1	3 %
Training and assistance to other departments	1	3 %
Consultation with Biosafety Officer in charge of Plan	1	3 %
Provide information to committee	1	3 %
Each Department develops their own business/operations continuity plan	1	3 %

Table 11 however, did show that EH&S departments assumed major responsibilities for pandemic plan development, maintenance and modification at nearly half of the universities responding to the survey. EH&S also held responsibility for organizing drills and training at the universities surveyed in addition to committee selection and coordination and for stockpiling PPE and other pandemic emergency supplies.

Six universities (17%) responding to the survey surprisingly indicated their EH&S department as having no responsibilities for pandemic emergency planning. It would be interesting to follow-up on this question during a future survey to learn how and why EH&S

would or could avoid responsibilities during a campus pandemic given their experience with campus crises and responsibilities for staff and student safety.

Two of the 36 universities responding to this question indicated their EH&S department performed bio-waste disposal, unusually low numbers in that bio-waste and chemical waste are routinely handled by vendors contracted through EH&S Departments. Seven universities individually listed unique duties in Table 11 performed the EH&S department involving risk assessment, public health coordination, consulting, training and business continuity, indicating greater shared responsibilities by other departments on the Pandemic Preparedness Committees.

4.1.15 Question 15 – Supplies Stockpiled at Universities to Avert Shortages during a Pandemic Emergency.

Question 15 asked survey respondents to indicate from a checklist the critical supplies stockpiled at their universities to avert shortages during a pandemic emergency. Thirty-two university Directors responded to this question and 4 elected not to answer the question even though they did reportedly have Plans. The results shown in Table 12 indicate the relative priorities placed on stockpiling these essential supplies that may become difficult to order during a pandemic.

Note from Table 12, that N-95 respirators, hand sanitizer and protective gloves were the most commonly stockpiled items for pandemic emergencies. This may be an outcome of manufacturer's or supplier's threatened shortages during the 2009-2010 pandemic flu declaration. Next among the priority items to stockpile (less than half of the universities responding) were disinfection supplies, surgical masks, protective suits, non-perishable foods and water all of which can be used on a rotating stock basis. Supplies with expiration dates like anti-viral medications and electrolyte are less likely to be stockpiled.

Table 12: Pandemic Emergency Supplies Stockpiled at Responding Universities

Critical Supplies to be Stockpiled	Number of Universities Stockpiling This Material	Percentage of Respondents
N-95 Respirators	23	72%
Hand Sanitizer	23	72%
Protective Gloves	21	66%
Disinfectant Wipes	15	47%
Cleaning Supplies	14	44%
Surgical Masks	13	41%
Protective Suits	13	41%
Non-perishable Foods	12	38%
Bottled water	11	34%
Portable beds, cots or sleeping bags	8	25%
Anti-viral medications	6	19%
Bed linens	5	16%
Tissues	5	16%
Electrolyte Drinks	3	9%
No Stockpiles of pandemic supplies	2	6%
Rely on local public health stockpiles	1	3%

Stockpiling of critical supplies in anticipation for pandemic emergency is a guessing game. Part of maintaining business continuity during an emergency of any kind is making an educated guess given the information available. Good guesswork is part of any contingency planning effort to assure that adequate supplies are on hand and more will be available when needed. In 2009 when manufactures warned their customers that some emergency supplies like N-95 respirators, hand sanitizer and protective gloves might be in short supply during a pandemic; these became the most commonly stockpiled items on campus. When the stockpiles were not exhausted during that declared pandemic, the University of Pittsburgh was fortunate in being able to sell or donate these supplies as their 5-year expiration dates approached and while they were still serviceable. New stock piled supplies have been purchased, albeit in lesser quantities, and are now placed on a rotation schedule to avoid being stuck with an irreplaceable

of supply deteriorated and unusable PPE should a pandemic emergency arise (OSHA, 2009, Falcone, et.al. 2015, Radonovich, et.al., 2009).

Among the priority items to stockpile (less than half of the universities responding) were disinfection supplies, non-perishable foods, water, surgical masks and protective suits all of which also can be used for other purposes. Supplies with expiration dates like anti-viral medications are less likely to be stockpiled possibility due to costs and also reports from the medical community that their effectiveness for most flu victims is in question (CDC, 2011). Universities and their vendors need to work towards better on-demand purchasing of both perishable and non-perishable supplies that will be available in sufficient quantities when needed. Perhaps manufacturers can develop rubbers or elastics and other PPE materials as well as food supplies and medications that don't degrade as quickly remaining viable during long term emergency storage.

4.1.16 Question 16 – Outside Agencies Coordinating with Pandemic Committees

In question 16, universities were asked to indicate from a checklist, other outside agencies they coordinate with regarding their Pandemic Preparedness Plans. Thirty-two university Directors responded to this question as shown in Table 13 and four Directors chose not to respond.

As seen in Table 13, Local and State Health Departments along with the nearby hospitals are the most likely institutions to be included in pandemic preparedness communications with the responding universities. Local health departments were most commonly included (91%) with community hospitals next at 66%. State health departments were included in Plan coordination 53% of the time. All other outside organizations listed in the survey coordinated with university pandemic committees less frequently.

Table 13: Outside Agencies Coordinating with Pandemic Preparedness Plans

Outside Agencies involved with University Pandemic Planning	Number of Schools Responding	Percentage of Respondents
Local Health Department	29	91%
Local Hospitals	21	66%
State Health Departments	17	53%
Local Government Administration	12	38%
Local Police	12	38%
Food and Beverage Suppliers	12	38%
Local Paramedics	10	31%
Local FEMA Office	7	22%
State FEMA Office	7	22%
Federal FEMA Office	2	6%
Local Business Owners	2	6%
City Fire Department	1	3%
City/County EMS	1	3%
World Health Organization	1	3%

Local health departments, having community infection control as their principle mandate, are listed in the survey as most likely (91%) to coordinate with the university's Pandemic Preparedness Committee. In addition, the local health departments are more likely to be in close communication with their state counterparts, the CDC and WHO as they determine when a pandemic declaration will take effect and what response actions are being recommended. Critical during all phases of a pandemic emergency is that local, state and federal health agencies establish a cooperative relationship with universities in their jurisdiction as opposed to one that is overbearing and intolerant. Directives or response actions based on "one size fits all" mandates from some bureaucratic emergency plan rather than common sense actions imposed by individuals familiar with local norms and customs would be counterproductive.

Any recommended response actions should be based on sound expert information proven effective for the given situation as determined by past experience or at least tested during an

exercise drill. The decision making for emergency response should also consider what best fits the community “needs” based on local knowledge and attitudes being careful not to let the community “wants” get in the way when a difficult decision must be made to control the pandemic. Common sense, flexibility and decisiveness must be among the hallmarks of those committee members “in-charge” when determining the coordination needed by local governments, emergency responders, hospitals, suppliers, FEMA and others responding to or having a stake in the declared pandemic emergency. The pandemic response should be coordinated by an effective leader working with everyone’s best interest in mind and not one focused on being “in-control” or taking advantage of the emergency for political, social or monetary gain.

4.1.17 Question 17 – Social Media Outlets used for Pandemic Plan Communications

With the ever expanding services offered by electronic social media, this question inquired which social media outlets might a university use to spread the word through campus and beyond about a pandemic emergency. Table 14 lists, in descending order, the social media outlets used by respondent universities. Thirty-two universities responded to this question most using multiple social media outlets used for communication.

Overwhelmingly (91%), Facebook and Twitter were most commonly indicated by responding universities as a possible means to advance communications about a pandemic emergency. Under reported (22%) in this survey for campus emergency communications were the university’s emergency preparedness webpage or the emergency e-mail/phone alert system present on many campuses. A number of respondents did however include these avenues of emergency communication under the “other” category for this survey question. You-tube and

Instagram were used by 25% of the universities responding as a means of communication with their campus.

In this survey five (16%) of the respondents considered their campus emergency communications webpage and two (6%) listed their emergency e-mail/phone alert system as social media outlets. Unfortunately, while many universities are currently using e-mail and cell phone alerts as a primary means of notifying students, faculty and staff about campus emergencies, many campus occupants are permitted to opt out of these services or fail to check for website updates and alerts in a timely fashion when issued (Schuler, 2016, UC Berkley, 2016, WVU, 2016).

Table 14: Social Media Outlets used at Your University to Facilitate Communications

Social Media Outlets used to Facilitate Campus Communications	Number of Schools Responding	Percentage of Respondents
Twitter	29	91%
Facebook	29	91%
You Tube	8	25%
Instagram	8	25%
University Webpages	5	16%
Linked-in	5	16%
Google +	5	16%
Pintrest	3	9%
Flickr	3	9%
University's Emergency Alert System	2	6%
Tumblr	2	6%
Snapchat	2	6%
Reddit	1	3%

PBS Nova (2015) reported in a television special how social media texts about an earthquake in the Himalayans easily beat the earthquake's shock waves traveling around the globe. In this survey, it was found that Facebook and Twitter were used by many more universities (91%) than other lesser known services such as You Tube or Instagram (25%).

Even though they were not listed as social media selections on the questionnaire, five Directors wrote- in votes for indicated their emergency response website and two listed their emergency alert lines as social media outlets for campus communications. Whether used by parents, family members, the media or the students themselves, these sites should be focused on supplying reliable, up to date information on any emerging situation on campus. The website must be updated periodically as the primary source for directives and guidance on what students should be prepared to do during a pandemic emergency. It should also contain information on emergency plan implementation, class scheduling, event postponement, campus evacuation, travel restrictions, vaccination sites and medical treatment options. The website should also speak to the general, human resource and medical aspects of the campus pandemic plan based on CDC/WHO and local health department directives. Emergency websites must be prominent on the university home page, easy to navigate, clear in their guidance, current and full of accurate information with active links to other pertinent websites and emergency contact information.

4.1.18 Question 18 – Ranking the Importance of General Aspects to Pandemic Preparedness Plans

In Question 18 respondents were asked to assign numerical Likert grades (0-4) on the importance of 15 general aspects to their Pandemic Preparedness Plans as listed on the survey. Thirty-three (33) universities responded to most of the general aspects listed. For three aspects (13, 14 & 15) one university did not include an entry. Table 15 presents the results in descending order of importance for each general plan aspect based on the mean Likert score of the respondents.

Topping the list with a mean Likert score of 3.39 and 3.36 out of 4 points respectively were delineating the responsibilities of key personnel and identifying Plan leaders Twenty-one universities out of the 33 responding indicated these two general aspects as essential elements of their Plans.

Next highest importance, with 22-29 universities scoring these general aspects as either high or essential to their plans (Likert means between 2.52 and 3.09) was given to feeding and housing sick students, maintaining communications with key personnel, deciding when and how to close the campus, establishing quarantine provisions and deciding when to cancel classes, sporting events and extracurricular activities.

Lower priorities, with mean Likert scores between 2.21 and 2.48, were given to maintaining research facilities and animals, identifying key decision makers from the state or local communities, provisions for feeding and housing essential personnel on campus, holding exercise drills and stockpiling critical supplies and equipment to enable limited caretaking operations.

Table 15: Rank Order of Importance for General Aspects of a Pandemic Plan

General Aspect of Pandemic Plan	No Mention 0 points	Low Priority 1 point	Moderate Priority 2 points	High Priority 3 points	Essential Element 4 points	Mean Likert Score
1. Delineate responsibilities of key personnel on campus	1	1	3	7	21	3.39
2. Identify Plan leader and response team	1	2	2	7	21	3.36
3. Feeding & housing students unable to return home	2	0	2	18	11	3.09
4. Emergency communication plan for key personnel	1	1	5	13	12	3.06
5. Action plan for closing campus	4	0	2	13	14	3.00
6. Emergency housing and quarantine plans	2	2	4	16	9	2.95
7. Action plan for cancelling class	4	1	5	12	11	2.76
8. Action plan for cancelling sports events & extracurricular activity	5	3	4	12	9	2.52
9. Plan for maintaining key research facilities and animals	4	1	11	9	8	2.48
10. Identify decision makers from state and community partners	2	4	12	7	8	2.45
11. Plan for feeding & housing essential personnel	5	0	9	14	4	2.30
12. Exercise drill on campus	4	7	12	7	2	2.25
13. Stockpiling essential supplies and equipment	4	5	8	12	4	2.21
14. Providing surge capacity for local hospitals and community	9	6	5	8	5	1.82
15. Participation in community drills	8	7	12	3	2	1.50

Least important to their Pandemic Plans was, with Likert means less than 2.0 (moderate importance), were providing surge capacity for the local hospitals or the community and participating in community drills. Only 2-5 universities reported these two elements essential to their pandemic plans and 8 or 9 universities made no mention of these elements in their pandemic plans.

In comparing the Likert scores of the collective universities with their own pandemic priorities, the intention was to determine if university planning committees needed to re-evaluate and modify their plans to enable a more effective response to a pandemic crisis if one occurs. As

discussed previously, topping the list of important general planning aspects was the need for good leadership as reflected in a committed and decisive pandemic planning chairperson surrounded by committee members and other key campus personnel each knowing their responsibilities and capable of carrying them out during a crisis.

Ranking next in importance were aspects dealing with providing food, water, shelter and other support for those remaining on campus during the pandemic period, providing for students unable to return home or essential personnel maintaining campus facilities during the pandemic. High on the list of importance is staying in communication with everyone remaining on campus, or those working from home as well as those in the community providing service to the university. Factual and timely communication is essential to limit the spreading of false rumors that can arise creating unnecessary fear, selfish acts, costly mistakes and poor community relations all of which can make responding or recovering from a pandemic period more difficult.

4.1.19 Question 19 - Ranking the Importance of Human Resource Aspects to Pandemic Preparedness Plans

As in the previous question, respondents to Question 19 were asked to assign numerical Likert grades (0-4) on the importance of 14 human resource aspects relating to their Pandemic Preparedness Plans. Thirty-three universities applied scores to each aspects of this question. Two universities skipped one aspect rating each. Table 16 presents the results in descending order of importance for each aspect based on the mean Likert score of the respondents.

Unlike the General aspect scoring, none of the mean Likert scores for the Human Resource (HR) aspects exceeded 3.0. The two highest scored HR aspects in this question, with mean Likert scores of 2.55 and 2.53 respectively, were defining the criteria for suspending university operations and determining critical faculty and staff needs, closely followed by drafting a campus shutdown plan at 2.45. Between 19 and 23 universities rated these elements with a moderate or high priority with only 6 to 9 universities scoring these aspects as essential to the pandemic Plan.

Other HR aspects rated as moderately important during a pandemic, with mean Likert scores ranging between 2.12 and 2.36, included issues such as restricting travel, assuring faculty/staff communications, drafting plans for suspending athletic or social events and reopening campus to such events. Between 19 and 25 universities scored these HR issues with moderate to high importance. Only 3 to 5 universities out of the total had these aspects rated as essential elements of their plans, while 2 to 6 respondents made no mention of them in their plans.

At the lower end of the Likert scoring, with means ranging between 1.75 and 2.09, were the HR issues of planning for increased absenteeism when child daycare centers close,

establishing liberal work from home policies and providing technologies and access to office records allowing productive work from home to happen. Modified leave and payroll policies and cross training of personnel to perform key jobs were also scored in the moderate range with more universities (4 to 7) having no mention of these aspects in their plans (0 points) vs. only 1 to 4 respondents rating them as essential elements (4 Likert points).

Table 16: Rank Order of Importance for Human Resource Aspects of a Pandemic Plan

Human Resource Aspect of Pandemic Plan	**No Mention 0 points**	**Low Priority 1 point**	**Moderate Priority 2 points**	**High Priority 3 points**	**Essential Element 4 points**	**Mean Likert Score**
1. Define criteria for suspending university operations	5	0	9	10	9	2.55
2. Determine critical faculty/staff needs	3	0	12	11	6	2.53
3. Draft plan for shutting down campus	5	1	8	12	7	2.45
4. Restrict travel during pandemic period	2	5	9	13	4	2.36
5. Plan for faculty/staff communication during shutdown	2	3	15	10	3	2.27
6. Assure accuracy of faculty & staff contact information	4	3	11	10	5	2.27
7. Provisions for suspending athletic or social events	5	4	9	10	5	2.18
8. Draft plan for reopening campus	6	0	11	12	3	2.12
9. Plan for increased absenteeism due to child care closure	4	5	12	8	4	2.09
10. Establish liberal work from home policies	4	5	13	7	4	2.06
11. Develop policy for personnel lacking paid leave	7	3	12	8	3	1.96
12. Facilitate technology allowing productive work from home	6	4	13	7	3	1.91
13. Assure home access to key records and files	4	7	13	8	1	1.85
14. Cross training of employees critical to operations	6	5	16	5	1	1.75

Human Resource aspects included in this survey looked at business continuity, labor relations, leave policies, staff communications, and event coordination. The Likert scoring, prioritizing the importance of these aspects by survey respondents, named suspending university

operations, providing critical faculty and staff needs and drafting plans for shutting down campus as the top three factors. Interestingly, even the three highest ranked issues averaged just over a 2.5 level of importance on a 4 point Likert scale.

The list of priorities with low to moderate Likert scores ranging from 1.7 to 1.9 were cross training of employees to perform critical functions, remote access to key records and files and providing technologies permitting staff to work from home. Various other issues such as travel restrictions, postponing classes and social events and other faculty or staff policy changes rank in the middle of the 14 human resource aspects considered. One reason for the lower priority scores given these Human Resource considerations in pandemic planning may be that the General Aspects considered in Question 18 and the Medical Aspects listed in Question 20 are more prominently addressed in CDC and other published pandemic plans. It could also be that a rapid response to an emerging pandemic crisis with effective leadership, good plan implementation and proper medical attention overrides concerns about employee needs, paychecks and maintaining business continuity. While these Human Resource aspects are important in the long run for a swifter campus recovery, in this survey, they are secondary to protecting the health and safety of those involved in the initial pandemic response.

4.1.20 Question 20 - Ranking the Importance of Medical/Health Aspects to Pandemic Preparedness Plans

In the final survey question, respondents again assigned 0 to 4 Likert scores to each of 15 medical or health aspects based on the importance to their Pandemic Plans. Thirty-three (33) universities responded to this question again with two universities missing one aspect in their

answer. Table 17 presents the results in descending order of importance for each medical/ health aspect based on the mean Likert scores applied by the respondents.

As seen in Table 17, the top three ranked medical/health related aspects in university pandemic preparedness plans were 1) recommendations for hand hygiene, 2) encouraging sick employees to stay away from campus and 3) having aggressive flu vaccination programs. Between 24 and 27 of the 33 universities responding to this question rated these aspects as high or essentially important to pandemic planning.

Aspect numbers 4 to 8 relating to communications with local, national and global medical agencies, setting common sense infection prevention and cleaning guidelines ranked slightly lower with 20 or 22 Universities giving them high and essential scores. Factors 9-13 dealing with personal medical screening, quarantine provisions, stockpiling medical supplies and protecting high risk individuals were rated less important to the plans with between 12 and 17 universities scoring them high or essential element ratings.

Aspects 14 and 15, setting the requirements for vaccinating students, faculty and staff received the lowest importance ratings with 14 universities not mentioning them at all in their pandemic plans or scoring them low to moderate in priority. Nine and ten of the 33 respondents still scored these vaccination requirements highly important to essential for pandemic preparedness planning.

Among the highest ranked Likert scores noted in this study were the Medical and Health aspects addressed in survey question number 20. During a flu pandemic, as with other contagious illnesses, people understand the importance of washing their hands, staying home when sick and getting vaccinated to prevent infectious disease (CDC 2009). These were the top three issues ranked on the survey with Likert scores ranging from 2.97 to 3.09. This message is reiterated

time and again in the media and by health care professionals whenever an infectious illness is at play. Paying attention to federal and community health alerts concerning a possible pandemic along with recommendations for health screening, social distancing, infection prevention actions and quarantine were also among the top ranked aspects of this question.

Table 17: Rank Order of Importance for Medical/Health Aspects of a Pandemic Plan

Medical / Health Aspect of Pandemic Plan	**No Mention 0 points**	**Low Priority 1 point**	**Moderate Priority 2 points**	**High Priority 3 points**	**Essential Element 4 points**	**Mean Likert Score**
1. Hand Hygiene recommendations	2	1	3	12	14	3.09
2. Advise sick employees to stay home	1	0	8	14	10	2.97
3. Coordinate flu vaccination program on campus	2	0	4	18	9	2.97
4. Communicate with hospitals & health departments	2	0	10	9	11	2.84
5. Inform committee of CDC, WHO & FEMA flu updates	3	3	6	7	14	2.82
6. Recommend surface cleaning practices	3	1	8	11	10	2.73
7. Recommend social distancing requirements	2	5	4	11	11	2.73
8. Establish cough & sneeze control guidelines	3	2	7	13	8	2.64
9. Set quarantine provisions for on campus students	4	2	12	7	8	2.39
10. On campus flu screening of employees	4	4	8	12	5	2.302
11. Set quarantine provisions for faculty, staff & students returning from travel	3	5	13	7	5	2.18
12. Stockpile flu related medical supplies	4	6	7	13	3	2.15
13. Develop plan to ID and protect higher risk individuals	5	7	8	9	4	2.00
14. Set flu vaccination requirements for faculty & staff	7	7	10	5	4	1.88
15. Set flu vaccination requirements for students	7	7	9	6	4	1.79

As the pandemic flu approaches a university campus, recommended restrictions by health agencies are expected to increase. Many of these health restrictions received lower priority

rankings on the survey with Likert scores ranging from 1.79 to 2.39. People in general don't like to be told what to do for their personal healthcare as evidenced by firings over flu shot refusal, misconceptions about flu vaccines, pharmaceutical conspiracy theories etc. (Health Impact News 2014). Doctors, nurses, paramedics, and other healthcare providers, however, are serious about this advice. Even non-medical personnel, private citizens, will put themselves in harm's way to help others in need even at great personal risk to themselves. However, personal interests and the basic drive for self-preservation may tend to overshadow ethical or moral inclinations to protect others when a medical panic sets in. Violence and hording, may also affect who will get treated when medications supplies run short or essential personnel are absent to provide help as evidenced by the Ebola outbreak in West Africa (Draper, et.al. 2008), Mody, 2007, OSHA, 2009).

4.2 SUMMARY OF RESULTS AND DISCUSSION

The purpose of this survey research study was to evaluate pandemic influenza preparedness at major universities in the United States and to gauge their efforts at maintaining a high level of preparedness in the time period since the pandemic flu outbreak in 2009-2010. In reviewing answers to the 20 questions in this survey, this researcher attempted to determine whether the surveyed university emergency plans were in substantial agreement with current CDC and WHO guidelines for effectively and comprehensively preparing for, responding to and recovering from pandemic emergencies at their institution and in the nearby community.

Survey questionnaires were e-mailed to CSHEMA (Campus Safety, Health and Environmental Management Association) destinations using the Qualtrics® survey software

required by the University of Pittsburgh. Of the 216 surveys e-mailed, 114 (53%) were opened by the recipients. Thirty-six universities participated in the survey with 33 answering most of the applicable questions leaving a few answers incomplete. While the overall survey return rate of 16.7% was lower than desired, the data obtained did provide insight into some of the current thinking about Pandemic Planning at larger U.S. universities.

Descriptive analysis was performed on all 20 survey questions, including the first three questions on enrollment figures, the percentage of students housed on campus and the population density surrounding the main university campus. Given the number of responses and the anonymous nature of the survey, comparative statistics were deemed infeasible using population or location data from questions 2 and 3 so descriptive analysis continued for questions 4-10 on how pandemic plans and committees were organized, structured and administered. A comparative statistical analysis using Likert scoring was performed on Question 11 to better evaluate replies addressing how quickly university pandemic committees believed they could learn about arising needs, develop new response strategies and change their emergency plans during a crisis. While Likert scores indicated that approximately 77% of the responding universities on average could learn develop and make changes to their pandemic plans within a week, less than 24% on average indicated they could accomplish these tasks in one day or less. Descriptive analysis resumed in questions 12-17, which addressed planning methodology, plan revisions and enhancements for issues concerning vaccinations, responsibilities, supply stockpiles, agreements with outside agencies and communications via social media.

Likert scores were also applied to the final three questions to determine the relative priorities applied to the general, medical and human resource aspects of university pandemic plans. The Likert scores, totaled from survey replies, were used to give some measure as to

where the pooled universities were investing their time, talents and money when developing emergency preparedness plans. This scoring was done with the hope of providing universities some theoretical benchmarks for where to expend their resources, better enabling them to invoke an effective response to a pandemic flu crisis if one occurs. The mean Likert scores were calculated for these questions based on the number of survey respondents to each question

In summary, this study made an effort to survey key individuals from emergency planning groups at larger universities in the U.S. to gather information on what is important in their pandemic flu plans and how their committees and plans are structured. The survey responses gave an indication that many of the university plans were in substantial agreement with current CDC and WHO guidelines for effectively and comprehensively anticipating, preparing for, responding to and recovering from pandemic emergencies at their institution and in the nearby community. Some shortcomings, particularly those involving Federal agency collaboration, lower priorities given some human resource planning aspects and practice drills were noted. The data generated from this research study will hopefully provide pandemic flu planners with useful comparisons to their peer universities for judging when their plans are sufficiently robust to meet a pandemic threat and to minimize the impact on their campus in the face of rising costs, shifting university priorities and increasing demands on their time.

Logistical limitations, priority given emergency preparedness, budget restrictions of public vs. private universities, risk tolerance, available resources from communities, cooperation from state or local health departments and nearby medical centers and support from local police, fire and EMS are just some of the issues universities need to consider when developing their pandemic emergency plans.

5.0 CONCLUSIONS AND RECOMMENDATIONS

This dissertation was written from the perspective of an Environmental Health and Safety (EH&S) professional for EH&S Directors and other university personnel responsible for developing and managing Pandemic Preparedness Programs. Its goal was to give university leaders a compass to determine if they had optimized their committee participation, planning scope, plan content and level of effort with regards to their Emergency Preparedness Program to assure an effective response to and recovery from a future pandemic event.

The final determination of this optimization can only be determined after the pandemic occurs and a comprehensive study is made of the outcomes at each institution. However, constructive information on what to include and setting priorities is needed to compare a university program to model Pandemic Plans developed by Federal or International agencies tasked with disease surveillance and maintaining public health. Also, much can be learned by comparing a university's Pandemic Plan with those of peer institutions in the struggle to develop an effective plan for their university. With these intended goals, this dissertation now offers the following conclusions and recommendations.

This study was a survey-based research project with quantitative descriptive analysis of data from the survey questionnaire responses received. A Qualtrics® e-mail survey was sent to Environmental Health and Safety Directors at universities across the U.S. assessing Emergency Preparedness Committee organization and their level of pandemic influenza preparedness in

comparison to a response framework developed by the Centers for Disease Control and Prevention (CDC) in Atlanta (CDC, 2010). The design of the questionnaire and data analyses was intended to provide university pandemic plan coordinators with metrics on Pandemic Committee organization, planning methodologies, key elements to include in the plan and when they have optimized their strategies i.e. have a comprehensive plan in place for a pandemic flu emergency on their campus relative to other peer universities and in comparison to CDC guidelines. The next three sections will evaluate the survey questions' effectiveness in answering each of the three main research questions.

5.1 PANDEMIC FLU COMMITTEE ORGANIZATION

This research question asked, "When organizing Pandemic Flu Committees, do universities optimize representation by departments, campus groups and outside agencies?" This question was addressed in the collective answers to survey questions 1, 2, 3, 5, 6, 7, 11, 14 & 16. The survey findings of this dissertation demonstrate that the CDC/WHO Pandemic Flu Guidelines have influenced planning efforts for most of the universities polled in this study. Based on the higher percentages (60-83%) of universities reporting current pandemic plans, frequent updates, active committees, participating departments and high level leadership it was apparent that federal guidelines were being followed by the majority of respondents.

Optimizing representation on a Pandemic Flu committee is going to depend on the size and location of the university along with the number of students living on campus assumed to be the responsibility of the Student Health program. These issues were addressed in the first three

survey questions that were focused on larger, doctoral degree granting universities who were also CSHEMA members.

In their 2010 guidance document of influenza response for higher education, the CDC provided a listing of key decision makers and stakeholders to be involved in pandemic flu preparations at universities. The list included the following departments or outside organizations: local and state health departments, Homeland Security agencies, campus security and emergency managers, student affairs and residence life, communications staff, physical plant staff, food services, student and faculty leadership, community representatives, and student families.

This study of larger CSHEMA universities indicated that the majority of these campus groups and local outside agencies were listed as planning committee members on the collected surveys. Although, student families, federal agencies and individual students and faculty members were give lower priorities or were not specifically listed on any survey response. The universities Directors responding to the survey appear to have an understanding about the key decision makers at their institutions and the importance of committee members being able to work together, learn of needs, develop plans and change strategies, often times very quickly, to achieve a better outcome.

5.2 ELEMENTS TO INCLUDE IN A PANDEMIC PLAN

This research question asked, “Do universities’ Pandemic Flu Plans include elements that are comprehensive in scope and content?” This question was addressed in survey questions 8, 10, 14, 15, 16, 18, 19 & 20. One intended outcome of this study was to broadly determine if larger universities have let their pandemic preparedness efforts lapse in the six years since the last

declared flu pandemic or have they modified their plans annually incorporating the key elements included with the CDC/WHO recommendations of 2010. Pandemic Plan modifications recommended by the CDC in their "Preparing for the Flu" publication included the following 11 steps. (CDC, 2010)

1. Review and revise flu or emergency response plans annually including plans to protect high risk students, faculty and staff.
2. Collaborate with local health departments, social organizations and businesses in the community.
3. Communicate with vendors who supply critical products and services ensuring continued service during flu period.
4. Update emergency contact information for students, parents, staff and faculty.
5. Establish contacts for local medical, public health and education agencies.
6. Develop a plan to staff key positions at your institution (housing, medical, facilities).
7. Encourage good hand hygiene and respiratory etiquette via posters, flyers and other direct education means.
8. Develop flu prevention resource materials to communicate with students, parents, faculty and staff. (CDC Toolkit, 2009)
9. Adjust sick leave and absenteeism policies allowing faculty, staff and student to stay home without negative consequences during flu episodes.
10. Develop options to allow work and lessons to continue from home if university suspends classes or closes campus.
11. Help students and staff understand the role they play in controlling the spread of flu.

The data shown in Question #8 of the survey indicated that only 24% of the universities polled have updated their pandemic plans every year as recommended. This percentage shows low compliance with the CDC guidelines. However, 74% of the universities responding had updated their pandemic plans at least once since the last declared flu pandemic in 2010 with 42% reportedly updating their plans every one to three years. Most of the CDC recommendations listed above did appear in the university survey elements for questions 18-20. In particular, collaboration with local health departments, hospitals and EMS, stockpiling critical supplies, designation of key personnel or services, infection prevention, emergency communications and suspending campus operations each given higher priorities on the Likert scaling in Questions 18-20.

Scoring the level of emergency preparedness for each plan with regard to pandemic flu surveillance, risk assessment, continuity preparedness, assigned responsibilities, community participation, counter measures, communications, training, and overall response to an influenza pandemic would be difficult given the anonymous way survey data was collected in this study. A qualitative evaluation would be achievable only if each university had self-rating their flu plans or if their emergency preparedness websites were evaluated using the pandemic planning guidelines from the CDC to provide a rating scale or comparison standard. Perhaps this kind of qualitative analysis can be considered in future studies.

5.3 IMPLICATIONS OF UNIVERSITY PREPAREDNESS

This research question asked, “How does the Pandemic Flu Plan fit into the larger university emergency planning framework for ongoing course instruction, research, and business

continuity?" This question was addressed in survey questions 4, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 & 20. Pandemic Plans have many unique components, especially from a medical standpoint that are not included in most University Emergency Plans. While Pandemic Plans often stand alone, many elements can be incorporated into an All Hazard Emergency Plan to ease the burden on campus planning committees. Many of the business continuity efforts during a pandemic should be similar to efforts needed during other long duration or high impact emergencies disrupting campus life. Another objective of this dissertation was to answer the practical question posed by many university pandemic planners around the country giving them some idea when they have optimized their efforts to assure an effective response to and recovery from a pandemic emergency. In reality, optimization is a hypothetical answer that no one can really determine until the pandemic emergency takes place and university officials have an opportunity to judge if their response was sufficient to minimize the short term and long term impacts of the crisis.

The answer to this research question as indicated by the survey data has determined that the universities surveyed have at least considered making plans to maintain some semblance of business continuity during a campus emergency especially regarding education continuance, research efforts and event planning? Again it would be difficult to judge if a university's business continuity plans are sufficient or not until after the event has happened and a critique of the emergency response effectiveness is made. While these "post mortem" critiques are commonplace in every aspect of our society, waiting for a potentially ruinous pandemic to occur before developing a university preparedness or business continuity plan seems unwise. Certainly, learning what today's experts in the medical, university management or EH&S professions are recommending for pandemic preparedness combined with how peer institutions and their

emergency planning committees are proposing to respond and recover from any crisis can set benchmarks for which to strive.

5.4 LIMITATIONS OF THE STUDY

A number of limitations were encountered during this survey including the following;

- Less than 53% of the universities acknowledged receipt of the survey questionnaire.
- Less than half of those receiving the questionnaire attempted to answer all questions.
- Requesting total student populations in Question number 1 may have biased school size relating to pandemic preparedness as commuters, online learners and grad students living off campus would likely not be part of the university's response plan.
- Six respondents to Question number 2 asking for the on-campus student population answered the question incorrectly thereby invalidating use of this data in statistical analysis.
- Of the 44 university Directors submitting the survey, eight (8) were excluded from the study because they answered six or fewer questions.
- Of the 36 accepted surveys, five respondents did not answer between 3 and 9 questions, either because they did not have a pandemic plan or committee and considered a response inappropriate.
- The anonymity requirement for the survey prohibited contacting the respondents to clarify survey responses.

- Most university websites publicize limited information on their pandemic plans often omitting details about plan responsibilities and response strategies making fact checking difficult even when the responding university was known to the researcher.
- This survey assumed the individual completing the questionnaire was the most qualified to provide the correct information. Some may not have had the information at hand leaving answers blank.
- Respondent's unfamiliarity with All Hazard Planning verses the Incident Command System or the SITAR planning methodologies may have resulted in an incorrect characterization of their university pandemic plans.

  Strategies to minimize or correct these limitations and to more clearly define the survey questions would certainly improve the outcome of this survey for future studies.

5.5 RECOMMENDATIONS FOR PANDEMIC PREPAREDNESS

5.5.1 CDC/WHO Flu Prevention Strategies

The Centers for Disease Control and Prevention (CDC) issued a pandemic preparedness strategy for institutions of higher education during and after the WHO's pandemic flu declaration in 2009. The following key elements included in this CDC prevention strategy have remained essentially unchanged since they were presented (CDC, 2010).

1. Encourage vaccination against the flu, with higher risk groups first in line.
2. Facilitate self-isolation of students and staff having flu symptoms, at home if possible.
3. Establish system to check on and care for students remaining on campus. (Flu buddy)

4. Revise absenteeism policies to discourage sick individuals coming to campus.
5. Establish distance learning programs and work from home policies during a pandemic.
6. Promote sneeze and cough etiquette and hand hygiene providing soap, water and hand sanitizer in convenient locations.
7. Avoid close contact with sick individuals (social distancing).
8. Perform periodic cleaning of frequently touched surfaces (door knobs, hand rails, etc.)
9. Seek medical treatment and anti-viral medication (if prescribed) at first manifestation of flu (Gavura, 2014).
10. Use PPE (gloves, masks) when close contact with sick individuals cannot be avoided.
11. Limit or suspend campus events during flu period and encourage sick not to attend.
12. Establish restrictions for study abroad students, campus tours, sporting events, and other large gatherings during flu period.

5.5.2 Added Strategies as Flu Severity Increases

When the CDC and WHO determine that the Flu Pandemic is spreading globally, nationally or regionally the following additional actions are recommended by the CDC, (2010)

1. Encourage students, faculty and staff to remain at home continuing to perform education and work activities as best they can using distance learning, Blackboard chat rooms, remote file access, etc.
2. Increase social distancing as much as possible (6 foot minimum recommended).
3. Postpone or cancel campus events.
4. Extend the self-isolation period to 7 days when flu symptoms are realized.
5. Suspend classes and close buildings when untenable to continue operations.

6. Establish clear lines of communication with all students, their parents, faculty and staff via campus website, emergency alerts and social media.
7. Frequently update communications for all aspects of campus life affected announcing what is suspended, what services are available, campus restrictions, medical treatments and who to call for additional information.

Comparing these straightforward CDC recommendations with the collective survey responses, it was apparent that, as a group, the universities completing the survey appeared to have an understanding of what is required or recommended in their Pandemic Emergency Plans. Looking at the individual survey replies, as one might expect, universities committing more time and resources to their flu preparation plans have addressed most if not all of the key elements stressed by the CDC and WHO.

5.5.3 The Reality of University Emergency Planning and Some Practical Considerations

No one would argue that having a Pandemic Plan that addresses all of the key aspects of a CDC or WHO model plan is a starting point for a university planning committee. Taking the basic federal guidelines and comparing it with your peer university groups or local emergency planning organizations, customizing it to better fit the particular needs or those of the community can make it even stronger. Universities, however, are busy places and department managers within those institutions constantly struggle to complete day-to-day tasks. The Environmental Health and Safety or Public Safety Department whose job it might be to develop, implement and manage Emergency Management Programs on campus, must consider many hazards or risks and set priorities, addressing first the higher probability, higher impact issues.

Figure 2 displays an example of a decision making matrix to help organizations decide where to commit their time, talent and resources for cost effective emergency management.

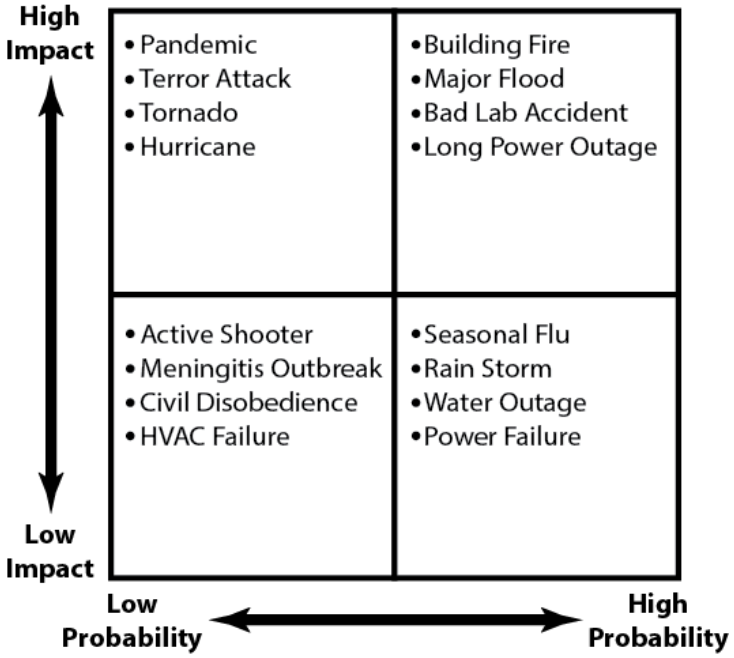

Figure 2: Decision Matrix for Prioritizing Campus Emergencies
Source: Created by the author.

In an All Hazard planning effort the likelihood of a pandemic flu or some other deadly illness impacting a university campus is a lower probability event when compared to a fire, weather emergency, riot, or terrorist event. Despite the lower probability often perceived for a pandemic flu, should one occur, the potential for loss of life and campus disruption could be devastating. In light of these facts, University Pandemic Planners should consider implementing the following recommendations based on this dissertation study.

1. Each year, planning leaders should determine if there have been any changes to federal, state or local guidelines and CDC or WHO flu alerts that impact their Pandemic Plans. If so Plans should be modified to address these issues.

2. Each year, planning leaders should verify that all University committee members are still willing and able to serve and that their contact information is current.
3. Each year, University management should be informed on the status of their Pandemic Plan as well as other Emergency Plans at their campus. Management should also be made aware of their Emergency Planning Committee participants to acknowledge this important responsibility and confirm their continued support.
4. Each year, the outside agency coordinator on the Pandemic Flu Committee should contact each agencies listed in the Plan to confirm their continued support and to update contact information and current expectations under the Plan. Periodically Mutual Aid Agreements should be developed to formalize what resources would be made available during a crisis or emergency.
5. In addition, this same person or persons should contact University management to confirm that they are still committed to holding up the university's end of these reciprocating agreements to provide supplies, temporary housing and aid to these outside groups during a crisis or emergency.
6. Every two years, University Emergency Planning Committees should meet to reevaluate their plans to prioritize the time and resources allocated to the possible crises events. Perhaps a simple 4 block matrix, as shown in Figure 2, can be created to segregate high and low probability emergencies further classifying them as high or low impact events for their University Campus location.
7. Every two years Emergency Planning Committees should perform a SWOT analysis to evaluate the strengths, weaknesses, opportunities and threats impacting the campus. Using this information, planners can determine what equipment and resources to

stockpile and in what quantities to assure adequate supplies during a crisis. The matrix shown in Figure 2 could also be used to stock up on supplies useful for multiple emergencies, especially items that have a long shelf life or can be part of a rotating stock of materials used during day to day university operations in order to minimize waste.

8. Pandemic Planning Committee should perform table top exercises every 2-3 years to be sure that all parties know their roles when a pandemic is declared by the CDC or WHO. Outside agencies should be invited to these exercises to better evaluate established coordination efforts aimed at minimizing duplication and cost when response plans come together.
9. Every 3 years Emergency Planners should gather data to estimate how many students, faculty or staff might have to remain on campus becoming the responsibility of the university to care for during a pandemic emergency. Ideally, the intent is to send most people home to minimize the flu impact on campus, leaving only those students unable to return home or key staff required to remain on campus under the care of the university.
10. Management, faculty and students from medical schools, nursing schools and other health related professions at the university should be asked to commit their time and talents during a pandemic emergency when Hospital staff and resources are over extended. An example of this would be using student volunteers to administer seasonal flu vaccinations or assist during campus blood drives.

Another consideration for Pandemic Planners, during this modern age of instant global communications combined with the diligent “flu watch” efforts of medical epidemiologists, is the likelihood that no one will be surprised by a flu pandemic. Local health departments and

those they serve should have several weeks warning about an emerging flu pandemic giving universities and others time to plan and prepare.

5.5.4 Federal Disaster Preparedness Efforts

All three of the research questions in this dissertation involved some level of coordination with outside agencies including the Federal Government. Universities are encouraged to develop these relationships and to keep them “in the loop” when developing campus emergency plans. FEMA and the CDC can provide much needed information, support and critical supplies during an emergency.

National Public Radio (NPR) recently reported on Government warehouses stocked with essential medicines and supplies ready for public health catastrophes (Greenfield-Boyce, 2016). Reportedly there are at least six of these warehouses strategically placed around the U.S. to provide rapid access to “at risk” population centers in time of need. The locations of these warehouses and their exact contents remain undisclosed in the interest of national security. The warehouses are operated by a number of federal agencies ranging from the Department of Defense to the Food and Drug Administration.

Universities who are aware of available government programs and have developed a working relationship with the local agency contacts could incorporate some of these Federal resources into their planning efforts and develop protocols for gaining access to them in a crisis. Perhaps a mutual aid agreement can be established whereby the agency can make use of some university facilities for overflow casualty housing or sharing of resources stockpiled at the university.

During the NPR interview and site visit to one of these warehouses, CDC Program Director, Greg Burel commented that the Strategic National Stockpiles were first created in 1999 in preparations against terrorist attacks involving nuclear, chemical or biological weapons. Some of the current inventory, valued at more than 7 billion dollars, consists of vaccines against smallpox, anthrax and other bioterrorism agents, chemical agent antidotes, and medicines used to treat radiation exposures. Since the 9/11 attack in 2001, Hurricane Katrina in 2005, and the 2009 flu pandemic the importance and focus of these warehouses has expanded to provide medical triage supplies, antiviral medicine, food, water and other essentials required during many kinds of national emergencies.

One of the most interesting items described by the NPR reporter (Greenfield-Boyce, 2016) was the 12-hour push packages. Approximately 130 of these 50 ton shipping containers at each warehouse are pre-packed with pharmaceuticals, ventilators, IV fluids and other essential emergency supplies designed to be loaded on a truck beds, trains or transport aircraft for delivery to Emergency Responders at the disaster site within 12 hours. The containers are color coded and packed with all of the supplies needed to respond to a particular kind of emergency. Custom supplies can also be ordered from a warehouse catalog to accompany the push packages as needed.

At the urging of Congress, a committee was formed to study the effectiveness and sustainability of these warehouses. The committee determined that although the warehouses contain many kinds of the essential supplies, some of which, like vaccines, will expire after several years and continually need to be discarded and replaced at a high cost. In addition, the audit determined that some state and local public health resources have declined over the past decade with a loss of 50,000 health officials. These local health officials and responders are the

individuals who would be expected to receive, deploy and distribute the warehouse shipments during an emergency. Despite these logistical downsides, directors at the warehouse are confident that they can still provide essential supplies during an emergency and they continue to operate (Greenfield-Boyce, 2016). One might question if universities are on the list of recipients for such emergency supplies or if they would have access to these resources. Logically, larger universities and their affiliated medical centers with the available of dormitory rooms, auditoriums and gymnasiums to serve as potential triage sites should be considered as a key resource for community pandemic response. In additional the medical personnel available at most large universities, including doctors, nurses, medical researchers, as well as volunteer medical or nursing students and those from other health related professions and could prove invaluable during a pandemic crisis.

5.5.5 The Next Pandemic

A 2016 study conducted by the U.S. Department of Homeland Security's (DHS) National Bio-surveillance Integration Center (NBIC) concluded that the next influenza pandemic would cost twice as much as previously estimated (Society for Risk Analysis, 2016). These costs however would depend on how well the public, government and businesses prepare for and respond to the epidemic. Risk experts concluded that cost could be reduced from $45 to $34 billion dollars with diligent use of vaccines and rapid deployment of more effective antiviral medications.

Most of the economic losses from a pandemic would be related to hospital expenses and lost business productivity from deaths, illnesses, and reduced workforces staying home to deal with family issues. Besides the ineffective use of flu vaccines, further cost reductions could be

realized if the public would comply with CDC recommendation to avoid confined public places like subway stations and airports, limit attendance at concerts and sporting events during a pandemic flu, practice social distancing and quarantine sick individuals (Society for Risk Analysis, 2016).

The DHS study concluded that, for both seasonal and pandemic flu outbreaks, vaccinations are the most effective way to reduce the overall spread of the flu and to limit the resulting economic impacts. With the addition of effective avoidance and resilience measures the study estimated that economic losses to the U.S. Gross Domestic Product (GDP) could be reduced by almost $10 billion dollars (Society for Risk Analysis, 2016).

5.5.6 Worst-Case Scenarios: How Should We Plan?

Sandman, (2007) and Harmon (2011) speculating on the worst-case scenarios of the next influenza pandemic raised issues on risk communications, preparation planning and business continuity. Sandman (2007) discusses the dilemmas faced by senior executives of any organization having to make business decisions for a worst case scenario like a pandemic influenza outbreak. The difficulty comes from simultaneously thinking about a risk that has multiple adverse outcomes but is unpredictable in its likelihood to occur. While not intellectually difficult, knowing that most catastrophic events are unlikely, leaders logically tend to pick one above the other. However, when emotions cloud intellectual reasoning and the focus is placed on the hard lessons learned from past horrific events in a worst case scenario, a decision is made to take maximum precautions regardless of the costs. On the other hand, when decision makers emotionally focus on the low probability of a serious threat, a choice is made not to allocate time or resources to pandemic preparedness.

Sandman (2007) goes on to state that either of these emotional decisions are the wrong approach to take when planning for or responding to a predicted flu event. Acting on the horrific nature of a worst-case outcome runs the risk of creating panic among the planners or the people at risk. Telling people that the risk is very unlikely is taking a gamble with the hope that nothing bad will happen leaving your institution totally unprepared if your decision is wrong. In the interest of maintaining credibility and honesty, Sandman (2007) suggests that leaders explain to their constituents that predicting the severity of a flu outbreak would be impossible because there are too few facts known in advance. Better to assure them that you will be ever vigilant to reliable reports on where flu is spreading and how fast, keeping everyone updated on planned responses appropriate to the risks. In summary, Sandman (2007) recommends using the following guidelines when communicating with constituents.

- Don't claim that a worst-case flu scenario is likely.
- Don't downplay how bad a worst-case flu could be.
- Don't rely too much on numbers to convey your point.
- Always put your worst-case scenario into context by not understating or overstating how bad the flu may become.
- Consider the importance of planning for less than the worst case flu scenarios.
- Remind decision makers that it is good business practice to hedge your bets.
- Expect the unexpected and prepare to change your plans.

In a *Scientific American* article where the author interviewed several leading experts attending a European conference on influenza, Harmon (2011) related how important it was for researchers and public health officials to make use of the latest scientific discoveries about flu virus behavior along with the past lessons learned when preparing for the next influenza

pandemic. In addition, researchers must continue to study how these viruses mutate, how they grow and spread from animal species to humans, why they preferably infect victims of certain age groups and which of the virus mutations under surveillance might emerge as the next pandemic flu.

The article also conveys the historical fact that during the 2009 flu pandemic declared by the WHO, experts were closely watching bird (H5N1) and swine (H1N1) flu outbreaks spreading through animal populations in Africa and Southeast Asia (Harmon, 2011). These experts were caught off guard when the H1N1 swine flu virus began infecting humans in Mexico and quickly began spreading into the United States leaving little time for medical experts to prepare treatment regimens or develop a vaccine. Fortunately, this flu outbreak was milder than expected and we learned that older adults had retained some immunity from previous flu vaccinations. We also learned that college age youth were reported to be at highest risk for catching the flu and numerous deaths were reported among this age group. This is another reason for optimized flu plans at a university.

Harmon (2011) relates how efforts to understand and predict future pandemic flu outbreaks must continue to focus first on the spread of flu strains in animal populations around the globe. Mutations of these virus strains must then be studied by researchers with the goal to find faster ways to develop and test effective flu vaccines. The current four to six months required to develop a flu vaccine against an emerging pandemic virus will not be adequate. Harmon (2011) commented on some of the logistical challenges facing the world during the next pandemic influenza, namely shortages of emergency supplies, hospital beds and emergency staff willing to put themselves at risk. From all that has been written about pandemic preparedness since 2009, federal, state and local governments, health departments, emergency responders and

medical providers in the U.S. appear better prepared to contain, treat and recover from a pandemic flu but what about the rest of the world?

World renowned experts acknowledge that global eradication of influenza viruses will be impossible and predicting flu severity or spread and the availability of effective treatments will remain uncertain (Harmon, 2011). In spite of this dilemma, our methods of communicating these uncertainties to the media and general public must be improved if only to gain trust and prevent panic during a public health response. Harmon (2011) concludes by describing three lessons learned from the last pandemic flu that must be put into action when planning for the next one.

1. Organizations must make pandemic plans capable of handling many different scenarios.
2. Pandemic plans must be comprehensive, flexible and able to adapt quickly to changing conditions.
3. Plans must be kept up to date, refreshing supply stockpiles and reevaluating needs based on the latest research of flu viruses, exposure prevention and effective treatments.

5.5.7 Recommendations for Future Study

Future studies of pandemic emergency planning should continue to evaluate the effectiveness of written emergency plans and preparedness activities stressing the importance of leadership, committee dedication, realistic expectations by its members, interaction with state and local health departments, and willingness of university partners and community stakeholders to participate in drills and exercises even in the face of budget cuts and low risk tolerance.

In future studies using the Qualtrics® survey system, it would be recommended to formally contact the survey population in advance of the questionnaire mailing to establish a relationship with the individuals making them aware of the pending solicitation. In this way,

perhaps one can learn of the best contact person, someone who may be more knowledgeable about your subject and willing to participate in the survey. This was done with a Pilot group in this project, and while there was limited negative feedback, respondents knew what was being asked of them and they remained willing to complete the survey.

Using the Qualtrics® survey system and complying with the IRB recommendation for making this an anonymous survey, created some problems and limited the usefulness of some data. One example of this was survey Question 2 that asked what percentage of students lived on campus. Four of the 36 respondents to this question gave a raw number rather than the percentage. Being unable to link these replies to the Universities, these data could not be included in the descriptive statistics.

Another comparison that would have been interesting to look at was community involvement and support depending on the university's location in a rural vs. an urban setting. The hypothesis suggested would have been that residents in a small rural community would be more likely to become personally involved in a pandemic tragedy at the local campus bringing the community together with a desire to help. Unfortunately, as the data was collected anonymously there was no way to determine which survey responses for Question 3 came from large urban universities verses smaller colleges or rural campuses. This could be a potential area of future research on campus/community relations.

Future studies in this area might also compare the amount of money spent on pandemic preparedness based on the size of the university and its geographic location. Speculation might surmise that Colleges and Universities in metropolitan or urban settings might be able to share costs and resources with the surrounding communities in the spirit of cooperation and mutual

aid. This study might also focus on “Town and Gown” relationships rating them as good, fair or poor.

As with most research, future studies take the lessons learned from what has been done in the past and move forward into uncharted territory exploring new ideas and mining additional information previously overlooked. This research statement is especially true for the broad world of emergency preparedness and even the smaller subset of pandemic preparedness where there is so much more to explore. Much has been learned and written about preparations, response and recovery from the next pandemic influenza and indeed many of the techniques and response action proven effective in real world events albeit on a smaller scale or with a less deadly agent.

As previously stated about lessons learned with war planning and preparations, once the battle begins, often the best laid plans are found to be ineffective. Unpredictable events, genetic mutations, ineffective medications, unexpected reactions by stakeholders, political figures, or the public are just a few scenarios of what can go wrong with the best preparations.

Any stakeholders including government experts, emergency responders, campus officials, local health department, medical staffs and the general public must maintain preparations and keep vigilant of pandemic risks. Old plans, new plans, old tools and new tools must be tested and revised over and again to assure effectiveness. Organizations and political structures must be constantly reviewed to maintain current communications and participation. Drills, exercises should be conducted with sufficient frequency to gage readiness and to modify plans when shortcomings are realized. Finally, all involved in pandemic preparedness at a university campus and the surrounding community must understand that successful planning can only be realized when a pandemic event like the flu occurs and the response is timely and effective as measured

by minimal fatalities, adequate care for the sick and quick restoration of classes, research and business operations.

As discussed by many authors referenced in this document, planning is critical to the success of any operation even though plans should be expected to change. Failure to plan for an emergency event like a pandemic flu is a mistake likely to result in an ineffective response, a poor casualty outcome and a slower recovery. While not perfect, universities with an active emergency planning committee are better equipped to anticipate their needs, quickly recognize a potential problem, logically evaluate the risks and better control the outcome and cost of their response. Indeed, “failing to plan is planning to fail.”

APPENDIX A

QUESTIONNAIRE EVALUATING THE PANDEMIC PREPAREDNESS OF A UNIVERSITY

Q1. Please select one of the choices below estimating the total student population at your university's main campus.

- o Less than 10,000 students
- o 10,001- 20,000 students
- o 20,001 – 30,000 students
- o More than 30,000 students

Q2. Please provide a percentage estimate of students living in on-campus housing at your main university campus.

Q3. Based on the USDA County Rural-Urban Continuum Code how is the location of your main university campus best described?

Q4. Does your university have a written Pandemic Preparedness Plan?

- o Yes
- o Don't know
- o No

Q5. Does your university have a Pandemic Preparedness Committee?

- o Yes
- o Don't know
- o No

Q6. If you answered yes to Question 5, indicate each university department represented on your university's Pandemic Preparedness Committee.

o Executive Office	o Academic Affairs	o Legal Services
o Employee Health	o Campus Security (Police)	o Housing Services
o Student Services	o Student Health	o Food Services
o Human Resources	o Faculty Representative	o Physical Plant/ Facilities Mgt.
o Health and Safety	o Public Affairs	o Information Technology
o Communications	o Registrar	o Risk Management
o Other _____	o Other _____	o Other

Q7. Who chairs your Pandemic Preparedness Committee? (Indicate their job title and department)

_____

Q8. How frequently has your Pandemic Preparedness Plan been updated since 2009?

- o Annually
- o Bi-annually
- o Once
- o Not Updated
- o Other _____

Q9. Which emergency management approach best describes your Pandemic Preparedness Plan? (Note descriptors).

- o All Hazard Plan (Bottom up approach, comprehensive plan, vulnerability/pragmatic model)
- o Incident Command System (top down approach, National Incident Management System, technocratic model,
- o Other approach (please describe) _____.

Q10. The SITAR Planning Model (with its 5 segments indicated by the first letter in the name) incorporates a blend of 5 planning models each containing characteristic methodology. Please indicate any of these SITAR model characteristics evident in your University Pandemic Preparedness Plan.

- o Synoptic Planning (comprehensive goal setting, qualitative, central control, feasibility, policy alternatives, cost/benefit analysis, detailed action plan) (1)
- o Incremental Panning (partisan intuition, past experience, democratic decision making, incremental response, consultative, wait and see attitudes, muddling through) (2)
- o Transactive Planning (interpersonal dialog with those affected, emphasis on human dimensions of personal and organizational development, economic self-interest) (3)
- o Advocacy Planning (adversarial, defense of the public interest, social justice, sensitivity to unintended environmental, social or financial side effects) (4)
- o Radical Planning (self-reliant activism, mutual aid, cooperative spirit free from outside manipulation, decentralized operations) (5)
- o None of these planning styles were used (6)

Q11. When a pandemic flu emergency is declaration by the CDC, rapid decision-making by a university's planning committee may be required as new facts are learned and the situation develops. Institutions may have to modify their plans numerous times to better respond to the pandemic on their campus. How would you describe your university planning committee's ability to learn quickly, develop contingency plans, and implement the changes needed for an effective pandemic response? (Mark the correct box with an x.)

Contingency	Slow (>2 weeks)	Somewhat slow (1-2 weeks)	Average speed (1 week)	Somewhat fast (2-6 days)	Fast 1 day or less)
1. learning					
2. development					
3. change					

Q12. Did your university revise your Pandemic Preparedness Plan after the 2009-2010 flu season?

- o Yes
- o No
- o Don't know

Q13. If your Pandemic Preparedness Plan was changed, indicate the modifications made as a result of the 2009 WHO pandemic declaration.

o Enhanced flu screening policy	o More aggressive flu vaccination policy
o More committee members added	o Additional job cross training
o Updated contingency plan	o Changes to stockpiling priorities
o Added travel restrictions	o More practice drills
o Revised vendor contracts	o Revised agreements with local hospitals
o Other _____	o Other _____

Q14. Indicate responsibilities assigned to the Environmental Health and Safety Office in **your** Pandemic Preparedness Plan.

o Pandemic Plan development and maintenance	o Committee selection and coordination
o Considerations for drills and training	o Plan modification as needed
o Maintain stockpile of flu masks, gloves, suits and other pandemic flu supplies	o Other _____

Q15. Indicate critical supplies that your university stockpiles to avert shortages during a pandemic emergency.

o Non-perishable food	o Bottled water	o Electrolyte drinks
o Anti-viral medicines	o Hand sanitizer	o Protective gloves
o Surgical masks	o N-95 respirators	o Protective suits
o Portable beds	o Linens	o Cleaning supplies
o Tissues	o Disinfectant wipes	o Other _____

Q16. Indicate outside agencies coordinating with your university's Pandemic Preparedness Committee.

o Local hospitals	o Local Administration	o Local Police
o Local Paramedics	o Local Health Department	o State Health Department
o Local Businesses	o Food & Beverage Suppliers	o Local Aid Organizations
o Local FEMA Office	o State FEMA Office	o Federal FEMA Office
o Other _____	o Other _____	o

Q17. Which social media outlets might be used at your university to facilitate Pandemic Plan communications?

o Facebook	o Twitter	o LinkedIn
o Google+	o YouTube	o Instagram
o Pintrest	o Tumblr	o Snapchat
o Reedit	o Flickr	o Other _____

Q18. Please assign a numerical grade (0-4) to each of these general aspects based on its importance to your Pandemic Preparedness Plan.

	No mention in plan – 0 Points	Low priority element – 1 point	Moderate priority element – 2 points	High priority element – 3 points	Essential element of plan – 4 points
Identify campus plan leader and response team.	o	o	o	o	o
Delineate responsibilities of key personnel on campus	o	o	o	o	o
Identify decision makers from community and state partners	o	o	o	o	o
Action plan for cancelling classes	o	o	o	o	o
Action plan for cancelling sporting events and extracurricular activities	o	o	o	o	o
Action plan for closing campus	o	o	o	o	o
Emergency housing plans and quarantine	o	o	o	o	o
Plan for feeding and housing students unable to return home	o	o	o	o	o

o Question 18 (continued)					
Plan for feeding and housing essential personnel maintaining critical facilities	o	o	o	o	o
Plan for maintaining key research facilities and animals	o	o	o	o	o
Stockpile of essential supplies and equipment.	o	o	o	o	o
Providing facilities for surge capacity from local hospitals or community	o	o	o	o	o
Emergency communication plan identifying key personnel on and off campus	o	o	o	o	o
Exercise drills on Campus	o	o	o	o	o
Participate in community drills	o	o	o	o	o

Q19. Please assign a numerical grade (0-4) to each of these human resource aspects in your Pandemic Preparedness Plan.

	No mention in plan – 0 Points	Low priority element – 1 point	Moderate priority element – 2 points	High priority element – 3 points	Essential element of plan – 4 points
Cross training of employees critical to operations	o	o	o	o	
Assure accuracy of staff contact information	o	o	o	o	
Assure access to key records, files, passwords	o	o	o	o	o
Establish liberal work from home policies	o	o	o	o	o
Develop policy for personnel lacking paid leave.	o	o	o	o	o
Facilitate technology allowing more people to work from home	o	o	o	o	o
Determine critical faculty/staff needs	o	o	o	o	o
Develop plan for faculty/staff communication during shut-down	o	o	o	o	

o **Q -19 (continued)**					
Provisions for suspending athletic or social events	o	o	o	o	o
Restrict travel during pandemic period	o	o	o	o	o
Plan for increased absenteeism due to child care closure	o	o	o	o	o
Define criteria for suspending school operations	o	o	o	o	o
Draft plan for shutting down campus	o	o	o	o	o
Draft plan for reopening campus	o	o	o	o	o

Q20. Please assign a numerical grade (0-4) to each of these medical/health aspects in your Pandemic Preparedness Plan.

	No mention in plan – 0 Points	Low priority element – 1 point	Moderate priority element – 2 points	High priority element – 3 points	Essential element of plan – 4 points
Advise sick employees to stay home	o	o	o	o	o
On campus flu screening of employees	o	o	o	o	o
Set flu vaccination requirements	o	o	o	o	o
Coordinate flu vaccination program on campus	o	o	o	o	o
Inform committee of CDC, WHO and FEMA updates on pandemic severity status	o	o	o	o	o
Hand hygiene recommendations	o	o	o	o	o
Recommend surface cleaning practices	o	o	o	o	o
Recommend social distancing requirements	o	o	o	o	o
Establish cough and sneeze control guidelines	o	o	o	o	o

Q -20 (continued)					
Stockpile flu related medical supplies	o	o	o	o	o
Develop plan to identify and protecting persons at higher risk of illness	o	o	o	o	o
Set quarantine provisions for on campus students	o	o	o	o	o
Set quarantine provisions for faculty, staff or students returning from travel	o	o	o	o	o
Communicate with local hospitals and state or local health departments on issues affecting university.	o	o	o	o	o

APPENDIX B

Table 18: Combined Flu Matrix for Colleges and Universities

CDC Interval	State and Local Planning Indicators	College and University Response Actions
Number 1. Investigation Interval – Coincides with WHO Inter-pandemic and Alert phases	Identification of novel influenza A Infection of animals or humans in the U.S. with potential implications for human health.	Continuous tracking of WHO and CDC flu surveillance activities. Update the university's emergency planning website with active links to CDC, WHO and other pandemic flu healthcare sites. Contact pandemic flu committee to assure that all individuals wishing to remain active provide current contact information Check that emergency resources such as; food, water, hand sanitizer, bedding, gloves, protective masks and other safety wear are still available. Begin flu awareness campaign emphasizing sneeze and cough etiquette, hand hygiene and voluntary isolation when ill to limit flu transmission. Reestablish communications with local health care facilities, community leaders and emergency services to assure mutual support of pandemic flu plan partners.

Table 18 (continued)		
Number 2. Recognition Interval – Overlaps with WHO Alert phase	Increasing potential for influenza A Infections in humans in U.S. with indicators of ongoing human to human transmission	Have university medical personnel in close contact with local laboratories and medical facilities to facilitate novel influenza surveillance in the local area. Consider options for an enhanced flu vaccination plan and purchase of anti-viral drugs and supplies. Communicate confirmed flu cases to local and state health departments as recommended by the National Notifiable Disease Surveillance Program. Consider recommending isolation of ill persons on campus and voluntary quarantine of close contacts when flu cases suspected. Send ill dormitory students home if practicable after notifying their parents. Encourage ill faculty, students and staff to remain away from campus until their illness passes.

Table 18 (continued)		
Number 3. Initiation Interval Coincides with WHO Pandemic phase	Confirmed wave of human pandemic influenza anywhere in the world with efficient (>20%) and sustained (3 generations) human to human transmission	Activate the Campus Pandemic Flu plan mobilizing key departments and support personnel to begin mitigation activities. Enhance focus on flu surveillance on campus and in the local community alerting plan partners as appropriate when flu cases are confirmed by laboratory analysis. Implement a pandemic flu vaccination campaign if the appropriate supplies are available based on federal guidelines and recommendations. Disseminate an updated risk message providing guidance for faculty, staff and students and their parents on what might be expected along with any appropriate precautions or mitigation efforts. Campus medical personnel should ready their stockpiles of antiviral and other flu relief medication in preparations to treat patients. Campus medical efforts should be coordinated with other local medical facilities, nearby schools of nursing and medicine along with city, county and state health departments who may provide added personnel and material support during the pandemic. Impose travel restrictions to locations where active flu cases are occurring. Encourage faculty, staff and students visiting those areas to return home if permitted by local quarantine restrictions. Or if stranded to isolate oneself as much as possible. Provide regular updates to the campus community and plan partners along with elected officials and the media as appropriate. Recommend suspension of extracurricular activities such as sporting events, concerts and other social gatherings. As flu cases increase on campus or in the local community, consider activation distance learning thereby limiting classroom activities. Reinforce the need for sick faculty, students and staff to remain at home or isolated from group activities in dorms, cafeterias or classrooms.

Table 18 (continued)		
Number 4. Acceleration Interval Overlaps WHO Pandemic phase	Consistently increasing number of flu cases locally or in nearby states or cities indicating established pandemic flu transmission	Continue initiating response actions deemed necessary by medical experts continually gauging their effectiveness and modifying as needed. Continue surveillance of flu transmission on campus obtaining lab confirmation of select cases if possible to monitor for changing epidemiology. If not already activated, initiate closure of childcare facilities, campus schools, and non-essential gatherings. Institute the practice of social distancing for all school and campus workplaces. Encourage use of hand sanitizers, sneeze and cough control and other infection prevention measures throughout campus. If the flu continues spreading on campus, despite these mitigation efforts, implement the suspension of classes and all other non-essential work activity. This will require the designation of essential housekeeping, maintenance and security personnel and volunteers to maintain critical campus facilities and to care for students who are unable or too sick to return home. Provisions must be made to care for sick students living in campus dormitories, residence halls or in off campus apartments. Food service, housekeeping, maintenance and medical staff and volunteers must be coordinated to check on and care for these students as needed during this phase of the pandemic. During this active pandemic phase, campus business continuity plans will be implemented to allow essential campus activities, distance learning and critical research activities to continue as best they can. As in the other pandemic phases, updated risk messages along with other critical information on the Pandemic flu status and mitigation or response information should be issues frequently to keep all stakeholders informed and to provide needed instructions.

Table 18 (continued)		
Number 5. Deceleration Interval Overlaps WHO Pandemic phase	A steadily decreasing rate of pandemic flu cases locally or in nearby states or cities	Continue flu response activity and pandemic surveillance as needed during this phase. Assess if response activities can be decreased and supplies conserved. Update flu risk messages and other critical information on lessening mitigation activities. Implement the cession of select mitigation measures communicating needed information to plan partners. Begin a staged resumption of normal school activities according to a phased schedule. Maintain infection control measures including hand hygiene, cough controls and social distancing throughout this phase. Provide pertinent instructions to stakeholders on the resumption of school activities. Be vigilant and remain prepared to respond to a second wave of flu.

Table 18 (continued)		
Number 6. Preparation Interval Coincides with WHO Transition phase	Low pandemic flu activity nearby with ongoing vigilance for a recurring outbreak and preparations for future pandemic waves.	Post statements on University websites that the flu risk has subsided on campus and that normal activity can resume. Remain vigilant for a persistent flu agent in the environment and the need for an ongoing response to a second wave of illness. Be attentive to WHO and CDC monitoring of genetic and phenotypic changes to flu viruses and how these may impact next year's influenza season. Restore medication stocks and other supplies and equipment as needed. Recover any unused and time sensitive medicines and supplies and consider donating them to locations where they can be utilized before expiration. Provide ongoing mental health support for post event reactions among students, faculty and staff. Create an after action report with input from community partners to document the response actions of the various working groups and to discuss lessons learned. Convene a meeting of the school's planning partners to modify their plan as needed based on the effectiveness of the response and mitigation measures during this episode.

APPENDIX C

Table 19: List of Universities with Total Enrollments 2012-2013

Name of School	Total Enrollment
1. Arizona State University	73378
2. University of Central Florida	59601
3. Ohio State University Columbus	56387
4. University of Texas At Austin	52186
5. University of Minnesota Twin Cities	51853
6. Texas A & M University	50627
7. University of Florida	49913
8. Pennsylvania State University Main Campus	45783
9. University of Illinois at Urbana-Champaign	44520
10. New York University School of Medicine	44516
11. University of Washington Seattle	43485
12. University of Michigan	43426
13. University of Wisconsin Madison	42269
14. University of Maryland Baltimore	42268
15. Indiana University	42133
16. University of Houston, Clear Lake	40747
17. Florida State University	40695
18. Rutgers, The State University of New Jersey	40434
19. Purdue University	40393

Table 19 (continued)	
20. University of Southern California	**39958**
21. University of California Los Angeles	**39945**
22. California State University Fullerton	**37677**
23. Temple University	**36855**
24. University of California Berkeley	**36137**
25. University of Georgia	**34816**
26. North Carolina State University Raleigh	**34767**
27. University of Missouri	**33762**
28. University of Cincinnati Main Campus	**33347**
29. University of Texas Arlington	**33279**
30. George Mason University	**32961**
31. Boston University	**32603**
32. University of Colorado Boulder	**32558**
33. University of California Davis	**32354**
34. University of Utah	**31660**
35. University of Alabama	**31647**
36. University of Texas San Antonio	**30968**
37. Virginia Polytechnic Institute and State University	**30936**
38. Florida State University at Jacksonville	**30863**
39. Wayne State University	**30765**
40. University of South Carolina	**30721**
41. Colorado State University	**30467**
42. Texas Tech University	**30194**
43. University of Tennessee	**29833**
44. University of Iowa	**29810**
45. Louisiana State University	**29718**
46. West Virginia University	**29617**
47. Iowa State University	**29611**
48. San Francisco State University	**29541**

Table 19 (continued)	
49. University of Wisconsin Milwaukee	**29350**
50. Florida Atlantic University	**29246**
51. University of North Carolina Chapel Hill	**29137**
52. New Mexico State University Main Campus	**28977**
53. University at Buffalo	**28849**
54. University of Pittsburgh	**28766**
55. University of California San Diego	**28593**
56. Portland State University	**28584**
57. Central Michigan University	**28194**
58. University of Illinois Chicago	**28091**
59. University of Kansas - Lawrence	**27939**
60. Kent State University	**27855**
61. Harvard University	**27392**
62. University of Nevada Las Vegas	**27364**
63. Washington State University	**27329**
64. University of Kentucky	**27226**
65. University of California, Irvine	**27189**
66. University of Oklahoma	**27138**
67. Northeastern University	**26959**
68. Utah State University	**26757**
69. Oklahoma State University	**26201**
70. Columbia University of Health Sci. Morningside	**26050**
71. University of Connecticut	**25868**
72. Auburn University	**25469**
73. Northern Arizona University	**25359**
74. University of North Carolina Charlotte	**25277**
75. Oregon State University	**24962**
76. University of Pennsylvania	**24832**
77. Old Dominion University	**24753**

Table 19 (continued)	
78. University of Nebraska Lincoln	**24593**
79. University of Oregon	**24396**
80. Ohio University Athens	**24390**
81. University of Virginia Main Campus	**24297**
82. Kennesaw State University	**24175**
83. Stoneybrook University (SUNY)	**23920**
84. Kansas State University	**23863**
85. University of Arkansas	**23199**
86. Northern Illinois University	**22990**
87. University of Memphis	**22725**
88. Boise State University	**22678**
89. University of Texas El Paso	**22640**
90. University of Toledo	**22610**
91. University of Colorado Denver	**22495**
92. California State University Fresno	**21981**
93. University of California Santa Barbara	**21685**
94. University of Delaware	**21489**
95. Towson University	**21464**
96. Illinois State	**21310**
97. California State Univ. Los Angeles	**21284**
98. University of Texas Dallas	**21193**
99. Cornell University	**21131**
100. California Polytechnic State University	**21107**
101. Saint John's University	**21067**
102. Johns Hopkins University	**20996**
103. Northwestern University	**20959**
104. Georgia Institute of Technology	**20941**
105. University of California Riverside	**20900**
106. Syracuse University	**20829**

Table 19 (continued)	
107. University of Hawaii	**20429**
108. Mississippi State University	**20424**
109. Missouri State University	**20276**
110. Stanford University (ChemTracker)	**19945**
111. Clemson University	**19914**
112. University of Nevada Reno	**18766**
113. Miami University Oxford	**17901**
114. Georgetown University	**17849**
115. University of North Carolina Greensboro	**17707**
116. University of California Santa Cruz	**17454**
117. SUNY At Albany	**17338**
118. University of California Santa Cruz	**17203**
119. University of Missouri, Saint Louis	**16814**
120. Wright State University	**16656**
121. University of Massachusetts Boston	**16277**
122. Baylor University	**16263**
123. University of North Florida	**16198**
124. University of Miami	**16068**
125. Loyola University Chicago	**15957**
126. Southeastern Louisiana University	**15662**
127. University of Missouri, Kansas City	**15473**
128. Duke University	**15427**
129. West Chester University of PA	**15100**
130. University of New Hampshire	**14942**
131. University of North Dakota	**14697**
132. Youngstown State University	**14483**
133. North Dakota State University Main Campus	**14399**
134. Washington University in St. Louis	**13908**
135. Emory University	**13893**

Table 19 (continued)	
136. Montana State	**13671**
137. Boston College	**13525**
138. Saint Louis University	**13505**
139. University of Vermont	**13478**
140. University of Maryland, Baltimore County	**13199**
141. California State, Univ. East Bay	**13160**
142. Carnegie Mellon University	**12991**
143. Tulane University	**12845**
144. University of Wyoming	**12778**
145. South Dakota State University	**12725**
146. University of West Florida	**12588**
147. University of Idaho	**12312**
148. Yale University	**12109**
149. University of Notre Dame	**12004**
150. Marquette University	**12002**
151. The University of Tennessee At Chattanooga	**11600**
152. Massachusetts Institute of Technology	**11319**
153. University of Dayton	**10835**
154. Villanova University	**10735**
155. University of South Dakota	**10061**
157. Univ. of Florida	**49,785**
158. Kennesaw State Univ.	**33,000**
159. U. of Calif. Irvine	**29,000**
160. Univ. of Oklahoma	**28,966**
161. Washington State Univ.	**28,686**
162. Univ. of Kentucky	**28,435**
163. Carleton University	**28,289**
164. Utah State Univ.	**27,662**
165. Kent State University	**27,500**

Table 19 (continued)	
166. Old Dominion Univ.	**24,670**
167. Ohio Univ. Athens	**23,306**
168. Towson University	**22,000**
169. California State Fresno	**20,000**
170. Univ. of Alaska	**19,629**
171. Miami Univ. Oxford	**18,456**
172. Georgetown University	**17,858**
173. Appalachian State	**16,636**
174. Eastern Kentucky U.	**16,454**
175. Baylor University	**16,263**
176. West Chester Univ. PA	**15,845**
177. Youngstown State Univ.	**15,194**
178. Northern Kentucky Univ.	**15,000**
179. Southeastern Louisiana	**14,498**
180. Arkansas State	**13,144**
181. Marquette University	**11,745**
182. U. of Tenn. Chattanooga	**11,670**
183. Univ. Of Idaho	**11,534**
184. Mass. Institute Of Tech.	**11,319**
185. Murray State Univ.	**11,207**
186. Univ. of Dayton	**10,835**
187. Tufts University	**10,819**
188. Case Western Reserve	**10,771**
189. Villanova University	**10,735**
190. American University	**10,580**
191. Univ. of South Dakota	**9,971**
192. Duquesne University	**9,757**
193. Slippery Rock Univ.	**8,495**
194. Gonzaga University	**7,400**

Table 19 (continued)	
195. Seattle University	**7,273**
196. Belmont University	**7,244**
197. Lehigh University	**7,133**
198. Rensselaer Polytechnic	**7,028**
199. Catholic University	**6,838**
200. Rice University	**6,498**
201. Southern Methodist U.	**6,391**
202. Univ. of Rochester	**6,166**
203 Clarion University	**6,000**
204. Midwestern University	**6,000**
205. Monmouth University	**5,634**
206. Santa Clara University	**5,486**
207. Robert Morris University	**5,358**
208. Ryerson University	**5,300**
209. Lipscomb University	**4,489**
210. Stevenson University	**4,400**
211. Clarkson University	**3,873**
212. Bob Jones University	**3,000**
213. Waynesburg State Univ.	**2,516**
214. Whitworth University	**2,470**
215. Trinity University	**2,353**
216. Southwestern Univ.	**1,528**

University Enrollment Figures Obtained From:

- **Digest of Education Statistics (2013)**
- **Stat.University.com (2012)**
- **U.S. News and World Report (2015)**
- **University Websites (2015)**

APPENDIX D

Questions Eliminated from Final Survey

Q14. Indicate responsibilities <u>assigned</u> to the University Executive Officers in **<u>your</u>** Pandemic Preparedness Plan.

o Issue directives to flu planning committee	o Review CDC/WHO pandemic alert levels
o Direct campus operations as needed	o Liaison with local, state and federal officials
o Approve media releases	o Make decision to cancel classes
o Make final decision to close campus	o Other _____
o Other _____	o

Q15. Indicate responsibilities <u>assigned</u> to the Academic Affairs Office in **<u>your</u>** Pandemic Preparedness Plan.

o Track student absenteeism	o Track faculty absenteeism
o Recommend need to suspend classes	o Consider alternate learning options as needed
o Evaluate study abroad options	o Consider foreign student travel options
o Maintain student contact list	o Other _____
o Other _____	

Q16. Indicate responsibilities <u>assigned</u> to the Human Resources Office in **<u>your</u>** Pandemic Preparedness Plan.

o Establish policy for absenteeism	o Set guidelines for working from home (if possible)
o Maintain current employee contact list	o Facilitate cross training of employees
o Identify persons with higher flu risk	o Encourage sick employees to remain at home
o Encourage social distancing practices	o Other _____
o Other _____	

Q17. Indicate responsibilities assigned to the Student / Employee Health Services Department(s) in **your** Pandemic Preparedness Plan.

o Coordinate vaccine distribution	o Employee/student screening
o Coordinate student health care	o Promote infection control practices
o Communicate with state and local health departments	o Set policy for quarantine
o Facilitate extended student care while in isolation	o Coordinate with local hospitals
o stockpile anti-viral medications	o stockpile other medications
o stockpile electrolyte drinks	o other _____

Q18. Indicate responsibilities assigned to the University Public Safety Department in **your** Pandemic Preparedness Plan.

o Continue to provide public safety and law enforcement	o Facilitate campus security during pandemic phases
o Restrict visitors coming to campus during pandemic	o Facilitate command center activities
o Other _____	o Other _____

Q19. Indicate responsibilities assigned to the Communication/IT Department in **your** Pandemic preparedness Plan.

o Maintain normal campus wide phone, e-mail and website operations	o Frequently update website during pandemic periods
o Maintain telephone hotline	o Facilitate radio and cell phone communication to essential personnel
o Other _____	o Other _____

Q20. Indicate responsibilities assigned to the Student Housing Department in **your** Pandemic Preparedness Plan.

o Maintain normal operations for as long as possible	o Facilitate student's return home as campus suspends operations
o Consolidate students into fewer dormitories	o Arrange on campus housing for students unable to return home
o Facilitate infection control practices with tissues, hand sanitizer, sneeze etiquette and social distancing	o Increase surface disinfection during housekeeping
o Identify/prepare potential isolation dormitories	o Facilitate daily monitoring of sick students
o Other _____	

Q21. Indicate responsibilities assigned to the Dining and Food Service Department in **your** Pandemic Preparedness Plan.

o Maintain normal food service for as long as possible	o Consolidate dining facilities as dormitories close
o Increase surface cleaning practices in dining halls	o Switch to disposable tableware
o Stockpile non-perishable food	o Stockpile water and electrolyte drinks
o Plan lighter diet suitable for sick students	o Provide food services to essential personnel living on campus
o Promote hand hygiene and sneeze etiquette in dining halls	o Other _____
o Other _____	

Q22. Indicate responsibilities assigned to the Facilities Management/Physical Plant Departments in **your** Pandemic Preparedness Plan.

o Maintain normal operations as long as possible during pandemic	o Identify critical infrastructure to be maintained as a priority
o Develop plan to cut back on facility maintenance as staffing diminishes	o Notify faculty, staff and students ASAP when facilities are to close
o Establish contingency plan for facilities to be used for school or community health care overflow	o Focus essential staff on priority duties established by Pandemic Flu committee
o Focus custodial cleaning towards infection control priorities	o Other _____
o Other _____	

Q23. Indicate responsibilities assigned to the University Business/Financial Office in **your** Pandemic Preparedness Plan.

o Establish business continuity plan(s)
o Coordinate vendor agreements for added support during a pandemic emergency
o Maintain financial obligations for insurance, bill payment, salaries
o Other _____

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