

**LEVEL OF PREPAREDNESS FOR PANDEMIC INFLUENZA AMONG KEY
LEADERS IN BRAZOS COUNTY**

A Thesis

by

ELIZABETH KASTER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2010

Major Subject: Health Education

Level of Preparedness for Pandemic Influenza among Key

Leaders in Brazos County

Copyright 2010 Elizabeth Kaster

**LEVEL OF PREPAREDNESS FOR PANDEMIC INFLUENZA AMONG KEY
LEADERS IN BRAZOS COUNTY**

A Thesis

by

ELIZABETH KASTER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Approved by:

Co-Chairs of Committee,	Ranjita Misra
	Buster E. Pruitt
Committee Member,	Leon Russell
Head of Department,	Richard Kreider

December 2010

Major Subject: Health Education

ABSTRACT

Level of Preparedness for Pandemic Influenza among Key Leaders in Brazos County.

(December 2010)

Elizabeth Kaster, B.S., Tarleton State University

Co-Chairs of Advisory Committee: Dr. Ranjita Misra
Dr. Buster E. Pruitt

With the outbreak of the 2009 pandemic influenza A (H1N1) comes the need to evaluate the preparedness level of government entities that had preparedness plans. This study looks at the preparedness level for pandemic influenza among key leaders in Brazos County according to their Brazos County Pandemic Influenza Preparedness Plan. Ten key leaders were recruited to participate in interviews. Interviews were transcribed and analyzed for salient themes. Main themes that emerged from interviews were categorized into vaccinations, communication, logistical issues, and the need for evaluations and feedback. Recommendations for increasing preparedness include addressing contingency plans, increasing education through public health efforts, addressing biosecurity, increasing use of technology, and increasing funding and research.

DEDICATION

For my family and my G-d

ACKNOWLEDGEMENTS

I would like to thank my committee co-chairs, Dr. Misra and Dr. Pruitt, and my committee member, Dr. Russell, for their guidance and support throughout the course of this research.

Thanks also to my friends and colleagues and the department faculty and staff for making my time at Texas A&M University a great experience. I also want to extend my gratitude to the Emergency Response Coordinator for Brazos County, without whose help this study would not have been possible, and to all the people who were willing to participate in the study.

Finally, my utmost thanks go to my family for their unwavering encouragement, patience, and love, and a never-failing faith in my abilities.

TABLE OF CONTENTS

	Page
ABSTRACT	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
1. INTRODUCTION: PREPAREDNESS FOR PANDEMIC INFLUENZA	1
1.1 Literature Review	1
1.2 Purpose and Significance of Study.....	3
2. METHODS.....	6
3. RESULTS.....	8
3.1 Vaccinations	8
3.2 Communication	12
3.3 Logistics	15
3.4 Evaluation.....	18
4. SUMMARY AND CONCLUSIONS.....	22
4.1 Recommendations	22
REFERENCES.....	25
APPENDIX A: INTERVIEW PROTOCOL.....	29
VITA	31

1. INTRODUCTION: PREPAREDNESS FOR PANDEMIC INFLUENZA

Preparedness toward natural disasters, such as an outbreak of a pandemic influenza, is a topic of importance to, and interest for many people for several reasons. One reason for the intrigue may be the lack of knowledge among the general public. This lack of knowledge and preparedness may lead to mass panic during outbreaks. To allay this, government officials at both the national and local levels began focusing on preparedness efforts, specifically for pandemic influenza outbreaks.

This research aims to illuminate the preparedness level for pandemic influenza of Brazos County in order to develop a more specific instrument with valid items.

1.1 Literature Review

With so many of the world's populace succumbing to different influenza strains, preparation to handle outbreaks is the new global public health priority over eradication (Juckett, 2006). The need for a preparedness plan, however, requires adequate funding as well as a central authority to coordinate and execute the plan (Whitley et al., 2006). In 2005, the US Department of Health and Human Services drafted the updated Pandemic Influenza Plan (United States Department of Health and Human Services, 2006) and the US Homeland Security Council drafted the National Strategy for Pandemic Influenza (United States Homeland Security Council, 2006) that focused on preparedness aspects such as international and domestic surveillance, vaccine

This thesis follows the style of *Health Promotion Practice*.

development and production, antivirals, communication, and preparedness at the state and local levels (Fauci, 2006). Drafting of these preparedness plans began with international plans and continued with increasingly more local plans of action to address the pandemic ("Draft plan for flu pandemic," 2004; Hampton, 2004; Katz, 2009). In May of 2006, the Brazos County Pandemic Influenza Preparedness Plan (BCPIPP) was drafted. This document was designed to coordinate the response for pandemic influenza for Brazos County organizational entities, support agencies, and external partners involved in the pandemic influenza preparedness and response (Brazos County Health Department, 2006).

Preparedness plans such as the BCPIPP were drafted based on the assumption of an outbreak of the avian influenza H5N1 due to the projected seriousness and research attention on that particular strain. Juckett (2006) reported that the H5N1 strain was different from past pandemic strains in that it had been acknowledged as a potential pandemic threat for over ten years. Since it causes a high mortality rate among humans, the highly pathogenic H5N1 virus is of great concern (Capua & Alexander, 2004). Most people are susceptible to the different subtypes of influenza A (classified by the HA and NA surface proteins), making it capable of spreading quickly as a pandemic virus (Oshitani, 2006; Monto, Comanor, Shay, & Thompson, 2006). In fact, the World Health Organization (2010) has found a case mortality rate of approximately 59.4% for all reported confirmed human cases of avian influenza H5N1 as of August 31, 2010.

On April 17, 2009, the CDC confirmed the first two known cases of a novel swine influenza A (H1N1) from two children in southern California (Centers for Disease

Control and Prevention, 2009). After this outbreak, the novel influenza A (H1N1) strain quickly spread worldwide and reached pandemic proportions in less than two months (Zarocostas, 2009). Coincidentally, the outbreak occurred during a time when many researchers were calling for preparedness plans for pandemic influenza, with a particular focus on avian influenza A (H5N1) (Osterholm, 2005).

1.2 Purpose and Significance of Study

Assessing Brazos County key leaders' response to this outbreak according to the Brazos County Pandemic Influenza Preparedness Plan is important to the overall preparedness level of the county, including continuity of business, healthcare, education, etc., in the event of another outbreak of a pandemic influenza strain. However, there is a paucity of information on the level of pandemic influenza preparedness among local key leaders who have received these plans. Specifically, assessment of key leaders within Brazos County, who have the BCPIPP, and their readiness to handle the pandemic influenza outbreak is lacking. Hence, this study purports to gain a deeper understanding of the level of pandemic influenza preparedness among key leaders in Brazos County, Texas, based on the BCPIPP, using a thematic analysis. The long-term goal of this study is to utilize the themes to develop and validate a semi-structured interview instrument, which will be utilized for a subsequent larger study.

Though Brazos County has the BCPIPP, a qualitative study from the behavioral sciences perspective is also necessary. Because knowledge by itself does not lead to action or skills in performing a certain action, representation from the behavioral

sciences is necessary in developing both the knowledge and skills necessary to prepare and respond to a pandemic influenza outbreak. Unfortunately, representation for the behavioral sciences is missing from many planning committees (Pickles, 2006). This research is novel since, to the researcher's knowledge, no health education / promotion program looks at behavior of key leaders in addition to their knowledge regarding pandemic influenza preparedness.

This research is also necessary because, to the researcher's knowledge, no studies exist that examined the level of pandemic influenza preparedness among the key leaders specified in a local pandemic influenza preparedness plan. The strength of the results stemmed from knowledge and skills gained by the key leaders, who had to implement the plan for the novel H1N1 influenza pandemic. Some literatures have documented past simulated outbreaks of infectious diseases to assess the response (Beaton, et al., 2007; McCormick, et al., 2009); however, these simulations and "table-top exercises" were based on broad expectations of disease outbreaks (such as influenza), and were not specific.

The nature of studying the preparedness level for a novel infectious agent required a focused, in-depth (qualitative) method in order to gain a better understanding of the current knowledge and skills of key leaders in Brazos County as well as guide what questions should be asked of the local key leaders. The research was guided by the following research questions:

- (1) *How did the key leaders prepare for pandemic influenza?*
- (2) *What hindrances exist for following and implementing the BCPIPP?*

(3) What improvements do the key leaders believe should be made to the BCPIPP?

2. METHODS

The study utilized a qualitative design, consisting of semi-structured interviews, a thematic analysis, and development of an instrument with valid items. This design allowed the researcher to determine which theoretical constructs were appropriate for developing and understanding the problem (grounded theory). A qualitative design was needed for this research to create a strong instrument that could be used before and after evaluations of preparedness and response plans. Furthermore, by questioning the key leaders and asking them to deliberate about the BCPIPP, researchers believed many preparedness and response issues could be determined and possibly resolved before they have to be enforced.

Participants consisted of key leaders in Brazos County, Texas, who played an integral part in the BCPIPP implementation, as identified by the key informant (EPR Coordinator). Ten key leaders were recruited through e-mail, with seven (70%) agreeing to participate. Those key leaders who agreed to participate in the study were interviewed at a time and place of convenience to them. All interviews were audio recorded and transcribed.

Interview questions were guided by three study variables that answer the research questions: pandemic influenza preparedness among key leaders in Brazos County, barriers to executing the BCPIPP, and improvement necessary for enhanced BCPIPP implementation.

After interviews were transcribed, responses were categorized into themes based on content analysis and constant comparison (a thematic analysis). Analysis was validated using peer debriefing. Results of the thematic analysis are to be used not only to ascertain a guiding theory or components from many different theories (grounded theory), but also to develop and finalize a semi-structured interview instrument with valid items, which will be utilized for a subsequent larger study.

3. RESULTS

Questions asked from the protocol were based on the three research variables: preparedness for pandemic influenza, barriers to implementing the BCPIPP, and any improvements necessary for the BCPIPP. For all of the variables, the common themes that emerged from the data were vaccinations, communication, logistics, and evaluation. The following sections will elaborate on these themes in more detail with supporting comments from the key leader interviews.

3.1 Vaccinations

A major theme that emerged from the analysis was vaccination, including aspects of production, distribution, public perceptions, and clinics. Vaccination is important to the BCPIPP and was considered a major part of mitigating a pandemic influenza outbreak due to suggestions in prior literature that vaccination be the main method for protection against avian influenza (Stephenson, Nicholson, Wood, Zambon, & Katz, 2004). Obviously, the planning assumption behind the BCPIPP was that the strain would be avian in origin and spread from overseas. This presented problems when a new strain emerged in Mexico in March of 2009, presented in the U.S. in April of 2009, and quickly spread worldwide.

One concern noted regarding vaccinations was the lag time producing a vaccine for an unknown strain of influenza at that time. Both the production and distribution of the vaccine also came in small quantities. This limited supply of vaccine began to cause

public panic, creating difficulty for the key leaders to respond appropriately. Stephenson et al. (2004) had also noted that demand for a new vaccine would be great during a pandemic such that strategies would be needed for increasing the manufacturing speed of the developed vaccine.

Supporting comments for vaccine production and distribution include the following:

I think there are parts of the plan that function well and those were the actual portions of the plan that described the actual distribution of vaccine. Um, and I will say that the reason that the plan, my opinion, the plan did not go as foreseen when it was being written is because of some of the intangibles which we couldn't control: availability of vaccine, timeline for vaccine delivery, um, the restrictions that were placed on the vaccine from a standpoint of who could receive it and what point in time, um, the availability of personnel to be able to administer the vaccine. All of those were things that we had to kind of, um, estimate and create, um, more or less a, a scenario in our minds how we thought it might transpire when we were writing the plan, but the reality of it, um, was somewhat different than our initial concept—uh, conception of the, of the emer—of the situation when we were writing the plan. Um, vaccine arrived later with more restrictions on it, uh, there was a lot of grey area, um, information from the standpoint of who could receive it, how it could be received, um, and even the type of vaccine that we received.

But there were, there were some issues with the, the allocations and how that happened. But that was at a CDC level and a state level. We didn't really have any control.

...just the limited amount that you quickly run out and then people were still in line, and so I think that could probably could've been handled, you know, uh, addressed better: what do you do about public panic when it comes to, "Well, I've been standing here all morning, what do you mean there's no more vaccine?"; and so, that was a hard thing to handle; and so, which, I think, maybe the plan next time can—we can, you know, better plan for that dilemma 'cause I don't think we saw that ahead of time. We always just assumed in the planning process that there would always be plenty of the medicine or the vaccine that we were needing.

One of the policies that the key leaders began to implement while waiting for vaccine production was pushing public health strategies such as hand-washing, using hand sanitizer, covering nose and mouth when coughing or sneezing, and practicing social distancing. Another strategy would be increasing capacity for vaccine production. Unfortunately, as one of the key leaders pointed out, “the United States does not have a robust organic vaccine production capability.” Having more domestic production of vaccine would not only increase vaccine production overall, but also solve any political issues with receiving certain amounts of vaccine from outside countries. This call for more domestic and rapid vaccine production has fostered the development of Project GreenVax, a federally sponsored research and development project that purposes to produce millions of doses of plant-based pandemic influenza vaccine per month for lower costs (Riedmann, 2010) within the Health Science Center at Texas A&M University.

Another problem regarding vaccinations was the distribution system. The mandates in the plan became cumbersome from lack of personnel and resources. The BCPIPP also had first responders (EMS workers, firemen, policemen, etc) receiving the vaccinations first. This was problematic because the epidemiology of the 2009 pandemic strain demonstrated children and those with suppressed immune systems to be more susceptible to contracting the flu more so than healthy first responders. This had to be changed quickly to allow children and those with certain medical conditions to receive the first limited quantities of vaccine. Some of the key leaders faced difficulty with this change because the general public panicked with limited quantities of vaccine.

Key leaders had to make an ethical decision of who should be the priority to receive a limited quantity of vaccine.

In the original BCPIPP, the category for vaccinations assumed one strain and one vaccine. During the pandemic outbreak of the novel H1N1 strain, a two-pronged problem with the vaccines occurred when people were faced with not only two influenza strains to be vaccinated against, but also two vaccination methods: injectable and nasal mist. Lack of awareness for needing to be vaccinated against two strains of influenza caused confusion among the general public. Lack of education of the different types of vaccination methods caused a public perception that the injectable was better than the nasal mist. In fact, past literature has shown that the intranasal vaccine for influenza viruses tends to produce a longer lasting and more natural immunity than the injectable (Cox, Brokstad, & Ogra, 2004).

The last issue with vaccination mentioned by key leaders during the interviews was regarding the mass vaccination clinics. Once enough vaccine was made available to the public, the health department arranged mass vaccination clinics on a first come, first serve basis. One problem that occurred during these clinics dealt with allocation of the different types of vaccines. The health department was given much more nasal mist than injectable vaccines. The limited supply of injectable vaccine was required for people who are at a high risk for developing complications from influenza. If providers donated their vaccine to the health department, this left high risk patients having to wait in line at the mass vaccination clinics in hopes of getting an injectable vaccine that was in limited

supply. Having the providers give vaccine to their patients lifted the burden from the health department.

As discussed in this section, according to key leaders, educating the public about vaccinations and remaining transparent in decisions on distributing the vaccine is important to helping to make a quicker and easier response. The next section discusses communication and education in more detail.

3.2 Communication

This theme refers to many aspects of the BCPIPP where educating and communicating both within departments and agencies as well as with stakeholders, the general public, and the media were needed.

Whenever any hazard takes place, such as an infectious disease outbreak, education and communication both among the leaders and the general public (risk communication) are crucial to allaying any panic created by fear of unknowns as well as aiding response. Initially, during the outbreak of the 2009 pandemic influenza strain, any risk communication became difficult because the strain was unknown and different sources were providing different information. This was detrimental to the key leaders because elected officials, media, and the general public were all looking to them for guidance. Reissman et al. (2006) predicted that “In the event of pandemic flu, the public will demand information, reassurance, and guidance about what they can do to protect themselves, their families, and their economic well-being.”

Suggestions in the literature regarding risk communication include letting the public know about the problems and be a part of the preparedness and response process. Allowing the general public to be a part of the process helps solve problems, brings new suggestions and recommendations, helps with conflicts, and makes the public less angry if the key leaders turn out to be wrong. During a time of crisis, governments and those in authority need to be transparent and honest regardless of fears about appearing incompetent, injudicious, or impetuous. To respond late, cover up, or minimize the problem creates a loss of their credibility to the public when it is needed most for guiding actions during a pandemic (Sandman & Lanard, 2005).

Key leaders recalled that communicating well with the public and elected officials was one of the most important ways in preparing the public during the outbreak. They had to be sure that the information they provided was clear, concise, consistent, and in English and Spanish as well as at the appropriate reading level. To do this, key leaders were having to meet with each other internally. Meetings though were either impromptu or scattered. As one key leader said:

...we probably needed to have set meetings, you know, every so often just say, 'Time out. Where are we at; where are we still trying to go?' Because in the heat of the battle, sometime we lost sight of that...

Another communication issue was dealing with the public and their perceptions about vaccinations. Many of the key leaders thought that the public would receive the nasal mist vaccine amenable because no needles were involved with the mist. However, many people were afraid of the nasal spray vaccine. There was a need for more education on the reliability of the nasal mist vaccine because of the limited availability

of the injectable. Key leaders found that better communication was also needed on which type of vaccine was being dispensed at clinics because some of the clinics were dispensing only seasonal influenza vaccine. If the people are educated about the vaccinations and availability, and the key leaders are open to the public about decisions regarding vaccine allocations, public panic may be allayed in any subsequent pandemic influenza outbreaks.

Media play a very important role in disseminating information to the general public. The media are able to communicate very quickly and effectively the status of response to a pandemic influenza outbreak and educate the populace on public health tips. A problem that occurred initially with the 2009 pandemic outbreak was that the key leaders did not have the information to give the media or the general public because the outbreak was sudden and the strain unknown. Many of the key leaders recalled that because of the unknown strain and lack of information, the media began to create public panic from making the situation worse than it was. The message that key leaders wanted to give the public was that the H1N1 strain was still an influenza that could be combated through public health efforts.

According to key leaders, a strategy that may help with communicating effectively with the general public is to use media outlets such as websites or social networking venues to give constant updates on the situation.

3.3 Logistics

This section discusses a theme that emerged regarding organizing and implementing the BCPIPP. Logistical issues included resources, sampling, clinics and exercises, and planning.

One issue in implementing the BCPIPP was the availability of resources, especially when the pandemic outbreak was sudden and different from what was originally planned for. The 2009 pandemic strain outbreak was the first time that the BCPIPP had to be enacted for a real situation, but the H1N1 strain was different from the H5N1 strain the BCPIPP had assumed. Thus, certain resources that were needed were in short supply. As one of the key leaders mentioned, hand sanitizers, M95 masks, and other such equipment were in short supply because the BCPIPP had not planned for them.

The shortage of material problem was exacerbated by money issues because grant money had to be used according to directives from whoever funded the grants. Even though money was provided for resources, the funders stipulated that the money be allocated for certain phases in the BCPIPP; that may or may not have been where the money was needed.

However, with grant money and available resources, the equipment needed for responding to the 2009 pandemic influenza was possible. According to one key leader, “We might actually be in a good spot because we’ve got a lot of resources and we’re close to a lot of resources: Houston, Austin, Dallas; and we’ve got still a manageable population.”

Another problem with the availability of resources occurs when a situation is particularly serious, as in the case of pandemic influenza with a high mortality and morbidity. Some of the key leaders mentioned that not only was the BCPIPP not extensive enough to handle that situation, but also the people had to depend on public health efforts. Unfortunately, public health is, as one key leader said, both “underfunded and undermanned.” Inadequate funding was actually found in the literature to be a factor related to the shortage of public health workers (Draper, Hurley, & Lauer, 2008). Key leaders also mentioned that, if the pandemic influenza strain were virulent enough to cause high morbidity and high mortality, Brazos County would very quickly be past capacity for personnel, resources, and mass casualties and deaths. Implementing the plan would be difficult if people were either sick or afraid of volunteering or working because of the risk of becoming sick.

A second logistical issue discussed was unforeseen problems that occurred with laboratory samples. Detection is considered the first phase in the BCPIPP, with diagnosis being one of the ways of detecting the pandemic influenza and determining how fast it is spreading. When the BCPIPP first had to be enacted toward the beginning of the 2009 pandemic influenza outbreak, problems with the courier caused samples to be taken to the wrong laboratory for testing. This caused a lag time in diagnosis. Some individuals had recovered by the time diagnosis with the H1N1 pandemic strain could be determined, making isolation and containment difficult. This made key leaders realize that although detection by laboratory diagnosis was a major part of the BCPIPP, it was

not the best method for a pandemic influenza outbreak wherein morbidity and mortality was higher.

One other logistical issue the key leaders mentioned regarded the table-top exercises implemented prior to the 2009 pandemic influenza outbreak to test the BCPIPP and clinics for seasonal influenza. The BCPIPP had a certain layout that ended up not working because of flow and security issues during table-top exercises or mass vaccination clinics for seasonal influenza or school immunizations. Key leaders mentioned that it was by implementing the plan in this way that helped tweak and refine how mass vaccination clinics would be better performed.

In fact, a few key leaders said that implementing the plan through exercises was better than reading the BCPIPP in preparing for a response. One key leader explained that during a fast-paced response, stopping to go back to read the plan would be very difficult. These exercises and clinics also helped to make any future implementation of the BCPIPP easier by building relationships with the people the key leaders would have to work with.

A problem that some key leaders mentioned during the clinics was how to speed up the process of filling out paperwork for the people who needed to be vaccinated. One key leader mentioned that technology could go a long way in improving the speed in processing people as well as the vaccines. Another key leader said that lawmakers needed to understand that in the event of a future emergency pandemic outbreak, paperwork may need to be put on a lower priority than getting the people vaccinated.

The last logistical issue dealt with the implementing the BCPIPP itself. Many of the key leaders mentioned that the BCPIPP did not fit the 2009 pandemic influenza situation because the BCPIPP was focused on a different strain with higher mortality and morbidity. One key leader mentioned that it was hard to assess whether the plan would work because many aspects of the plan never had to be implemented for the 2009 H1N1 strain. In the event of a more serious pandemic influenza outbreak, the BCPIPP would need better planning for continuity of operations when absentee rates became high.

These key leaders thought that overall, the BCPIPP helped allay panic both in the public and among the key leaders themselves because it was at least some baseline document written to help them think about how best to respond.

3.4 Evaluation

This theme emerged as a major portion of what key leaders mentioned regarding the BCPIPP. The issues surrounding this theme included what the plan is, shortcomings of the plan, assets of the plan, and recommendations for the plan. These issues are discussed in more detail in this section.

According to the key leaders, the BCPIPP was written as an operational template with the purpose of the bulk of its contents being to satisfy bureaucratic requirements. A major portion of the plan was state requirements and the other portion was operating procedures, thus making a very large document. It was a structure or outline of what to do during a pandemic influenza outbreak. Obviously, if planning assumptions were wrong and the outbreak situation changed, the plan would need to be modified.

The BCPIPP had some limitations mentioned by the key leaders. Key leaders talked about trying to follow the plan as much as possible and make changes as the situation dictated, using the BCPIPP as a guide for how to think about the situation. Since much of the plan had state recommendations and requirements, key leaders encountered difficulties being able to make changes to the plan.

Other problems with the BCPIPP included the fact that planning assumptions were for an avian influenza outbreak, which was different than the 2009 H1N1 influenza strain. This created not only lag time as key leaders created smaller plans to implement activities based on the BCPIPP, but also difficulty collaborating with the media or increasing public awareness. The planning assumptions of the BCPIPP were problematic because influenza viruses mutate over time, which creates difficulty in trying to prepare for each different pandemic outbreak. Differences in influenza strains necessitate a tailored approach for resources, absenteeism, morbidity and mortality, and containment.

Planning for containment was another issue due to modern transportation. Frequent national and international travels enhance the risk of transmitting the virus worldwide in a matter of days, especially when travelers are in the asymptomatic stage of the infection yet still communicable. Isolation and quarantine may also not be feasible since people would be exposed before an absentee rate became high.

Key leaders also mentioned positive aspects of the BCPIPP. The main point many key leaders talked about was that the plan did help allay panic among those responding to the 2009 pandemic influenza outbreak because it had some sort of

response already written down. Having something already written down and planned out helped the key leaders by acting as a starting point and guiding them through thought processes. The BCPIPP also pushed for exercises, which was one aspect that key leaders mentioned helped them better understand how to respond.

Though any infectious disease outbreak is unfortunate, the key leaders were able to learn from the experiences of the recent 2009 pandemic influenza outbreak in order to evaluate the BCPIPP and make recommendations. As one key leader put it, “plans always need revision...,” and having regular reviews of the plan both during and after implementation is necessary for improvement. Many of the key leaders stated the need for having more feedback and recommendations from other key leaders and stakeholders involved in the BCPIPP. The current recommendation for reviewing the plan is every five years, which was not adequate according to the key leaders.

One recommendation given for encouraging people to read the BCPIPP and provide feedback was to shorten the BCPIPP or have short operational sections for different people so that the plan could be easily read and revised. Another recommendation was to keep very open lines of communication among the key leaders so that the plan did not have to be constantly read.

In order to shorten the BCPIPP, most all of the key leaders mentioned making the document broader, such as an infectious disease plan that covers many infectious diseases, including the pandemic influenzas. All state requirements and planning strategies that are universal to all infectious disease outbreaks would be included in the broader “infectious disease plan” with smaller sections for each individual infectious

disease that outlined standard operating procedures. The standard operating procedures could then include items such as checklists and diagrams for mass vaccination clinics. This way, key leaders could focus on shorter standard operating procedures rather than having to page through a larger document.

Another recommendation for the BCPIPP that key leaders mentioned was the need for flexibility in the plan for different pandemics, both natural and as a result of bioterrorism. Not only is the BCPIPP not sufficient for preparing for a virulent influenza strain with high morbidity and mortality, but it also does not address what to do when an infectious outbreak is purposely produced and propagated.

According to the key leaders, preparedness plans also need to account for the wide variability in definitions of who is more at risk for pandemic influenza virus infection as well as the vast amount of uncertainty present during a pandemic. There would be no way of being able to account for every situation. Too detailed of a plan, according to risk communication, could cause problems and possibly criticism if it was unable to be flexible enough to account for the vast number of scenarios that would occur during a pandemic. This flexibility is vital when epidemiology and social conditions require a change in prioritization schemes and triage protocols within plans (Christian, et al., 2006; Uscher-Pines, Omer, Barnett, Burke, & Balicer, 2006).

Other recommendations that the key leaders mentioned included more guidance on lab sampling and more steps toward addressing lack of resources, lack of contingency plans, and communication.

4. SUMMARY AND CONCLUSIONS

The purpose of this study was to gain a broader understanding of the preparedness level for pandemic influenza among key leaders in Brazos County according to the BCPIPP.

From the thematic analysis; vaccinations, communications, logistics, and evaluations emerged as the common themes. Some of the problems encountered in each of these categories were either resolved during the implementation of the BCPIPP or still need to be worked out. As some of the key leaders mentioned, being 100% prepared is not always possible, but continuing to improve the implementation of the BCPIPP and overall response to any pandemic influenza outbreak based on experiences gained from the 2009 pandemic influenza outbreak will help increase preparedness for future outbreaks.

4.1 Recommendations

One important recommendation that can be made for the BCPIPP is addressing the contingency plans when absentee rates become high. When governments are overwhelmed from trying to deal with public panic and keep businesses running, and hospitals are overwhelmed by an outbreak's high morbidity and mortality, public health professionals become responsible for providing care and information, such as prevention and implementation activities, to the general public. Many of the key leaders stated the need for more education and communication with the general public. This education

cannot happen in a short amount of time during an emergency when people's fears are at their peak. Public awareness and education needs to occur during times when there is no threat of an outbreak.

Health educators and public health officials have an opportunity to provide the necessary education to the general public about preventive strategies during an outbreak, vaccine education, and any other preparatory steps to abate their fear during a pandemic. These preparatory steps will allow key leaders to implement standard operating procedures within the BCPIPP efficiently.

Another recommendation relates to biosecurity. The BCPIPP does not address preparedness for pandemic influenza perpetrated through bioterrorism. Biosecurity concerns include the lack of screening in U.S. ports of entry for travelers or immigrants. This problem also extends to colleges and universities that do not have a screening process for incoming international students that may be harboring infectious agents.

Other recommendations include the use of more technology (e.g., scanning devices) for a quicker processing of people who receive vaccinations as well as barcodes on medications and vaccinations. Use of modern technology can aid public health officials to process available resources in preparedness and response for outbreaks.

Obviously, with the need for more resources and interventions comes the need for more funding and research. As key leaders mentioned, Brazos County is better prepared, but not fully prepared to deal with an outbreak. One of the ways to increase preparedness is to involve the behavioral sciences, such as health educators in prevention education. Action and involvement from the behavioral sciences and health

professionals is needed in developing educational interventions or programs to deal with threats of an outbreak or emergency events.

REFERENCES

- Beaton, R., Stergachis, A., Thompson, J., Osaki, C., Johnson, C., Charvat, S. J., & Marsden-Haug, N. (2007). Pandemic policy and planning considerations for universities: findings from a tabletop exercise. *Biosecur Bioterror*, 5(4), 327-334. doi: 10.1089/bsp.2007.0029
- Brazos County health Department (BCHD). (2006). Appendix 3 to Annex H: Brazos County pandemic influenza plan. [Document confidential under the Texas Public Information Act, Government Code, Chapter 552 and not intended for public use].
- Capua, I. & Alexander, D. J. (2004). Avian influenza: Recent developments. *Avian Pathol*, 33(4), 393-404. doi: 10.1080/03079450410001724085
- Christian, M.D., Hawryluck, L., Wax, R. S., Cook, T., Lazar, N. M., Herridge, M. S., ...Burke, F. M. (2006). Development of a triage protocol for critical care during an influenza pandemic. *CMAJ*, 175(11), 1377-1381. doi: 10.1503/cmaj.060911
- Cox, R. J., Brokstad, K. A., & Ogra, P. (2004). Influenza virus: Immunity and vaccination strategies. Comparison of the immune response to inactivated and live, attenuated influenza vaccines. *Scand J Immun*, 59(1), 1-15. doi: 10.1111/j.0300-9475.2004.01382.x
- Centers for Disease Control and Prevention. (2009). Swine influenza A (H1N1) infection in two children--southern California, March-April 2009. *MMWR*, 58, 400-402. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5815a5.htm>

- Draft plan for flu pandemic. (2004). *FDA Consum*, 38(6), 5. Retrieved from http://permanent.access.gpo.gov/lps1609/www.fda.gov/fdac/departs/2004/604_udp.html#flu
- Draper, D. A., Hurley, R. E., & Lauer, J. R. (2008). Public health workforce shortages imperil nation's health. *Research Brief*, 4. Retrieved from <http://www.hschange.com/CONTENT/979/>
- Fauci, A.S. (2006). Seasonal and pandemic influenza preparedness: science and countermeasures. *J Infect Dis*, 194(S2), 73-76. doi: 10.1086/507550
- Hampton, T. (2004). Government drafts flu preparedness plan: concerns about serious pandemic spur effort. *JAMA*, 292(14), 1671-1672. Retrieved from <http://jama.ama-assn.org/cgi/content/full/292/14/1671>
- Juckett, G. (2006). Avian influenza: Preparing for a pandemic. *Am Fam Physician*, 74(5), 783-790. Retrieved from <http://www.aafp.org/afp/2006/0901/p783.html>
- Katz, R. (2009). Use of revised International Health Regulations during influenza A (H1N1) epidemic, 2009. *Emerg Infect Dis*, 15(8), 1165-1170. doi: 10.3201/eid1508.090665
- McCormick, L. C., Yeager, V. A., Rucks, A. C., Ginter, P. M., Hansen, S., Kazzi, Z. N., & Menachemi, N. (2009). Pandemic influenza preparedness: bridging public health academia and practice. *Public Health Rep*, 124(2), 344-349. Retrieved from <http://www.publichealthreports.org.lib-ezproxy.tamu.edu:2048/archives/issuecontents.cfm?Volume=124&Issue=2>

- Monto, A. S., Comanor, L., Shay, D. K., & Thompson, W. W. (2006). Epidemiology of pandemic influenza: Use of surveillance and modeling for pandemic preparedness. *J Infect Dis*, *194*(S2), 92-97. doi: 10.1086/507559
- Oshitani, H. (2006). Potential benefits and limitations of various strategies to mitigate the impact of an influenza pandemic. *J Infect Chemother*, *12*(4), 167-171. doi: 10.1007/s10156-006-0453-z
- Osterholm, M. T. (2005). Preparing for the next pandemic. *N Engl J Med*, *352*(18), 1839-1842. doi: 10.1056/NEJMp058068
- Pickles, H. (2006). Using lessons from the past to plan for pandemic flu. *BMJ*, *332*, 783-786. doi: 10.1136/bmj.332.7544.783
- Reissman, D. B., Watson, P. J., Klomp, R. W., Tanielian, T. L., & Prior, S. D. (2006). Pandemic influenza preparedness: Adaptive responses to an evolving challenge. *J Homeland Sec Emerg Manag*, *3*(2). doi: 10.2202/1547-7355.1233
- Riedmann, E. M. (2010). GreenVax Project. *Human Vaccines*, *6*(4), 286-291 doi: 10.4161/hv.6.4.11941
- Sandman, P.M. & Lanard, J. (2005). Bird flu: Communicating the risk. *Perspectives in Health*, *10*(2), 2-9. Retrieved from http://www.paho.org/english/dd/pin/Number22_article1.htm
- Stephenson, I., Nicholson, K. G., Wood, J. M., Zambon, M. C., & Katz, J. M. (2004). Confronting the avian influenza threat: Vaccine development for a potential pandemic. *Lancet Infect Dis*, *4*(8), 499-509. doi: 10.1016/S1473-3099(04)01105-

- United States Department of Health and Human Services (USDHHS). (2006). *HHS pandemic influenza plan* [www document]. Retrieved from <http://www.hhs.gov/pandemicflu/plan/>
- United States Homeland Security Council. (2006) *National strategy for pandemic influenza: Implementation plan* [www document]. Retrieved from <http://georgewbush-whitehouse.archives.gov/homeland/pandemic-influenza-implementation.html>
- Uscher-Pines, L., Omer, S.B., Barnett, D.J., Burke, T.A., & Balicer, R.D. (2006). Priority setting for pandemic influenza: An analysis of national preparedness plans. *PLoS Med*, 3(10), 1721-1727. doi: 10.1371/journal.pmed.0030436
- Whitley, R.J., Bartlett, J., Hayden, F. G., Pavia, A. T., Tapper, M., & Monto, A. S. (2006). Seasonal and pandemic influenza: Recommendations for preparedness in the United States. *J Infect Dis*, 194(S2), 155-161. doi: 10.1086/507557
- World Health Organization (WHO). (2010, August 31). *Cumulative number of confirmed cases of avian influenza A/(H5N1) reported to WHO* [www table]. Retrieved from http://www.who.int/csr/disease/avian_influenza/country/cases_table_2010_08_31/en/index.html
- Zarocostas, J. (2009). World Health Organization declares A (H1N1) influenza pandemic. *BMJ*, 338, b2425. doi: 10.1136/bmj.b2425

APPENDIX A: INTERVIEW PROTOCOL

Opening Statement (after reading and signing the informed consent):

I am glad that you have agreed to discuss with me your preparedness and response to pandemic influenza according to the Brazos County Pandemic Influenza Preparedness Plan. I am interested in understanding your preparedness toward pandemic influenza, any barriers to implementing the Brazos County Pandemic Influenza Preparedness Plan, and any improvement you deem necessary for the Brazos County Pandemic Influenza Preparedness Plan. For ease, I will refer to the Brazos County Pandemic Influenza Preparedness Plan from here on out as the BCPIP Plan.

Variable	Wording	Probes
Preparedness	Are you aware of the Brazos County Pandemic Influenza Preparedness Plan?	<ul style="list-style-type: none"> • Was it given to you? • Did you read it? • Do you know if others read it?
	Are you aware of how the plan was devised?	<ul style="list-style-type: none"> • What is your opinion of the plan?
	Are you aware of the plan's purpose?	<ul style="list-style-type: none"> • What do you mean by...? • Do you think it met what it set out to meet?
	Who are the major players involved in the BCPIP Plan?	Can you be more specific?
	Who is in charge?	
	How did your professional preparedness for pandemic influenza change due to the BCPIP Plan?	<ul style="list-style-type: none"> • Did it help? • Why?
	Do you feel prepared for pandemic influenza?	<ul style="list-style-type: none"> • Why? • Why not?
Barriers to execution	How was it implemented?	<ul style="list-style-type: none"> • Was it immediate? • Was it coordinated smoothly?
	How did the major players function together?	Why?
	What were your roles and responsibilities when responding to pandemic influenza?	<ul style="list-style-type: none"> • What did you do? • Was this sufficient?
	What problems/concerns arose when preparing and responding?	<ul style="list-style-type: none"> • Logistically • Mentally • Ethically
Improvement necessary	Was the BCPIP Plan clear?	<ul style="list-style-type: none"> • Tell me more. • What do you mean? • Could you give examples?
	Was the BCPIP Plan adequate?	<ul style="list-style-type: none"> • When was it not adequate? • Where was it not adequate? • How was it adequate?

Did the BCPIP Plan work?

- Why or why not?
- What should change?

Will the BCPIP Plan work in the future?

- Why not?
- Why?

Would this plan work for other pandemics?

- Why not?
- What should change?

Is there anything else you want to say about the BCPIP Plan?

VITA

Name: Elizabeth Kaster

Address: 158 V Read Building
Texas A&M University
College Station, TX 77843

Email Address: st_kaster@tamu.edu

Education: B.S., Animal Science, Tarleton State University, 2006
M.S., Health Education, Texas A&M University, 2010