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Stopping the Spread of Communicable Diseases

Through the United States Global Gateways

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

Abstract

This action research project was designed to implement a plan that meets the requirements for Federal Aviation Administration (FAA) international airport's response to a communicable disease event posing a public health threat. The problem was many of the international airports within the FAA system, including Orlando International Airport (MCO), did not have an established plan to meet these evolving requirements. The purpose of the project was to gain an understanding of how a communicable disease response should be accomplished at MCO, with the ultimate goal of developing a plan specific for MCO that could act as a model for other US airports to follow. The research answered 4 questions, (a) Which agencies have jurisdiction during a communicable disease response at a US airport? (b) Which agencies have responsibilities during a communicable disease response at Orlando International Airport (MCO)? (c) What format should be used to establish a written communicable disease response plan? (d) What information should be included in the Orlando International Airport (MCO) communicable disease response plan? Research was conducted through an extensive review of literature, accompanied with personal interviews from airport, federal, and medical agencies. A survey tool and best practices comparison of other US international airports were also accomplished. The findings determined the local public health department had direct responsibility for this type of event at MCO, but numerous agencies would be involved throughout the process. It was apparent a written plan was necessary, so the MCO communicable disease response plan was developed from the information gained in this action research project. Recommendations included sharing this information with key airport agencies, as well as developing an exercise to test the effectiveness of the plan.

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Airports are gateways that interchange a large volume of people moving throughout the world. The Federal Aviation Administration (FAA) was delegated by the Department of Transportation to oversee US international airports. A CertAlert released by FAA recommended international airports develop procedures to ensure a cohesive network for national protection during a public health threat at US ports of entry. The problem was many of the international airports within the FAA system, including Orlando International Airport (MCO), did not have an established operational plan to meet newly developed requirements for communicable disease response. The purpose of the project was to gain an understanding of how a communicable disease response should be accomplished at MCO. The goal was to establish a written communicable disease response plan for MCO that could also act as a model for other US airports to follow. Using the action research approach, this project focused on answering the following four research questions, (a) Which agencies have jurisdiction during a communicable disease response at a US airport? (b) Which agencies have responsibilities during a communicable disease response at Orlando International Airport (MCO)? (c) What format should be used to establish a written communicable disease response plan? (d) What information should be included in the Orlando International Airport (MCO) communicable disease response plan?

Background and Significance

Communicable diseases transmissions to pandemic levels have occurred across the globe during the previous four centuries. The 1918 Spanish Influenza was considered to be one of the most severe, having caused 20 to 40 percent of the worldwide population to become ill and over 50 million people to perish. Severe Acute Respiratory Syndrome entered the world scene in 2003, magnifying the need for global pandemic planning. Prior to that crisis, Centers for Disease

Control (CDC) had just 8 quarantine stations at US international airports. The CDC increased their airport presence to 18 quarantine stations by October of the same year, but MCO was not one of those facilities (Centers for Disease Control, 2000). The following year the Avian Influenza outbreak occurred, which kept the pandemic issue on the forefront.

The Homeland Security Council adopted a policy regarding entry and exit screening of international passengers in January of 2006. It put in place a tool that could restrict international travel to process through CDC quarantine stations during a pandemic. MCO was provided with an opportunity to participate in the program as a “plus six” facility, which was an airport without a CDC quarantine station on site that was capable of performing screening operations according to the federal requirements. This meant MCO could continue to receive international traffic during a pandemic, as long as established screening requirements were followed. This requirement had far reaching implications; therefore it raised many questions that are currently being evaluated.

On May 19, 2008, the CDC Division of Global Migration and Quarantine from Miami International Airport met with the Greater Orlando Aviation Authority, who is responsible for the operations at MCO, to discuss the development of an airport communicable disease response plan. Also included in that meeting were MCO Federal agencies, Orange County Health Department, and other essential community partners. Following the meeting there was minimal contact with the Miami Quarantine Station; however, discussions did take place between Greater Orlando Aviation Authority, MCO Federal agencies, and community partners. Leadership changes in several agencies slowed the development process considerably.

On April 25, 2009, less than one year after the initial plan development meeting at MCO, the World Health Organization (WHO) determined the H1N1 outbreak in Mexico represented a

public health emergency of international concern, so they raised the pandemic alert to phase 3. Just two days later, the WHO raised the pandemic level to phase 4, which indicated the Influenza was in three countries and containment was no longer possible. The WHO also recommended not to close borders, and not to restrict international travel. The date of phase 4 activation, Greater Orlando Aviation Authority called a meeting of the MCO emergency response group and Orange County Health Department, as well as the MCO based Transportation Security Administration and Customs and Border Protection, to discuss their respective plans for MCO operations during the rapidly developing pandemic. The Greater Orlando Aviation Authority emergency response group linked in to daily conference calls with the State of Florida Department of Health, increased common area and workplace cleaning practices, and began an education program for airport employees.

The E-net group is an informal committee of 20 airport fire department chief officers that have met monthly via telephone conference, and at various aircraft rescue firefighting events throughout the years. The E-net chairman moved up the monthly telephone conference call to April 28, in order to obtain a best practice comparison of each airport's pandemic plans. Twelve airports took part in the meeting, most indicating they were taking similar actions (Appendix A). The following day WHO raised the pandemic alert level to phase 5, the second increase in just a matter of four days. The CDC discussed implementing entry and exit screening for all international passengers. The level of concern at MCO was high, as Greater Orlando Aviation Authority dealt with the media surge and waited for CDC to make a determination on screening requirements. The virus was already in the US, so WHO and CDC determined entry screening would no longer be effective. Focus then moved to exit screening, but when the WHO raised the

pandemic level to phase 6 indicating a global pandemic was underway, those measures were also determined to be unnecessary.

Early in 2010, Haiti suffered a devastating earthquake which had a ripple effect on Central Florida. Repatriated citizens were flown to Sanford-Orlando International Airport, and then bussed to MCO to be dispersed to their US destinations. The number of Haitians arriving with medical problems was extensive, and Seminole County Health Department did not have a specific plan to manage this situation. They requested information from the Orange County Health Department, who in turn contacted Greater Orlando Aviation Authority to receive permission to share the draft communicable disease response plan with our community partners. Permission was granted and the plan was utilized, even though it was still in draft form. Planning also took place to fly wounded Haitians into MCO, because Miami was being overwhelmed with patients and upcoming local events. This activity never transpired, but a decision was made to use an aircraft hangar as the receiving point, with a Disaster Medical Assistance Team performing patient care prior to hospital transport.

The MCO Fire Rescue had received the required training and equipment to conduct medical screening procedures for communicable diseases, but many of the other Greater Orlando Aviation Authority departments and MCO assigned Federal agencies are not familiar with the detailed medical processes required during a communicable disease event. MCO had a draft plan that needed to be finalized and tested in order to meet the requirements for FAA international airports in responding to communicable disease situations, and to ensure all necessary agencies understood their role. The National Fire Academy (2009) referenced the goal of the *Executive Analysis of Community Risk Reduction* course was to develop leaders in community risk reduction with a primary focus on a local problem, “risks that may happen only

once every 5, 10 or even 20 years but have the potential for a devastating outcome... the risk should have affected your community in the past or be a major emerging issue” (p. 3).

The *Executive Analysis of Community Risk Reduction* curriculum required extensive pre-course literature review. Much of the material looked at fire risks from local census tracts to a nationwide scope. This literature showed how types of risks are different for specific areas, including how identifying and reducing key risks in local areas can have a positive effect on the nation as a whole. Managing a communicable disease event at a US international gateway is a noteworthy correlation of the information gained from the pre-course literature, even though it was not fire related. One of the reports, *America at Risk*, included principal findings and recommendations on the fire service role in the prevention and control of risks in the US.

Recommendation number 10, Emergency Medical Services, states:

FEMA [Federal Emergency Management Agency] should review the collective support provided by the federal sector to the EMS [Emergency Medical Services] activity of communities' fire departments and, based on a needs assessment, determine whether that support can be revised in order to enhance the EMS capability of these departments.

FEMA should facilitate the development of a working partnership among the health care industry, the health insurance industry, and the fire services with the goal of enhancing the provision of emergency medical services to the public and improving the efficiency and effectiveness of the health service industry. (Federal Emergency Management

Agency, 2002, p. 29)

That recommendation identified the need for enhancing local medical capabilities to positively affect the health service industry utilizing Federal partnerships, which is in direct alignment with the goal of this project.

The United States Fire Administration has established five year operational goals. Two of the objectives are directly related to the subject matter of this research project; promote within communities a comprehensive, multi-hazard risk reduction plan led by the fire service organization, and respond appropriately in a timely manner to emerging issues (National Fire Academy, 2005). Although communicable diseases and pandemics are not new, the requirements being placed on US international airports are still evolving. More than 5 million passengers travel by air or sea through 317 US ports, creating an intersection of the transportation industry, public health, and homeland security. MCO is one of those ports, so its' preparedness is critical to national security. History has shown communicable disease outbreaks are inevitable; therefore, identified shortfalls will have to be rectified to ensure MCO can effectively maintain an international gateway that will protect the citizens of Central Florida.

Literature Review

The Department of Transportation has been the Federal regulatory agency over US air transportation, and FAA was the agency within the Department of Transportation responsible for direct oversight of US airports. The FAA (2004) stipulated the rules governing airport operations in the US, authorizing FAA to revoke an airport certification when the regulation had not been met. That regulation required all airports to adopt an emergency plan in accordance with FAA Advisory Circular 150/5200-31A: *Airport Emergency Plan* (Federal Aviation Administration [FAA], 2009b). It outlined areas of responsibilities for organizations and departments during emergency situations, in addition to determining lines of authority. Although the FAA did not mandate a specific format for individual Airport Emergency Plans, it indicated a basic plan should contain (a) introduction, (b) definitions, (c) purpose, (d) situation and assumptions, (e) operations, (f) organization and assignment of responsibilities,

(g) administration and logistics, (h) plan development and maintenance, (i) authorities and references, and (j) unique planning considerations. The *MCO Airport Emergency Plan* had those same 10 sections listed in the same order (Greater Orlando Aviation Authority, 2009).

The FAA stipulated airport personnel should have received training to mitigate nine hazard areas. Although the specific hazard sections were outlined with general responsibilities for various departments, the FAA specified each airport as responsible for making the decision on what duties to include in each section. The *Airport Emergency Plan* stated, “While response organizations can, and usually do, perform admirably in emergency responses, problems often arise in the overall management of the situation, i.e., the merging of varying disciplines, organizations, and agencies not accustomed to working together” (FAA, 2009b, p. 6-3). The key to success in response to a communicable disease event was to plan, train and exercise on the plan, and properly implement the plan (United States Fire Administration, 2006).

Several core functions were delineated by FAA within each hazard specific section; direction and control, communications, alert and warning, emergency public information, protective actions, law enforcement, fire rescue, health and medical, resource management, airport operations, and maintenance. The health and medical section indicated the need to manage a communicable disease response that involved the amount of passengers carried on the largest aircraft using the facility. It also stated the need for a procedure to request a Disaster Medical Assistance Team and the National Disaster Medical System, as sources for medical supplies and equipment (FAA, 2009b).

The FAA issued CertAlert 09-09, which indicated airports should develop or review their pandemic and communicable disease response plans. The CertAlert advised airports to consider the Centers for Disease Control (CDC) estimated 30% reduction of employees in their plans do

to sick leave issues. The FAA (2009a) also stated the airport plan should consider best practices, along with guidance available from: CDC; International Civil Aviation Organization; Department of Homeland Security, referencing the *Pandemic Influenza, Preparedness, Response, and Recovery Guide for Critical Infrastructure and Key Resources* (Department of Homeland Security, 2008b); and airport associations, referencing the Airports Council International (2009), *Airport Preparedness Guidelines for Outbreaks of Communicable Disease*.

CertAlert 09-12 (FAA, 2009c) updated and cancelled CertAlert 09-09 (FAA, 2009a) with information regarding airport planning for pandemic flu. Most of the information in both CertAlerts was consistent, except the estimate for loss of employees during a pandemic was increased to 40%. CertAlert 09-12 noted the responses received from airports through the request in the cancelled CertAlert showed the majority of the plans were directed toward emergency response. The reference list in the most recent CertAlert was increased to include the Department of Health and Human Services, Department of Transportation, and Occupational Safety and Health Administration.

The Department of Homeland Security (2008b) contained a sub section that indicated aviation had seven key areas of vulnerability (a) essential services, (b) essential assets and equipment, (c) essential materials and supplies, (d) essential worker groups, (e) essential interdependencies, (f) regulatory and government policy issues, and (g) impacts from community mitigation strategies. The Department of Health and Human Services and CDC were identified as primary resources for information.

The essential services area showed a need to determine between essential and non-essential services. Airport operators must have classified the primary and supporting equipment critical to support each essential function, and be prepared to sustain essential equipment for a

pandemic wave that could last as long as 3 months. Essential materials and supplies also identified the need to sustain for 3 months, recommending procurement and stockpiling as additional means to ensure adequate supplies (Department of Homeland Security, 2008b). According to the United States Fire Administration (2006), with anticipated shortages in supplies and limited distribution systems, the only resources the responders would have available were those obtained prior to the event. The Department of Homeland Security (2008b) showed a need for personal protective equipment and establishing workplace safety policies, referencing the CDC, Food and Drug Administration, and Occupational Safety and Health Administration for more detailed information. Policies or actions to protect and sustain workers should have been developed and implemented, including vaccinations, disinfectants, and personal protective equipment. The Occupational Safety and Health Administration (2007) indicated healthcare workers are among the high risk groups that had priority in receiving vaccinations; however, only 40% of this group received immunizations in 2003.

The Occupational Safety and Health Administration (2009) provided guidance for healthcare workers responding to pandemic influenza, providing a clinical background, infection control, preparedness, and other special standards. The infection controls section differentiated between standard, contact, droplet, and airborne precautions. Standard precautions were identified to be used for all patient care, protecting responders from blood, bodily fluids, unattached skin, and mucous membranes. That approach would have been accomplished through the use of hand and face protection for coughing or sneezing patients, to include having used alcohol based cleaners or soap and water prior to, and following, personal protective equipment use. It also included operating procedures for disinfecting patient care equipment, treatment areas, and any other surfaces that could potentially be infected. The contact

precautions were indicated for interaction with patients who were suspected of having a serious illness that was easily transmitted. Those precautions included; donning standard personal protective equipment prior to entering patient care area, limiting patient movement, and isolating the patient from other persons.

Droplet protection included the use of a surgical mask within 3 feet of an individual suspected to have a serious illness that was easily transmitted by large particle droplets, and placing the individual in an isolated area. Airborne precautions would have been used when treating individuals suspected of having a serious illness, to have included placing the individual in a negative pressure room, or isolating the patient if a negative pressure room was not available. The room should have entry and exit doors shut when not in use, and have bathroom and hand washing facilities available. The personnel in the room should have been limited to only those necessary using NIOSH N-95 certified particulate respirators (Occupational Safety and Health Administration, 2009).

The Food and Drug Administration (2006) was the US agency responsible for clearing personal protective equipment products for use by emergency response personnel under the Federal Food, Drug, and Cosmetic Act. Once a product was cleared, the Food and Drug Administration maintained a database of approved products and manufacturers, ensured proper manufacturing practices, and tracked medical device problems. They also had the authority to issue Emergency Release Authorizations. That action would allow the use of uncleared medical products provided certain criteria was met. It also released stockpiles of medicines and verified appropriate diagnostic testing procedures.

The National Fire Protection Association (2007a) identified the fire department needs to assign a Health and Safety Officer to oversee the infectious disease program. It should have

included personnel who have received training in managing this process according to National Fire Protection Association (2005), which emphasized the importance of training personnel on the proper use of personal protective equipment. It was recommended an Infection Control Officer be assigned to manage the program and be knowledgeable on; identification and screening, immunizations, personal protective equipment, health effects education, and post exposure management. According to the Department of Homeland Security (2008b), essential worker groups were a dynamic resource in the plan that required several actions; however, a 40% absenteeism should have been anticipated for worker sick leave usage. The first action to be completed in this area would have been to identify which workers were critical to sustain essential functions, and to define their responsibilities. According to Delaney (2008), there were several variables that affect firefighters' participation during a pandemic; safety and concern for family, sufficient and adequate supply of personal protective equipment, developed plans, workers compensation coverage, and availability of pharmaceutical interventions.

Essential interdependencies were also critical at airports, because there were several agencies that have some level of responsibility during different phases of the travel process. Regulatory and government policy issues emphasized the legality of the process, stating airport operators must have identified the requirements and coordinated with each agency that will be necessary during a pandemic operation at the airport (Department of Homeland Security, 2008b). Turnbull (2007) stated under procedures for coordinating responses at airports during a pandemic event, "Identifying the roles and responsibilities of all groups is critical, as are coordination and communication among all groups" (p. 18). National Fire Protection Association (2004) showed the importance of the operations area of emergency service providers, indicating mutual aid

agreements with community partners were necessary to ensure the community was adequately protected.

All of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) and the CDC template (Appendix B) identified; (a) airline and conveyance captain, (b) Airport Operations Center, (c) CDC, (d) Customs and Border Protection, (e) emergency management, (f) emergency medical services, (g) health care facilities, (h) law enforcement, (i) local public health, (j) public affairs, and (k) Transportation Security Administration, as having responsibilities during a communicable disease response. FAA, Immigrations and Customs Enforcement, and volunteer organizations were specified in the CDC template, and Federal Bureau of Investigation was a stakeholder in DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a) plans. The Airport Operations roles were listed under the Airport Operations Center on the CDC template, and in five of the six plans; however, DTW showed Airfield and Landside Operations in lieu of the Airport Operations Center. MCO and DTW delineated an airport security function separate from law enforcement. The only plans that showed mass transit were FLL and MIA, with IAD (2009) being the lone plan with roles and responsibilities for a communications department. The CDC template did not have a public affairs group, but they were shown in all the E-net plans.

An initial response group consisted of (a) aircraft rescue firefighting, (b) airport operations, (c) Customs and Border Protection, (d) CDC Division of Global Migration and Quarantine, (e) emergency medical services, and (f) law enforcement, in each of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood

International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009), as well as in the PHX isolation procedures (Phoenix Aviation Department [PHX], 2009). Affected airline was included in all the initial response groups except BOS (2008). The local public health was included in FLL (2009), IAD (2009), and MCO (2008b); FLL added Transportation Security Administration, while IAD and MCO added emergency medical services transport agency. A larger response group consisted of the initial response group, along with county and state departments of emergency management and health, Federal Bureau of Investigation, and Transportation Security Administration, in all of the E-net plans except BOS. IAD included a public safety command and Emergency Operations Center staff. DTW (2009) added Department of Homeland Security, and MCO showed the Orlando Fire Department and Orange County Fire Rescue as available resources.

Incident command information was consistent in five of the six E-net plans, each emphasized the use of National Incident Management System (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a). The command section of the BOS (2008) plan identified the agencies in command for cruise ship, as well as the international and domestic aircraft areas of their operation (a) CDC for international and local public health for domestic flight isolation and quarantine decisions, (b) emergency medical services commander established communications link with CDC Division of Global Migration and Quarantine and/or local public health, (c) Customs and Border Protection held international passengers from processing into the

US until the initial medical assessment team arrives, (d) law enforcement officers established safety zones and security for isolation and quarantine areas, and (e) airline or ship representative participated in unified command to support on scene operations.

The MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) listed the following departments as having roles and responsibilities during emergency response events; air traffic control tower, aircraft rescue firefighter, communications, airfield operations, landside operations, airline operations, Orlando Police Department, maintenance, airlines, public affairs, finance, commercial properties, security, risk management, construction, and environmental. A research project titled, *Landing NIMS [National Incident Management System] Compliance at FAA Class One Airports* (Kann, 2008), determined the airport departments that would be necessary during an emergency response at MCO to include; airport management, animal control, communications, emergency management, environment, finance, fire rescue, law enforcement, maintenance, material control, operations, public information, purchasing, risk management and security. Kann determined not only the essential departments, but the level of responsibility each department had during an emergency.

Guidelines from Airports Council International (2009) stated airport operators should aim to protect the health and welfare of everyone at the airport. The guidelines were not a requirement, but contained industry recommendations that were designed to be modified to fit local situations. It indicated the responsibility for managing communicable diseases at airports falls with the local public health department and the airport operator, referencing the World Health Organization (WHO) for the roles of competent authorities. The WHO (2005), *International Health Regulation*, stated competent authorities shall: monitor baggage, cargo and conveyances arriving or departing from affected areas, so they are free from contamination;

provide facilities in a sanitary condition; remove contaminated waste; establish effective contingency plans; make notification of control plans to conveyance operators; supervise all necessary service providers; and communicate with the National focal point.

The Airports Council International indicated coordination of preparedness measures was the key to success in reducing risk during a communicable disease event. To have achieved that objective airport preparedness plans needed to have a clear contact point for policy preparedness, and identify the person with responsibility for operational implementation of the plan. The plan should have focused on (a) communications, (b) screening, (c) logistics, (d) equipment, (e) entry/exit controls, and (f) coordination with local public health. Implementation of screening measures for arriving and departing international passengers would have been determined by epidemiology, transmission, severity and cost. Various screening methods may have been employed, such as visual inspection, questionnaire and temperature measurement, but the method chosen should have matched the behavior of the communicable disease. The WHO continually evaluated new infectious agent epidemiological behavior to determine if the investigative findings, along with location of infected people, supported the implementation of screening measures (Airports Council International, 2009).

The Department of Homeland Security (2008b) indicated screening was part of a multi-layered US government strategy for containing, mitigating, and managing a pandemic influenza event. The CDC (2000) provided limited details on how the screening process would have accomplished that objective. The Department of Health and Human Services, Department of Homeland Security, and Department of Transportation developed the *US Public Health Entry Screening of Arriving International Travelers at Airports during an Influenza Pandemic* standard operating procedure (Centers for Disease Control, 2009). It indicated the trigger for

implementing the plan was based on a recommendation from the Department of Health and Human Services, in conjunction with the Department of Homeland Security, that screening would be necessary and prudent to slow the spread of a pandemic in the US. The decision to limit the airports receiving international traffic involved Department of Health and Human Services and Department of Homeland Security, but added Department of Transportation. “DHS [Department of Homeland Security] has overall responsibility for securing US borders against all hazards and disasters. DHHS [Department of Health and Human Services] has the mandate to protect the health of all Americans. DOT [Department of Transportation] is responsible for ensuring the safety of our nation’s transportation system” (p. 6).

State and local pandemic plans showed how state and local agencies would prevent, mitigate, respond, and recover from such an event. The plans were specific to the community and reflected the unique needs of the area. Planning assumptions included: ability of virus to spread worldwide; people may be asymptomatic while infectious; potential for simultaneous outbreaks across the US; enormous demands on health care system; delays or shortages in vaccines and antiviral drugs; and the potential disruption of community infrastructures, including transportation (Department of Health and Human Services, 2005). The CDC (2009) indicated the operations began within 48 hours of notice. The airports allowed to accept flights would be determined at that time, but included the 19 international airports with an on site quarantine station. It also indicated local plans should prepare to receive a federal staffing surge. Federal agencies responsible for screening at each airport were Customs and Border Protection and CDC, with assistance from Transportation Security Administration, FAA, airport operations staff, airlines, emergency responders, law enforcement, local public health, and testing laboratories.

The screening process showed any individual suspected of having a potentially communicable disease, and their contacts, would be escorted to a secondary screening location. All remaining passengers on board an involved aircraft went through a primary screening process consisting of; health declaration form review, visual observation and questions about illness, exposure potential, and travel history (Centers for Disease Control [CDC], 2009). Ill passengers identified in primary screening were escorted to secondary screening, along with their traveling companions. The secondary screening process included; patient triage, infection control measures, evaluation and physical examination, travel and exposure history, determination of long term contacts, communications between cohort and primary screening, and isolation of ill individuals until they could be transported to medical facility.

The CDC (2009) indicated a cohort out processing was designed to contain travelers from a single flight, while the other passengers were in primary or secondary screening. The functions of the cohort staff were to; make final visual observation, answer any traveler questions, collect and review health declaration form, calculate transit time, distribute health information, distribute antiviral drugs, and provide contact information. A temporary quarantine facility may need to have been established for a period of less than 12 hours and should have included; health and welfare items, security, bathroom facilities, timely information, comfort items, food, entertainment, medical care, methods for travelers to communicate, appropriate space, and furniture. Individuals in the cohort were released to continue their travel, if all individuals on their flight had completed screening and no individuals met the illness criteria. If an ill traveler was identified, the individuals on the same flight located in the cohort would either have been conditionally released or temporarily quarantined.

The local operations plans must include provisions for: screening all arriving international travelers and cabin crew, including identification of ill and exposed travelers; assigning risk to remaining travelers; maximizing traveler and screener safety; minimizing traveler and airline delays; preparing for multiple aircraft; using most effective methods for screening; providing communications, and unified command; scaling screening operations up and back down; transporting ill patients to appropriate health care facilities; and provisions for an on site temporary quarantine facility (CDC, 2009). Brigantic, Delp, Gadgil, Kulesz, Lee, and Malone (2009) provided information from an international passenger screening model that showed the US would screen over 17 million passengers during the first 100 days of a pandemic. The model estimated over 11,500 mostly asymptomatic travelers would pass through the screening process undetected; however, there would be 800,000 to 1.8 million less pandemic cases and 16,000 to 35,000 fewer fatalities. They showed airport screening identified approximately 50% of infected travelers and would not significantly delay the arrival of a pandemic influenza.

The MIA exercise document delineated primary and secondary screening of passengers that arrived on an international flight. It showed the primary health screening area should have accomplished a review of health declaration forms, a visual exam, and thermal scan. Individuals who had traveled to a place with pandemic influenza, along with any of the following; signs or symptoms of influenza-like illness, elevated temperature, close contact with an ill person, or long term contacts of ill passengers, would all have been escorted to secondary screening. In secondary screening a review of the health declaration form and clinical examination would be completed. Ill Individuals would have been transported to an appropriate medical facility, with long term and close contacts quarantined. Individuals determined not to be ill after completion

of secondary screening, along with their close and long term contacts, would have been escorted to a cohort out-processing area. The cohort area was designated to: collect health declaration forms; determine travel time; distribute antivirals and observe that therapy; and provide announcements, health information, legal forms and conditional release information. Individuals were kept in the cohort area until all passengers from their flight were processed through primary and secondary screening (Miami International Airport [MIA], 2008b). The MIA exercise process was supported by the information outlined in the CDC (2009) screening plan.

Screening travelers that departed from affected countries would more likely produce a positive result, according to Airports Council International (2009), travelers showing signs and symptoms in the affected area produced less false positives. “Exit (departure) screening is therefore less burdensome to travelers and societies, and, when required, should be undertaken as soon as possible after travelers have arrived at the airport, and before they pass through to airside” (p. 4). Entry screening at international borders was expensive, disruptive, and provided minimal impact on global disease spread; nevertheless, it may be considered for islands, or when epidemiological data indicated a need. When surveillance or exit screening in an affected region were less than optimal, consideration should also be given to entry screening. If an authority determined screening activities were necessary, costs associated with the screening equipment, airport space, and infrastructure support, would normally have been met by that authority.

The *Pandemic Influenza Plan*, indicated sustained human to human contact anywhere in the world would be a trigger event for US pandemic response, acting in concert with WHO. The Public Health Service Act authorized the Secretary of Department of Health and Human Services to declare a public health emergency and take necessary actions to respond. That potentially included grants, awards for expenses, entering into contracts, or conducting and supporting

investigations. It also provided the avenue for the Food and Drug Administration to approve the emergency use of unapproved products or approved products for unapproved uses (Department of Health and Human Services, 2005).

Travelers identified during screening to be at increased risk for communicable disease should undergo secondary screening by a medical authority. A positive assessment by the medical authority indicated the individual was thought to be suffering from a communicable disease that may pose a serious health threat, and efforts should have been made to prevent the traveler from leaving. According to Airports Council International (2009), isolation and quarantine facilities should be identified away from the airport by the local public health, and legal ramifications needed to be considered, referencing WHO (2005) Article 23. The *IHR* advised a state party may require arriving or departing travelers to provide; contact information for future follow up, details of where the traveler has been in relation to area of concern, review of health documents, and approval to submit to a non-invasive medical exam. It also allowed the state party to inspect baggage, cargo, and conveyances. Travelers must have given prior consent to medical examination or other health measures administered, with exception noted in Article 31. It stated travelers would not be subject to invasive medical examination or procedures as a requirement for entry to a state. The state may compel an individual to undergo the least invasive and intrusive medical examination to accomplish the public health objective including (a) vaccination, (b) prophylaxis, (c) isolation, (d) quarantine, or (e) public health observation. The state party may also have denied entry in accordance with Articles 32, 42, and 45, if a traveler would not consent to a non invasive medical examination or procedures (World Health Organization [WHO], 2005).

WHO Articles 32, 42, and 45, indicated the state party must respect the traveler's dignity and human rights; minimizing discomfort by taking into account gender, social culture and ethnicity, while providing accommodations, food, water, clothing, protection, and a means of communicating. All health information was kept confidential, unless necessary for managing a public health threat. The articles allowed state parties to require medical examinations or procedures; if there was an indication a public health risk exists, as a condition of entry for travelers seeking residency, or as a condition of entry following Article 43 or Annexes 6 and 7. Article 43 stated the regulations did not stop state parties from taking health measures following the national laws of their state, as long as they were equal to or greater than the health protection recommended by WHO. Annex 6 stated the vaccines or prophylaxis must be of a suitable quality, and the International Certificate of Vaccination or Prophylaxis would be completed with no deviation from format. Annex 7 specifically identified yellow fever as a disease that required a traveler to show vaccination certificate, or receive prophylaxis as a condition of entry or exit from a state (WHO, 2005).

The Congressional Research Service (2009) provided legal information that showed airlines were not under obligation to provide transportation because someone had a ticket. Airlines had contract clauses that allowed them to deny travel. Additionally, Department of Homeland Security and CDC developed a travel restriction tool called the Do Not Board list. According to Airports Council International (2009), persons with known communicable diseases who posed a significant health threat would be identified and restricted from boarding an aircraft departing from, or arriving in, the US. Inbound aircraft with a suspected communicable disease that may pose public health risk onboard, involved several considerations prior to the aircraft arrival (a) where to place the aircraft, (b) ensuring facilities are available, (c) ventilation, and

(d) public health personnel accessibility. Ill travelers were escorted from the aircraft to an area for further assessment, and there should be plans for obtaining baggage, customs and security clearance for sick travelers that need medical evaluation/treatment away from the airport facility.

The passengers should have been allowed to disembark as soon as possible, after the local public health had evaluated the situation. Travelers and crew members on the flight who were potentially contagious should be kept separated from other travelers, until seating assignments and contact information could be obtained. All individuals on a flight with a potentially contagious person must have been informed of necessary precautionary measures that could be taken, and any surfaces that an infected traveler may have contacted were appropriately decontaminated. Airports Council International (2009) concluded by advising airport operators to test preparedness through exercises, and recommended WHO, International Civil Aviation Organization, and the International Air Transport Association for additional information.

The WHO (2005) entered the *IHR* into force on June 15, 2007, with the purpose and scope “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, which avoid unnecessary interference with international traffic and trade” (p. 2). The US joined the list of State Parties accepting the *IHR*, but included a submission of reservation that obligations under the *IHR* would be completed according to the U.S. Constitution. The WHO outlined core capacity requirements for surveillance and response. State parties were directed to use existing national structures and resources to meet their core capacity requirements under the regulations. Core capacity requirements from WHO stated the airport must provide access to prompt medical assessment and care, along with a safe environment for travelers. There must also be trained personnel available to inspect conveyances. Capacities from the local public

health included; detection of disease events above expected levels, reporting of essential information, and immediate implementation of preliminary control measures.

The US national plan for pandemic response had three main goals: stop, slow, or otherwise limit the spread of a pandemic event into the US; limit the domestic spread of a pandemic event; and sustain infrastructure and mitigating impacts to the economy. It indicated the aviation sector had a role in each of the areas, as it was a key component in the national economic engine that involved aircraft carrying potentially sick individuals (Homeland Security Council, 2006). Turnbull (2007) stated that during a pandemic, carriers going to vacation destinations would experience significant declines in passenger volume, and that business travel would return before the leisure market.

The State of Florida Department of Health (2009) outlined the approach to a communicable disease event, designating Emergency Support Function Eight (ESF-8) as the lead group during a public health threat. It listed trigger events for activating the plan under preparedness, response and recovery activities, with roles for state bureau's that included local public health. Under preparedness the local public health was responsible for developing and testing community based response plans, and assessing healthcare resources which included development of contingency plans. The response area showed the local public health was responsible for implementing local response plans and assigning staff to assist with health and medical response. The recovery trigger indicated the local public health did not have any responsibility objectives.

Recommendations from WHO, the International Civil Aviation Organization, and the International Air Transport Association were compiled to develop, *WHO Technical Advice for Case Management of Influenza A (H1N1) in Air Transport*, which was formally adopted by

WHO. It provided actions for crew members to take, if they suspected a person had a communicable disease while in flight. It advised flight crews to seek medical support from established plans, notify the pilot, and complete the passenger locator card. The pilot in command of the aircraft protected passengers, completed the health portion of the aircraft general declaration, and notified Air Traffic Control. Air Traffic Control and the airline would notify the airport operator and local public health (WHO, 2009).

The International Air Transport Association (2009) stated air carrier response plans should align with their nations plan. The air carrier immediately contacted the Operations Control Director when they received information that may necessitate an emergency response. The Operations Control Director activated the airline Emergency Response Team, who contacted responding agencies to determine the level of airline response. An airline medical representative would be identified to liaison with CDC and local public health, and be responsible for determining airline equipment, quarantine, or disinfecting needs. Airline representatives at each airport contacted local staff to ensure a clear flow of information locally, as well as to the airline Emergency Response Centre. The representative obtained and locked passenger information for future identification, and liaison with customs authorities to share additional information. Airlines communicated externally with customers and media through coordination with health authorities, airports, and other key agencies to ensure an accurate and consistent message.

Airline personnel must have been briefed to have passengers remain seated until the local public health could assess ill passengers, prior to medical crews meeting the aircraft. All passengers, crew, baggage, and cargo must have remained on the aircraft until permission to disembark was received from CDC or local public health. Local airline representatives would also have assisted with quarantine measures and making arrangements for handling cargo and

baggage issues. Opening of a local passenger or friends and family centre should have been considered. Airline maintenance was responsible for disinfecting aircraft and continuing with cargo activities, with both activities following recommendations by their airline medical representative (International Air Transport Association, 2009). According to WHO (2005), conveyance operators shall have facilitated; inspections of cargo and conveyances, medical examinations of persons on board aircraft, and the application of health measures in accordance with the *IHR*.

WHO provided actions for the local public health to take when arriving at the airport (a) make the appropriate notifications, (b) facilitate medical services, and (c) ensure appropriate transport of potentially contagious individuals to quarantine, isolation, or treatment facility away from the airport. The local public health was also noted as being responsible for establishing a system to identify at risk travelers through training health authorities and border agency personnel. The arrival airport notified the pilot where to park the aircraft; which could be at the aircraft ramp, or at a remote location with the understanding this might delay medical response and complicate passenger handling. Disembarking should be completed as soon as possible, but after the local public health had assessed the situation. Passenger locator cards should be collected from passengers two rows in front and behind, as well as the row of, a potentially infected traveler. Travelers and crew members should be informed of signs and symptoms for suspected disease, and to seek help if either were experienced within the following seven days (WHO, 2009).

All six of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International

Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) had the recommended components shown in the CDC template (Appendix B) plus: all the plans also included an introduction section; DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a) included a reviewer's signatory page; and three plans had emergency operations retitled - BOS (2008) used on scene operations, DTW used illness notification and emergency response, and IAD (2009) used operations. The sub categories under the operations section in the CDC Template and two-thirds of the plans, DTW, FLL, MCO, and MIA consisted of (a) parking and gate procedures, (b) planeside response, (c) incident command, (d) screening/detention, (e) conditional release, (f) surge capacity, (g) decontamination, (h) media communications, and (i) international communications. The IAD plan showed planeside response, designated areas for affected aircraft, and temporary quarantine locations, as categories under their operations section; BOS did not have sub categories under on scene operations in their plan.

The best practices comparison of the E-net plans and CDC template provided details for specific information in several areas. The purpose section in the CDC template (Appendix B) and all the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) showed the objective of their plan was to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the US. The reviewer's signatory page on the CDC template (Appendix B) and DTW (2009), FLL (2009), MCO (2008b), MIA (2008a) specified; the officer in charge of the Division of Global Migration and Quarantine, the Customs and Border Protection Port Director, Director of local public health, and the Director of the airport, were necessary for plan approval.

FLL added Director of Transportation Security Administration, Department of Law Enforcement, and Department of Fire Rescue to their signatory page. A signatory page was not included in BOS (2008) and IAD (2009) plans.

The definitions section in five of the six E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) had the same 15 terms identified in the CDC template (Appendix B); conditional release, communicable disease, contact, contact tracing, detention, epidemic, incubation period, isolation, pandemic, quarantinable disease, quarantine, screening, surveillance, suspect, and transmission. Close contacts, other contacts, and non-contacts were added to those 15 definitions in the FLL (2009), MCO (2008b), and MIA (2008a) plans for a total of 18 terms. The IAD (2009) plan added five definitions; international traveler, passive surveillance, public health personnel, travel contacts, and travel companions, for a total of 20 definitions in their plan. The BOS (2008) plan had six definitions, four of which were identified in the CDC template (Appendix B) definitions. Hold was used instead of the term detention, but with the same basic terminology; Trigger was a unique term that was not shown in the definition section of any other plan (Massachusetts Port Authority [BOS], 2008). The background and overview section in DTW (2009), FLL, MCO, MIA, and the CDC template listed the quarantinable diseases, signs and symptoms, as well as reporting procedures. The background and overview section was not included in the BOS and IAD plans; however, the same information was provided in other areas of both plans.

The assignments of responsibilities section began with emergency operations in five of the six E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort

Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009). An assumption of actions by CDC and local public health were also listed in the plans that included: patient evaluation, treatment, and transport to appropriate medical facility; collection of passenger locator information; and on site temporary quarantine capabilities for the amount of people on board the largest aircraft using the facility for a period of up to 72 hours. The CDC template (Appendix B) used the assignment of responsibilities section to delineate the responsibilities of each individual department or agency.

The parking and gate procedures showed consistency in five of the six E-net plans, having travelers remain on the aircraft at a designated location until CDC Division of Global Migration and Quarantine had evaluated the sick passengers (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a). IAD (2009) did not specify to leave passengers on board the aircraft, and FLL (2009) used the arrival of local public health in place of Division of Global Migration and Quarantine. Planeside response in the DTW (2009), FLL, MCO (2008b), and MIA (2008a) plans stated Division of Global Migration and Quarantine was the lead agency for international flights, and designated local public health as lead agency for domestic flights. They also showed personal protective equipment would be used to gain access to aircraft and assess sick travelers, sick passengers would be isolated, and appropriate notifications needed to be made. FLL included the arrival of local public health, an assessment for potential bioterrorism, and steps for obtaining a quarantine order. All the plans mentioned Division of

Global Migration and Quarantine needed to have activated their agreements with local hospitals to receive communicable disease patients.

The screening and detention area specified locations for initial passenger screening and temporary holding in all the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009), with DTW (2009) and IAD (2009) having placed a timeframe on the temporary holding facilities of up to 8 hours. The BOS (2008) temporary holding area for less than 350 passengers was a general aviation terminal, with a hangar designated for aircraft carrying over 350 passengers. IAD and MCO (2008b) specified a transit lounge for temporary holding, and stated local public health was responsible for off site facilities; IAD showed a timeframe of 72 hours for the temporary holding, but MCO did not specify a time limit. MIA (2008a) identified a bomb shelter building for temporary holding, transitioning to an auditorium for longer timeframes. The PHX isolation procedures stated a portion of their terminal building would be segregated for temporary holding, until off site facilities could be established by local public health (Phoenix Aviation Department [PHX], 2009).

Under the conditional release section of all the E-net plans and the CDC template (Appendix B), the Division of Global Migration and Quarantine or local public health had the authority to allow a passenger to continue travel following a communicable disease event (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a;

Washington Dulles International Airport [IAD], 2009). FLL (2009), MCO (2008b), and MIA (2008a) stated when individuals were conditionally released the Division of Global Migration and Quarantine should have; included illness notification and response, collected passenger locator information, distributed health information, potentially performed prophylaxis, and tracked released individuals. A surge capacity was also identified in the CDC template (Appendix B), with DTW (2009), FLL, and MIA having pointed out Division of Global Migration and Quarantine requested local public health to assist. FLL also included emergency medical services response and indicated a federal surge staff may take 48 hours to respond, “Response may require a two-tiered approach... initial surge by LPH [local public health] and the immediate health care community who can arrive immediately. Long term (beyond 48 hours) sustainability of operations required a federal response following the arrival of national assets” (Fort Lauderdale/Hollywood International Airport [FLL], 2009, p. 24). DTW indicated in general anything beyond the 48 hour timeframe would require a federal agency response, and MCO showed local public health would request Division of Global Migration and Quarantine for assistance to manage surge.

The communications section was divided between media and international notification in the CDC template (Appendix B) and DTW (2009), FLL (2009), MCO (2008b), MIA (2008a), utilizing a Public Information Officer to coordinate press releases. They also showed the communication with international partners was a responsibility of the CDC, with the Department of State to be notified when an international flight or traveler was legally detained or quarantined. A *Public Health Communications Response Plan* was submitted in addition to the MIA (2008a) communicable disease response plan. It outlined the use of a Joint Public Information Task Force (JPITF) that consisted of (a) Aircraft Rescue Firefighting, (b) aviation

department division of security and communications, (c) county Emergency Operations Center, (d) local public health, (e) law enforcement, (f) Customs and Border Protection public affairs, (g) CDC Miami Division of Global Migration and Quarantine, (h) Transportation Security Administration, and (i) American Red Cross. The plan specified the primary media point of contact was through the county Emergency Operations Center, and the secondary media point of contact would be through the MIA Joint Information Center. A concept of operations provided a single page flow chart for different benchmarks in the response process, and the appendices included an emergency communications contact list, sample questions and answers for media responses, and communication scripts for various scenarios (Miami International Airport [MIA], 2007).

Several key areas were indicated by International Civil Aviation Organization (2007) as being necessary for inclusion in a communicable disease response plan: (a) clear contact points; (b) national planning command and control system; (c) system for notifying the local public health; (d) national and international networks; (e) aviation preparedness plan linked with national preparedness plan; (f) generic guidance to all communicable diseases; (g) WHO guidance for cohesion of global preparedness; (h) methods to notify public and provide consistent advice from the local public health, including a public health campaign; (i) health requirements for entry, or denial of entry into a state in accordance with WHO recommendations; (j) communication system; and (k) prophylaxis or preventative measures including airline and airport workers, with reference to *IHR* Articles 24, 27, and 28. Those articles identified the conveyance operators were required to ensure compliance with the health measures recommended by WHO, and that travelers would be informed of those measures. They also maintained when sources of infection and contamination were present on a conveyance, the

competent authority should consider the conveyance affected. This required determining the appropriate technique for controlling the public health risk, followed by implementation of disinfecting activities for the conveyance (WHO, 2005).

According to International Civil Aviation Organization (2007), airport preparedness had several components; communications, identifying position with implementation responsibility, establishing points of contact, and developing an exit screening plan. It was noted that exit screening should have taken place as early as possible to the time the traveler arrived at the departure airport. All travelers went through designated entry points prior to an airside access point. Screening measures used reliable equipment by trained personnel, and did not prevent or unduly delay the flow of passengers or cargo. There must also have been a system for assessing passengers who screen positive, as determined by the local public health including (a) medical staff, (b) location, (c) isolation and quarantine area for travelers and aircraft, (d) personal protective equipment, and (e) transport capabilities to appropriate medical facilities. It was noted the quarantine of a large numbers of travelers would be difficult, and after the acute phase would not significantly prevent the spread of an outbreak. Logistics for baggage, security, and customs were addressed, along with clear legal criteria and actions taken for denying travel. Additionally, International Civil Aviation Organization added States should have established a method for assessing preparedness through table-top or live exercises that included all stakeholders, in accordance with the core capacities in the *IHR*.

Closure of an airport should not be considered; however, regular traffic should be stopped if the facility is within the outbreak area. While the airlines have internal and external communications to establish, the International Civil Aviation Organization stated it was not the role of airline staff to be responsible for screening passengers. Airlines established a system for

crew members to identify and manage ill passengers. Recommendations were to report the situation to Air Traffic Control and obtain medical advice through standard company practices. The potentially ill passenger should have been moved away from other passengers, if possible. Appropriate personal protective equipment was used by crew members, and areas occupied by the traveler were sanitized. The standardized passenger locator card was completed and shared with local public health, along with any other information that was requested. Airlines had a policy for maintenance crews utilizing the proper protective equipment, to replace and dispose of re-circulation air filters, and vent vacuum waste tanks. Aircraft cleaning crews had guidelines for using proper personal protective equipment to sanitize the appropriate surfaces, and received training on how to properly dispose of the soiled cleaning materials. There were no special instructions for cargo and baggage handlers aside from standard hygiene precautions, except that inspection requirements were determined by the local public health (International Civil Aviation Organization, 2007).

The Department of Transportation (2006) manual was developed in coordination with CDC and the Department of Homeland Security to provide guidance for managing communicable diseases in air transportation. It stated, “Airlines already have their protocols and guidelines in place...However, most airports do not have a manual that reviews the total effort necessary for preventing widespread transmission of quarantinable diseases throughout the U.S.” (p. 1). Those guidelines provided information to U.S. airports for development of procedures specific for arriving international flights at their facility. A significant public health threat at an international airport may have become an incident of national significance, which required elements of the *National Response Framework*. A significant health threat would also be

applicable to *Homeland Security Presidential Directive Five (HSPD-5)*, which required the use of a National Incident Management System for Incident Command (Bush, 2003a).

The President of the United States implemented *HSPD-5*, which directed the Secretary of Homeland Security to develop and administer a National Incident Management System, “to provide a consistent nationwide approach for Federal, State, and local governments to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents” (Bush, 2003a, p. 3). This directive required adoption of a National Incident Management System to receive federal preparedness assistance. *Homeland Security Presidential Directive Eight* (Bush, 2003b), was a companion to *HSPD-5* that detailed the way Federal departments and agencies would prevent and prepare for response to a terrorism incident. It defined federal preparedness assistances as agency grants, cooperative agreements, loans, loan guarantees, and training.

Howitt & Leonard (2005) indicated that as implementation of the National Incident Management System proceeded there would have to be an organizational focus to educate individuals not accustomed to emergency services operations. “Part of that effort must be devoted to the constructive redesign and adaptation of IMS principles and practices to fit the operating circumstances of professions that have not been among the original participants in the spread of IMS” (p. 42). Challenges of affording change within different types of organizations were discussed in Heifitz and Linsky (2002). They stated the single most common failure in leadership is, “people, especially those in positions of authority, treat adaptive challenges like technical problems” (p. 14).

A Presidential Disaster Declaration triggered financial assistance and physical assets through the Robert T. Stafford Disaster Relief and Emergency Assistance Act and Federal

Emergency Management Agency, according to the Department of Homeland Security (2008a). The Federal Emergency Management Agency used the *National Response Framework* structure and was responsible for coordinating government relief efforts. The *National Response Framework* identified the roles and responsibilities for federal agencies. It showed State and local governments had primary responsibility for incident response, with federal assistance provided when the incident exceeded the State's capabilities. The *National Response Framework* provided a scalable and flexible structure for how the US conducted all-hazards response, building upon the National Incident Management System. It indicated each level of government should have adapted and applied the general rules by defining key leadership and staff functions, adopting capabilities-based planning, and imposing the discipline needed to plan and operate effectively. Each organization was responsible for funding and executing its own core emergency management responsibilities. The State's Governor had the responsibility for the welfare of its citizens, so if resources were overwhelmed the Governor requested assistance from other states through mutual aid agreements or made a request for help directly to the federal government.

The Government Accountability Office (2007) conducted a study that assessed the federal government's capabilities to lead a nationwide response during a pandemic. They found there were adequate guidance, checklists, grants, and new vaccine technologies, but there was a shortfall in clear leadership roles. A pandemic went beyond just health, likely affecting critical infrastructure, economy, security, and movement of goods across the globe. Those leadership responsibilities worked simultaneously, but the national strategy did not provide direction as to how that would occur. It also did not describe financial resources needed to implement plans, which left a gap that hindered local stakeholders in the effective execution of their plan.

Planning for the protection of personnel who responded to a quarantinable disease incident must have encompassed training of employees to ensure they understood (a) hazards present, (b) necessity of the personal protective equipment, (c) limitations of the personal protective equipment, (d) proper donning and doffing of personal protective equipment, and (e) proper care, maintenance, and disposal of personal protective equipment. The Department of Transportation (2006) cautioned that being overdressed may add undue anxiety to passengers and crew. The in-flight response had a number of tasks that required pre-incident planning; notification trees, airplane parking location, determination of who comprised the initial response team, providing appropriate personal protective equipment for suspected disease, and ensuring the responding entities understand the National Incident Management System. Passengers needed to be informed, so it was recommended to utilize scripts from the Centers for Disease Control (CDC) to provide accurate and consistent information. Once the aircraft arrived, an airport holding area was identified until quarantine facilities could be established. The responsibility for supplying and staffing the quarantine facility was placed with the CDC and local public health. Sensenig and Stambaugh (2008) divided the estimated costs for quarantine of 200 individuals for 2 weeks into five basic areas: supplies at \$100,000; space at \$7,500; activation at \$20,000; 24 hour operation at \$150,000; and an additional \$5,000 to close out the process. This showed a total of over a quarter of a million dollars to establish and maintain a quarantine facility; however, it was unclear who would be financially responsible. CDC had the authority to impose a quarantine order, but may choose to use voluntary home quarantine as another option to the more expensive and complex designated facility choice.

Pre-designated hospital facilities must have been identified to ensure responders transported ill patients to hospitals that had a Memorandum of Understanding with CDC. If

there were no hospitals in the area with established agreements, or they were unavailable, responders must receive direction on which hospitals to use from the local public health.

Planning for the recovery from a communicable disease incident allowed airports to return to normal operations sooner, so restoring the environment and infrastructure were areas to consider ahead of time. The Department of Transportation (2006) stated a successful incident response to a quarantinable disease event at an airport would require, “a well-coordinated effort by conveyance operators, airport operators, state and local governments, local health care facilities and support organizations, and agencies of the federal government” (p. 19).

Roles and responsibilities had the importance of determining authorities for different agencies necessary in the plan, including contact information. The Pandemic and All-Hazards Preparedness Act established the Department of Health and Human Services as the primary federal agency for coordinating the response to public health emergencies, utilizing the *National Response Framework* (Department of Transportation, 2006). *Title 42, parts 70 and 71* (FAA, 2003a, 2003b), regulated foreign and interstate quarantine, delegating authority from CDC to the quarantine facilities for detaining, medically examining, or conditionally releasing individuals. The quarantine facility also determined if an incident involved a potentially quarantinable disease of public health significance.

The FAA (2003b) advised a person with a communicable disease may not travel from one State to another without a permit from the health officer of the state. Individuals in the communicable period of cholera, plague, smallpox, typhus or yellow fever shall not be allowed to travel on a conveyance without a written permit from the Surgeon General. An exception to this rule was military or public health service personnel traveling under competent orders. The person in charge of any conveyance, with a traveler who may have a communicable disease, was

required to notify the next port of call as soon as possible. The regulation authorized the detention, isolation, quarantine, or conditional release of individuals, to prevent introduction, transmission, and spread of the communicable disease. Vaccinations or prophylaxis provided, as well as the cost for administering them, could have been assessed in a fee to the traveler that was collected at the time of administering. The *IHR*, Article 40 (WHO, 2005), advised the State Party can not charge passengers for medical examinations, vaccinations or prophylaxis, isolation or quarantine, and any documentation of those activities. Charges could have been levied for baggage, cargo, and conveyances, as long as they did not exceed the actual cost and were consistent with all operators.

The FAA provided regulations for conveyances from foreign countries entering the US. It indicated an ill person would have a temperature of 100 degrees Fahrenheit for more than 48 hours, accompanied by a rash, glandular swelling, or jaundice. Diarrhea of three or more loose stools in a 24 hour period would also indicate the traveler was ill. The commander of an aircraft inbound to a US airport reported the information immediately to the quarantine facility at the nearest airport. A conveyance would not be inspected unless the CDC or Department of Health and Human Services determined failure to inspect could present a threat of introduction of communicable disease into the US. They may also have required a controlled free portique, or detention of a conveyance. Animals that show signs of illness were examined by a veterinarian for professional determination. Remains of dead bodies with communicable disease were not allowed into the US, without having been cremated or embalmed in a hermetically sealed casket (FAA, 2003b).

The Director of CDC or Department of Health and Human Services may have determined the need to isolate, quarantine, or conduct surveillance of individuals, conveyance, or anything

onboard the conveyance that may cause a public health threat. Individuals placed under surveillance must provide information on their health and intended travel destination. According to FAA (2003b), each US airport that received international traffic provided at no cost to the government agencies, suitable office space, isolation, and other areas necessary for carrying out the responsibilities of the regulation. Any person that violated the provisions of the regulation would be subject to a fine of up to \$1,000 and imprisonment for up to 1 year. The Division of Global Migration and Quarantine facilities would be responsible for meeting legal and regulatory responsibilities with regard to (a) overseeing the screening of arriving international travelers for symptoms of illness that could be a public health threat, (b) responding to reports of illness on board arriving aircraft, (c) providing travelers with essential health information, and (d) collecting and disseminating worldwide health data. The Department of Transportation (2006) showed the processes would be conducted in collaboration with the airlines, airport departments, Customs and Border Protection, Department of Homeland Security, Immigrations and Customs Enforcement, Transportation and Security Administration, as well as the local public health that also holds quarantine authority.

Emergence of a quarantinable or new unknown disease activated the public health system through the Global Outbreak and Response Network administered by WHO, or Traveler and Health Alert Notices issued through the CDC (Department of Transportation, 2006). Travel Notices were classified in four levels: In the News, indicating there is sporadic cases of diseases of public health significance; Outbreak Notice, indicating disease outbreaks in a limited geographical area; Travel Health Precaution, indicating outbreaks of a greater scope that affect a larger geographic area, also outlining measures for travelers to take before, during, and after travel; and Travel Health Warning, indicating widespread outbreaks that moved outside the

initially affected population and may involve multiple regions or very large areas, including a recommendation to reduce nonessential travel to the affected areas (Centers for Disease Control, 2007).

Following the roles and responsibilities in a communicable disease response plan, the Department of Transportation (2006) recommended a concept of operations, which included an incident management structure covering (a) notification and assessment, (b) activation, (c) response, (d) recovery, and (e) mitigation. Airport operators had several departments that responded to communicable disease events. The Airport Operations Center made initial notification to the jurisdictional Division of Global Migration and Quarantine facility, airport communications center, Customs and Border Protection, and the Transportation and Security Administration. The Airport Operations Center coordinated with Customs and Border Protection, CDC, and FAA to decide where and when the aircraft should land, including determination of a parking location. Credentialing and providing escorts for local public health response, making appropriate notifications, providing information to travelers and family, assisting in the care of passengers and crew in holding areas, and providing transportation for those individuals to temporary care or quarantine facility, were all shown to be under the purview of the Airport Operations Center. The airport communications center made notification to Airport Operations Center, Customs and Border Protection, Division of Global Migration and Quarantine facility, emergency medical services, fire rescue, law enforcement, local public health, and the Transportation and Security Administration (Department of Transportation, 2006).

Emergency medical services assisted local public health in the assessment of ill persons, using the proper infection control measures to limit transmission. Treatment, removal from the

aircraft, and transporting of ill patients to designated medical facilities after Customs and Border Protection clearance, or medical parole, was also a responsibility of emergency medical services. According to the Department of Transportation (2006), law enforcement provided escort duties and security for the response staging areas, as well as access control for the airplane and airport. A law enforcement officer was sent to the command post to assist with coordination efforts to maintain order with transfer of ill persons for evaluation and treatment, along with enforcement of required actions for uncooperative individuals.

State and local public health personnel performed the preliminary assessment of ill persons, if Division of Global Migration and Quarantine staff was unavailable. The public health personnel coordinated with CDC to issue quarantine or isolation orders, and provided staff and supplies to maintain the facilities, which included mental health provisions. The local public health made the appropriate notifications, prepared for the medical surge, provided guidance to medical professionals on clinical and diagnostic practices, provided information to the public, and coordinated with the Division of Global Migration and Quarantine. Local emergency management authorities would support the State and local public health with temporary care and quarantine facilities (Department of Transportation, 2006).

The Federal government had several agencies that would have responsibilities during a communicable disease incident. The Department of Health and Human Services, Department of Transportation, and Department of Homeland Security, each had roles at different points in the process. The Department of Transportation (2006) indicated that when the CDC were notified of a potential communicable disease incident they made notification to; airport communications center, CDC, Customs and Border Protection, Federal Bureau of Investigation, healthcare facilities, and local public health. The CDC Division of Global Migration and Quarantine could

have authorized temporary detention or quarantine of travelers and flight crew, as well as rescind quarantine orders when deemed appropriate. CDC provided guidance in occupational health and infection control for Federal Inspection Stations, and obtaining traveler and conveyance information. They worked with the Department of State and WHO to make appropriate notifications to foreign countries and delegates.

The Department of Homeland Security had a couple components that played a role in the response to a quarantinable disease incident. The Customs and Border Protection conducted initial entry screening of international travelers, provided enforcement resources during a medical response, escorted responders on the aircraft, and keep the Division of Global Migration and Quarantine apprized of medical assessments. Customs and Border Protection met international conveyances to prevent disembarking until the Division of Global Migration and Quarantine, or their designee, arrived to evaluate travelers and crew. The Customs and Border Protection assisted CDC with distribution and collection of information from passengers. International travelers must have cleared through the customs process before leaving the area for treatment; therefore, Customs and Border Protection had the responsibility to complete the passenger processing, or parole the individual into the US. Immigrations and Customs Enforcement provided additional resources to assist CDC in the enforcement of quarantine and isolation (Department of Transportation, 2006).

A situation deemed a security threat by the Department of Homeland Security, granted the Transportation and Security Administration powers under the Transportation and Homeland Security Acts. The Transportation and Security Administration made notification to Customs and Border Protection, and worked with the FAA to direct a flight destined for the US to land at a specified airport equipped to handle a suspected infectious person. According to Department

of Transportation (2006), the FAA made notification to the jurisdictional airport dispatch center, Customs and Border Protection, Division of Global Migration and Quarantine, and Transportation and Security Administration. FAA provided air traffic control services to expedite a safe arrival at the airport designated by the Transportation and Security Administration. They also gave taxi instructions to the designated holding area on the airfield, and assisted with enforcement of temporary flight restrictions.

Parking the aircraft could be accomplished one of three ways. Parking the aircraft at the assigned gate provided easy access, and should the event be minor would have allowed for smooth disembarking of passengers. Disadvantages to that approach were the potential to contaminate the passenger boarding bridge and gate area, as well as potentially occupying the gate for hours. Parking the aircraft at a remote gate allowed responders good access, but remoteness of the gate could increase the response time for local public health. That approach required additional time to taxi the aircraft to a gate for disembarking, if the event was minor; however, if the event was major a gate would not be out of service for a long period of time. Isolating the aircraft on the ramp was an approach that helped prevent spread of the disease, but that positioning may have increased the response time for local public health and required a means for access to the aircraft (Department of Transportation, 2006).

Several considerations must have been taken regardless of the aircraft parking determination (a) support of the aircraft with power and air conditioning to provide comforts to the passengers, (b) evaluation and removal of ill persons from the aircraft, (c) keeping passengers and waiting family informed, and (d) keeping the situation under control using jurisdictional law enforcement. The initial response team should have consisted of airport police, emergency medical services, and fire rescue, along with Customs and Border Protection and local public

health in consult with the Division of Global Migration and Quarantine. According to the Department of Transportation (2006), when the aircraft landed at the US airport it should have been directed to the designated parking location by FAA. While the aircraft taxied, the passengers should have been notified an ill person on the aircraft required medical evaluation before anyone deplaned. The Division of Global Migration and Quarantine or local public health utilized proper personal protective equipment and boarded the plane as soon as possible. They assessed the ill persons and made a determination. If the individual did not have an illness of public health significance, the remaining passengers were allowed to go on with their travel. A determination could also have been made that an individual had an illness of public health significance, but did not pose a threat to others on the aircraft. That allowed for the same actions as an individual who did not have an illness of public health significance, except the sick individual was taken to a designated medical facility.

Individuals determined to have a non-quarantinable illness that could pose a threat to passengers required additional protective measures. People determined to be ill were isolated and asked to wear a surgical mask. If a mask was not available, or the individual could not tolerate the mask, proper respiratory and cough etiquette was instructed. The CDC and local public health were notified, and the ill individual was transported under appropriate isolation measures to a designated health care facility. The CDC or local public health could have issued a federal isolation order, and utilized law enforcement to impose the order for individuals who resisted. Locator information was collected, and health alert notices were issued to travelers and crew members before being released to continue travel. Individuals determined to have a quarantinable illness required the same actions as non-quarantinable illness situations, except asymptomatic passengers were not allowed to continue with travel. International travelers had to

clear Customs and Border Protection processing, or have been temporarily paroled, prior to being transported to a local health care facility. All international travelers would have been under Federal control, until Customs and Border Protection provided an on scene clearance (Department of Transportation, 2006).

Quarantine and Isolation would be implemented by the Division of Global Migration and Quarantine or local public health at US international airports, according to the Department of Transportation (2006), those authorities may have been delegated or run congruently. Planning for the logistics involved in managing a quarantine situation at an international airport included, locating a site with containment boundaries for security, in addition to being spacious enough to accommodate the passenger and crew capacity of the largest aircraft that used the airport. The diverse group of individuals would have religious and cultural needs, as well as foreign language barriers that must have been overcome. Support organizations were an avenue to assist with those special services, as well as food, water, tables, chairs, bedding, toilets, hand washing, avenues for communications, interpreters, entertainment, spiritual and mental health support, which were some of the many logistical items that must have been addressed when travelers and flight crew were held. Sensenig and Stambaugh (2008) stated, “a quarantine plan must include provisions for mental health services and the well being of the people in virtual lock down” (p. 11). Counseling was also provided to those individuals, as well as the responders, after the quarantine order was released. The National Fire Protection Administration (2007a) identified the fire department as responsible to provide medical guidance in the management of a critical incident stress program, and that it should include personnel who have received training in stress relief counseling.

The CDC template (Appendix B) and all six E-net response plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) listed CFR 42 Part 70 & 71 (FAA, 2003a, 2003b) for quarantine authority on domestic and international travel, and all except for BOS (2008) included the Customs and Border Protection Memorandum of Understanding between the Department of Homeland Security and Department of Health and Human Services:

Title 42 United States Code Section 264 (Section 361 of the Public Health Service Act) gives the Secretary of HHS [Department of Health and Human Services] responsibility for preventing the introduction, transmission, and spread of communicable diseases from foreign countries into the United States and from one state or U.S. possession into another. This statute is implemented through regulations found at 42 CFR Parts 70 and 71. Under its delegated authority, CDC, through the Division of Global Migration and Quarantine, is empowered to apprehend, detain, medically examine, or conditionally release persons suspected of carrying a quarantinable disease. By mutual agreement, U.S. Customs and Border Protection and the U.S. Coast Guard are required to aid in the enforcement of quarantine rules and regulations. Violation of federal quarantine rules and regulations constitutes a criminal misdemeanor, punishable by fine and/or imprisonment.

(Appendix B, p. 8)

The FLL (2009), MCO (2008b), and MIA (2008a) plans specified state public health codes and statutes for treatment, quarantine, isolation, and transportation authority. The State Health Officer was designated with jurisdiction in each of these areas according to section

381.00315(1)(b)(4) of the Florida State Statutes. Those plans also identified the authority for enforcement jurisdiction on domestic travelers referencing FAA (2003b), which showed the local public health was primarily responsible for communicable diseases incidents on domestic flights.

Recovery from a quarantinable disease incident to return the airport to normal operations required; assisting the public with mental health services, managing lost work and time issues, and re-booking travel arrangements. The environment had to be restored through decontamination of (a) the aircraft, (b) conveyances of transported ill, and (c) quarantine facilities. The disposal of medical waste was accomplished by established protocols. Restoring the infrastructure required tracking and reporting all resources, along with maintaining records and accountability of expenditures. Rebuilding property may also have been necessary and would have been a key part of the recovery process (Department of Transportation, 2006).

The National Fire Protection Administration (2005) provided details on disinfecting medical equipment. It stated contaminated equipment was stored in a separate area before being cleaned. Disinfecting was accomplished using splash-resistant eyewear, cleaning gloves, and fluid-resistant clothing. Personnel followed the disinfectant manufacturer's recommendations, and used only chemicals established as compatible with the equipment being cleaned. Cleaning of fire fighting protective clothing required a more time consuming process, and many disinfectants could not be used since they may damage the gear. Disposal of contaminated materials needed to be in a container labeled with the Department of Transportation biohazard warning symbol, or in a red bag or container that could be sealed when full. The fire department determined and implemented a written schedule for cleaning, and method of decontamination based on (a) location within a facility, (b) type of surface to be cleaned, (c) type of soil, and (d) tasks or procedures performed.

An ongoing plan management and maintenance section was recommended that showed actions for keeping the plan current with regulatory updates, and through lessons learned during exercises or incidents. The airport communicable disease response plan ended with an appendix section that provided clarifying information from expert sources. The appendices to the *National Aviation Resource Manual for Quarantinable Diseases* (Department of Transportation, 2006) included; a list of CDC quarantine stations, CDC travel notices, quarantinable disease executive orders, CDC quarantinable disease information, legal authorities for isolation and quarantine, Occupational Safety and Health Administration Incident Command, and the Atlanta Hartsfield-Jackson International Airport quarantine plan. The National Fire Protection Administration (2007b) specified the planning process should address; strategy, prevention, mitigation, operations, business continuity, and recovery. It also addressed the importance of updating plans through periodic reviews, and evaluating plans with exercises that provided a lessons learned follow-up approach.

Analysis of the information obtained during the literature review process showed glaring similarities between the departments identified in the Greater Orlando Aviation Authority (2009), and the agencies needed during a communicable disease response (Airports Council International, 2009; CDC, 2007, 2009; Department of Transportation, 2006; FAA, 2003a, 2003b, 2009b; International Air Transport Association, 2009; International Civil Aviation Organization, 2007; National Fire Protection Administration, 2004, 2007b; World Health Organization, 2005, 2009). That literature played a significant part in determining the various departments and agencies needed for a communicable disease response at MCO, as well as the responsibilities each of those groups had. Interviews with the groups assigned to MCO would spell out specific functions necessary for detailing the MCO plan.

The FAA (2004, 2009b) and United States Fire Administration (2006) provided some clarity in the decision of what format should be used for a written plan, as well as who had jurisdiction at different points in the process. The majority of the jurisdictional piece was supported by information from Bush (2003a, 2003b), CDC (2009), Department of Health and Human Services (2005), Department of Homeland Security (2008a, 2008b), and the Homeland Security Council (2006). Review of other airport plans would help solidify the format determination, and verify the jurisdictional component was concurred through established practices.

A multitude of information regarding the protection of response personnel and the public from communicable diseases was available, but the most influential material was found in the Food and Drug Administration (2006) and Occupational Safety and Health Administration (2007, 2009). Special information related to this area was valuable to understanding all the facets of protection, including the mental aspects (Delaney, 2008; National Fire Protection Administration, 2005, 2007a). The State of Florida Department of Health (2009) also provided helpful medical related information; however, details from industry experts were necessary to address remaining gaps in health related issues.

Authors expressed supporting information for several key points. The screening area had many aspects, including capacity demands, that were examined in Brigantic et al. (2009) and CDC (2009). The quarantine or holding of individuals had many implications that were reviewed in Sensenig and Stambaugh (2008) and the Congressional Research Service (2009); however, there were concerns about the government's role and funding support expressed in the Government Accountability Office (2007) and Turnbull (2007). Training practices were also found throughout the literature. A notable consideration was the implementation of training

following the National Incident Management System to be a cultural change that would be a mistake to overlook, discussed in detail by Howitt and Leonard (2005) and Heifetz and Linsky (2002).

Procedures

This project utilized the action research methodology to answer four questions. Which agencies have jurisdiction during a communicable disease response at a US airport? Which agencies have responsibilities during a communicable disease response at Orlando International Airport (MCO)? What format should be used to establish a written communicable disease response plan? What information should be included in the Orlando International Airport (MCO) communicable disease response plan? The procedures for conducting the project involved collecting data from an extensive literature review, submission of a survey tool (Appendix C), comparison of airport communicable disease response plans, and interviews with key individuals from aviation, medical, and federal agencies.

The literature review began during the *Executive Analysis of Community Risk Reduction* course conducted on the campus of the National Fire Academy in Emmitsburg, Maryland, in March of 2009. The student manual (National Fire Academy, 2009) referenced the National Fire Protection Association (2004, 2007a, 2007b) standards, for use in community risk reduction models. The *Standard on Fire Department Infection Control program* (National Fire Protection Association, 2005), also contained useful information pertinent to this project. The FAA (2009a) stated airport plans should have considered best practices, along with guidance available from: CDC; airport associations, referencing the Airports Council International (2009), *Airport Preparedness Guidelines for Outbreaks of Communicable Disease*; Department of Homeland Security, referencing the *Pandemic Influenza, Preparedness, Response, and Recovery Guide for*

Critical Infrastructure and Key Resources (2008b); and International Civil Aviation Organization. FAA (2009c) added the Department of Health and Human Services, Department of Transportation, and Occupational Safety and Health Administration. Each of those references was utilized during the literature review. Internet research was also accomplished utilizing the Google web sight advanced search. Key words researched were; airline and airport organizations, Centers for Disease Control, FAA, homeland security, Occupational Safety and Health Administration, pandemic, and World Health Organization.

The survey titled, *Airport Pandemic Status* (Appendix C) consisted of 18 E-net participants from separate US international airports. There are roughly 130 international airports, 23 of which are Index E, the largest category in the FAA system (J. McSwain, personal communications, June 4, 2009). The E-net group is an informal committee of 20 Index E airport fire department chief officers that met monthly via conference, and at various aircraft rescue firefighting events throughout the year. The E-net had a statistical significance of 87% in comparison to the amount of Index E airports in the FAA system. That group of respondents was chosen to participate in the survey tool due to their statistical significance, and the similarity of their facility size in relation to MCO. Airports affiliated with the E-net group and their contact information can be found in Appendix D.

The survey was developed and designed on the website SurveyMonkey.com® on May 1, 2009. The general instructions and background for completing the survey were provided immediately following the monthly E-net meeting on May 27, 2009, where verbal instructions and background was also provided. The survey was e-mailed to each member of the E-net group through the MCO computer system, with an internet link to *Airport Pandemic Status* survey. The survey consisted of four questions that asked the control group participants about the status

of their particular airport regarding pandemic operations. The questions within the survey were all multiple choice - single answer. A request was made for additional documentation, if a respondent answered in the affirmative to having a communicable disease written response plan or exercise after action report. The documentation was directed to be sent via electronic mail to dkann@goaa.org. That return address kept all communications for the survey and responses funneled through the Greater Orlando Aviation Authority computer system.

Question 1 of the survey was developed to determine the number of respondents in the E-net group with CDC on site, since that dramatically affected the airport's communicable disease response capabilities. The amount of international travelers impacted an airport's pandemic plan, especially if entry or exit screening measures were implemented. Question 2 provided ranges for the number of international passengers passing through the respondent's airport, in order to gain a better understanding on the magnitude of a pandemic screening operation throughout the US. Question 3 was submitted to determine the status of communicable disease response plans at the larger, usually more progressive airports. Question 4 was designed to find out how many airports had conducted exercises of those plans.

The most important value to questions 3 and 4 was the ability to obtain industry information for a best practices comparison. Plans were received from seven E-net members (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale / Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Phoenix Aviation Department [PHX], 2009; Washington Dulles International Airport [IAD], 2009). The PHX (2009) document was mainly focused on isolation procedures and was a small subsection of the City of Phoenix's overall influenza plan for police and fire. It did not go into the detail of

sections and categories like the other six E-net plans. Consequently the PHX (2009) document was not considered an airport plan for comparison; however, the information was found useful and was included in some areas of this action research project.

A noted limitation of the survey control participant group was the lack of capability to obtain airport information from US airports not associated with the E-net group. There were a couple similar sized airports in comparison to MCO not among the study group, but the vast majority of airports not surveyed were much smaller sized facilities. The amount of information that was necessary for review with this project required narrowing the scope; therefore, the E-net group was determined to be an appropriate survey size that would not overload the project. The statistical significance of the *Airport Pandemic Status* survey results showed 18 out of the 20 members provided responses, representing a 90% participation of the E-net group.

Another potential limitation with the survey was the possibility of the control group's unknown bias that may have been present when completing the survey instrument. The monthly meeting established between the members of the E-net group provided the opportunity to communicate why the information was being requested, and to notify participants that all information other than the best practices review would remain anonymous. That communication reduced potential misunderstanding, but may have unintentionally swayed input during the brief discussion. An advantage of surveying the E-net group was established practices of conducting various surveys throughout the year, so the process was already understood and embraced by the members. The E-net group had discussed the importance of answering surveys honestly, regardless of how the response may have reflected on their facility. That practice added confidence the members were providing accurate information.

Interviews were conducted with individuals from the Centers for Disease Control (CDC), Federal Aviation Administration (FAA), Orlando International Airport (MCO), and the Orange County Health Department. The individuals were chosen due to their agency's relationship with critical areas of the plan, in addition to the expertise they provided within a specific technical field. The obvious limitations to any personal interviews was information had a one sided dimension, and may have been skewed by unknown factors affecting the interviewee. Information provided by the interviewee had a scope of knowledge limited to the individual's education and experience; however, the personal interviews were conducted with individuals of high level authority in each of their respective fields.

Approximately 1 year before this research project began a meeting was scheduled by CDC Miami Division of Global Migration and Quarantine, to discuss initiating a communicable disease emergency response plan for MCO. The meeting took place on May 9, 2008, in the MCO boardroom, with attendance from the majority of MCO agencies and departments that had an anticipated role in the plan. A hard copy and electronic template from the CDC titled, *Communicable Disease Emergency Response Plan Template* (Appendix B), was provided by the CDC Miami Division of Global Migration and Quarantine at the meeting. At the conclusion of the discussion it was determined follow up meetings would be necessary to complete the objective. There was one follow up meeting held, which did not yield any information used in the research for this project.

The annual certification inspection was conducted at MCO by FAA Southeastern Region Airport Safety Certification Inspector, Jack McSwain. During the on-site inspection June 2 - 4, 2009, McSwain was interviewed in reference to FAA airports and the CertAlert 09-12 responses received from the different facilities. One background question asked how many airports were in

the FAA system, and how many of those were Index E? J. McSwain (personal communication, June 4, 2009) was asked what formats were used by the airports who submitted plans in reference to the Certalert 09-09 request. He was asked a follow up question on where he felt the MCO communicable disease response plan should be located. At the end of the interview J. McSwain was asked how many communicable disease response plans the FAA has received. J. McSwain can be reached via telephone at (404) 305-6718, or electronically at jack.mcswain@faa.gov.

A phone interview was conducted with CDC Miami Division of Global Migration and Quarantine Commander, Kirstin Warwar (personal communication, April 30, 2009), to obtain a status update from CDC Miami Division of Global Migration and Quarantine on their operations during the H1N1 pandemic. K. Warwar can be reached via telephone at (305) 526-2910, or electronically at kwarwar@cdc.gov. The interview took place from the office of MCO Assistant Director of Operations, Tom Draper. Following the interview with K. Warwar, a phone interview was conducted with Orange County Health Department Epidemiology Program Manager, Donna Walsh (personal communication, April 30, 2009). That interview was conducted to assess the health department availability during a communicable disease situation. D. Walsh can be reached via telephone at (407) 858-1400, or electronically at donna_walsh@doh.state.fl.us.

During a briefing on the H1N1 situation to MCO Federal agencies on September 25, 2009, the Orange County Health Department Incident Commander for the H1N1 event, Arlene Crow, asked MCO to host a mass prophylaxis exercise. A subsequent meeting was set up on October 5, 2009, with A. Crow and D. Walsh hosting T. Draper and D. Kann, to discuss a drive thru mass prophylaxis exercise. At the meeting a written and electronic updated draft of the

MCO Communicable Disease Emergency Response Plan was provided to Orange County Health Department for review. D. Walsh (personal communications, October 5, 2009), was asked a couple of questions during the meeting. The first question asked which hospitals were designated medical facilities to receive patients potentially infected with a communicable disease. That was followed up by a question of whether a Memorandum of Understanding between the CDC Miami Division of Global Migration and Quarantine station and Orange County Health Department was necessary. During discussion about response practices D. Walsh was asked if they responded personnel to the site of communicable disease incidents. She was also questioned about releasing asymptomatic individuals for self isolation and who provided training to response crews.

Several meetings between Orange County Health Department and MCO were held to plan the exercise that was geared towards administering the H1N1 vaccine to high risk personnel in order to test Orange County Health Department's capability for providing inoculations to large numbers of people within Orange County. The exercise was set up for November 10, 2009, at the MCO gold parking lot; however, due to the less than expected volume of H1N1 vaccine and other extenuating circumstances, the exercise never took place. Quality information was learned by MCO and Orange County Health Department during the planning process, some of which was incorporated into the research.

D. Walsh (personal communications, October 30, 2009) provided feedback on the updated draft *MCO Communicable Disease Emergency Response Plan* via electronic mail through the Greater Orlando Aviation Authority computer system. The suggestions were reviewed by MCO and a revised draft was completed. A phone interview was conducted with K. Warwar (personal communications, December 4, 2009), to gain information on the CDC

Miami Division of Global Migration and Quarantine operation, and how that interaction worked with MCO. She was asked about the status of a MIA plan for communicable disease response, including the point of contact with MCO and how that communication went during the H1N1 outbreak. That led to a question of whether there was a need for a Memorandum of Understanding between the CDC Miami Division of Global Migration and Quarantine station and Orange County Health Department. Another question inquired where the CDC template could be located for reference, with a follow up on the status of communicable disease response plans at airports with a Division of Global Migration and Quarantine on site. Following the interview, an electronic copy of the revised draft *MCO Communicable Disease Emergency Response Plan* was sent to K. Warwar through the Greater Orlando Aviation Authority computer network. K. Warwar reviewed the plan and provided feedback returned through the Greater Orlando Aviation Authority computer network via electronic mail on February 5, 2010.

Assistant Director of Operations at MCO, Tom Draper, was involved in the Orange County Health Department discussions on April 30 and October 5, 2009, and the Haitian relief planning on February 15, 2010. His expertise as the lead with the MCO Emergency Response Group, combined with his job duties overseeing MCO terminal operations, provided valuable insight on how a communicable disease response would intertwine with the complex functions of an international airport. T. Draper (personal communications, February 15, 2010) was asked where he thought the best location was for a temporary holding facility at MCO. Discussions led to a question about the best location to conduct exit screening at MCO. T. Draper can be reached via telephone at (407) 825-3021, or electronically at tdraper@goaa.org.

A discussion based exercise was set up in the MCO boardroom on November 19, 2009. All of the airlines, community partners, and MCO departments and Federal agencies shown to

have roles and responsibilities in the plan were invited to attend. Agencies were notified of the meeting during other MCO meetings and via the MCO computer network. At the exercise each group was provided an electronic and written copy of the revised draft *MCO Communicable Disease Emergency Response Plan*. A discussion detailing the plan contents was conducted, followed by a walkthrough of an event to show the different responsibilities and authorities of each agency. All agencies were asked to review the plan, especially their individual responsibilities, and provide feedback to dkann@goaa.org by December 4, 2009.

Feedback in addition to that received by Orange County Health Department, CDC Miami Division of Global Migration and Quarantine, and MCO Operations, was received via electronic mail through the MCO computer network from: Custom and Border Protection Port Director, Eduardo Oliveros (personal communications, December 4, 2009); FAA Air Traffic Control Manager, Ed Donaldson (personal communications, December 2, 2009); MCO Airfield Operations Manager, Bill White (personal communications, December 4, 2009); MCO Public Affairs Manager, Rod Johnson (personal communications, December 1, 2009); Orange County Emergency Manager, Steve Detwiler (personal communications, December 1, 2009); and Transportation and Security Administration Manager, Michael Sweeny (personal communications, December 3, 2009). Each of the individuals can be reached electronically: E. Oliveros at Eduardo.oliveros@dhs.gov; E. Donaldson at ed.donaldson@faa.gov; B. White at bwhite@goaa.org; R. Johnson at rjohnson@goaa.org; S. Detwiler at steven.detwiler@ocfl.net; and M. Sweeny at michael.sweeney@dhs.gov.

Results

The first question of this research project asked: Which agencies have jurisdiction during a communicable disease response at a US airport? The Literature review showed Department of

Transportation as the Federal regulatory agency over US air transportation, with FAA having direct oversight of US airports (FAA, 2004). The Pandemic and All-Hazards Preparedness Act established Department of Health and Human Services as the primary federal agency for preventing the introduction and spread of communicable diseases into the US, and from one state to another (FAA, 2003a, 2003b; Department of Health and Human Services, 2005; Department of Transportation, 2006). A significant public health threat at an international airport may become an incident of national significance according to the Department of Transportation (2006), so airports were recommended to consider utilizing the *National Response Framework* (Department of Homeland Security, 2008a) and the National Incident Management System with their individual communicable disease plans. It also identified the federal government had several agencies with responsibilities during a communicable disease incident; Department of Health and Human Services, Department of Transportation, and Department of Homeland Security, each had jurisdiction at different points in the process. Additionally, a potential terrorism threat would have placed the Federal Bureau of Investigations in authority to investigate and protect national security.

A large scale incident would be applicable to HSPD-5 and HSPD-8 (Bush, 2003a, 2003b), which required the use of National Incident Management System for Incident Command with activation of the *National Response Framework* (Department of Homeland Security, 2008a). The *National Response Framework* identified the roles and responsibilities for federal agencies, and showed a Presidential Disaster Declaration triggered financial assistance and physical assets, via the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The *National Response Framework* was activated by the Federal Emergency Management Agency, who then became responsible for coordinating government relief efforts. The Department of

Homeland Security indicated ESF-8 would be the lead support function, with Department of Health and Human Services being the primary agency with jurisdiction. According to the Department of Health and Human Services (2005) and the Homeland Security Council (2006), the Secretary of Department of Health and Human Services could declare a public health emergency. That action would have provided potential funding and support, in addition to an avenue for Food and Drug Administration to approve emergency use authorizations for products and procedures. The State of Florida Department of Health (2009) outlined the approach to a communicable disease event, designating ESF-8 as the lead group during a public health threat. It also listed trigger events for county health departments under preparedness, response and recovery activities.

The Airports Council International (2009) indicated the local responsibility for managing communicable diseases at airports fell with the local public health and the airport operator, with WHO referenced for roles of competent authorities. The US joined the list of State Parties accepting inclusion in the *International Health Regulations*, which designated the responsibilities for competent authorities (WHO, 2005). The Department of Transportation (2006) stated everyone must know CDC Division of Global Migration and Quarantine was the lead agency at an international airport for medical response to a quarantinable disease incident. The *Airport Pandemic Status* survey (Appendix C, question 1) asked each participant, “Is there a Centers for Disease Control quarantine station located at your airport?” The survey showed 7 out of 18 respondents did not have a quarantine station on site (Appendix E, question 1). A quarantine station was located at 61.1% of the respondent facilities, but the remaining 38.9% of the airports, including MCO, did not have an on site CDC Division of Global Migration and Quarantine facility or staff.

The CDC template (Appendix B) and all six E-net response plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) listed CFR 42 Part 70 & 71 (FAA, 2003a, 2003b) for quarantine authority on domestic and international travel, and all except for BOS (2008) included the Customs and Border Protection Memorandum of Understanding between the Department of Homeland Security and Department of Health and Human Services. The FLL (2009), MCO (2008b), and MIA (2008a) plans specified Florida public health codes and identified the authority for enforcement jurisdiction on domestic travelers referencing FAA (2003b), which showed the local public health was primarily responsible for communicable diseases incidents on domestic flights.

K. Warwar (personal communication, December 4, 2009) and D. Walsh (personal communication, October 5, 2009) were asked if there was a need for a Memorandum of Understanding between the CDC Miami Division of Global Migration and Quarantine station and Orange County Health Department. Both K. Warwar and D. Walsh said their respective roles were clearly defined in regulations, so a Memorandum of Understanding would not be necessary. K. Warwar added the CDC Miami Division of Global Migration and Quarantine station had a Memorandum of Understanding with Miami Dade County Health Department, because they both were located at Miami International Airport and could assist each other if necessary. On the other hand there was no Memorandum of Understanding with Broward County Health Department who had jurisdiction for Fort Lauderdale/Hollywood International Airport, because both agencies were not on site.

The results of this question provided information for the jurisdictional section of the draft *MCO Communicable Disease Emergency Response Plan*, as well as information on which agencies were required to do what. That led to the second question in the study that asked, Which agencies have responsibilities during a communicable disease response at Orlando International Airport (MCO)? The literature review showed understanding the roles and responsibilities for each group was the first step that must be accomplished when developing the airport communicable disease response plan (Department of Transportation, 2006). Airport operators were shown to have several departments that should have been involved in communicable disease events including; the Airport Operations Center, airport communications center, Customs and Border Protection, emergency medical services, FAA, law enforcement, local emergency management, local public health, reporting Division of Global Migration and Quarantine, public information officer, and Transportation Security Administration.

The Federal government had several agencies with responsibilities during a communicable disease incident; Department of Health and Human Services, Department of Homeland Security, and Department of Transportation, each had lead roles at different points in the process. The processes conducted by Division of Global Migration and Quarantine was in collaboration with (a) airlines, (b) airport departments, (c) Customs and Border Protection, (d) Department of Homeland Security, (e) Immigrations and Customs Enforcement, (f) Transportation Security Administration, and (g) state and local health departments who also had quarantine authority. Local public health performed the roles of the Division of Global Migration and Quarantine, if their staff was unavailable (Department of Transportation, 2006). The airlines were required to report ill domestic and international travelers to the CDC Division

of Global Migration and Quarantine as soon as possible (FAA, 2003a, 2003b, 2004; International Air Transport Association, 2009; World Health Organization, 2005).

According to the Department of Transportation (2006), a situation deemed a security threat by the Secretary of Department of Homeland Security, granted Transportation Security Administration powers under the Transportation and Homeland Security Acts. The decision to limit the airports that received international traffic involved concurrence from Department of Health and Human Services, Department of Homeland Security, and Department of Transportation. Federal agencies responsible for screening at each airport were Customs and Border Protection and CDC, with assistance from airlines, airport operations, emergency responders, FAA, law enforcement, local public health, Transportation Security Administration, and testing laboratories; support organizations were also necessary to assist with services for workers and special needs travelers (CDC, 2009). Additionally, the MIA (2007) *Public Health Communications Response Plan* outlined the use of a Joint Public Information Task Force that consisted of (a) Aircraft Rescue Firefighting, (b) aviation department division of security and communications, (c) county Emergency Operations Center, (d) local public health, (e) law enforcement, (f) Customs and Border Protection public affairs, (g) CDC Miami Division of Global Migration and Quarantine, (h) Transportation Security Administration, and (i) American Red Cross.

All of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) and the CDC template (Appendix B) identified the various agencies that would be needed during a communicable

disease response, including the initial response and command groups. A full-scale downcraft exercise was conducted at the MCO Aircraft Rescue Firefighting department training facility on March 8, 2008. It was developed to test the National Incident Management System capabilities at MCO, “Objective 1: Coordinate the response of multiple agencies using the National Incident Management System” (Greater Orlando Aviation Authority, 2008a, p. 6). Mutual aid agreements with Orlando, Orange and Osceola County Fire Departments, as well as the Orange County Emergency Medical System were activated. National Fire Protection Association (2004) showed the importance of mutual aid agreements with community partners to have ensured the community was adequately protected.

A research project titled, *Landing NIMS* [National Incident Management System] *Compliance at FAA Class One Airports* (Kann, 2008), determined the airport departments that would be necessary during an emergency response at MCO. It identified not only the essential departments, but the general level of responsibility each of those departments had during an emergency response. The list of MCO departments and corresponding National Incident Management System training levels, were consistent with departments and their respective roles in the *MCO Airport Emergency Plan* (Greater Orlando aviation Authority, 2009). The National Fire Protection Association (2007a) identified the fire department assigned a Health and Safety Officer to oversee the infectious disease program, to include personnel who had training in the process. According to National Fire Protection Association (2005), an Infection Control Officer would be assigned to manage the program and be knowledgeable in various areas related to a communicable disease response.

The Food and Drug Administration (2006) was the US agency responsible for clearing personal protective equipment products for use by emergency response personnel under the

Federal Food, Drug, and Cosmetic Act. Once a product was cleared, Food and Drug Administration maintained a database of approved products and manufacturers, ensured proper manufacturing practices, and tracked medical device problems. They also had the authority to issue Emergency Release Authorizations. That action allowed the use of uncleared medical products provided certain criteria was met. It also released stockpiles of medicines and verified appropriate diagnostic testing procedures.

The third question of the research asked: What format should be used to establish a written communicable disease response plan? The literature review showed all certified US airports were required to adopt an emergency plan in accordance with FAA (2009b). That circular did not mandate a particular format for an Airport Emergency Plan, but showed what should be included in the 10 section plan. The *MCO Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) had the same 10 categories recommended by FAA. The Department of Transportation (2006) recommended an airport communicable disease response plan format with seven primary sections, including an appendix; Department of Homeland Security (2008a) stated a Federal response would be provided in accordance with the *National Response Framework*, following the National Incident Management System principles. The modeling provided by the United States Fire Administration (2006) also added insight into format considerations.

The *Airport Pandemic Status* survey (Appendix C, question 3) asked each participant, “Does your airport currently have a written Pandemic Plan?” The majority of respondents (55.6%) stated their plans were in development. One airport (5.6%) stated they did not have a plan, and 7 respondents (38.9%) indicated they had a written plan (Appendix E, question 3). The survey asked respondents who indicated they had a written plan to provide a copy for a best

practices comparison. A plan was received from 7 respondents (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Phoenix Aviation Department [PHX], 2009; Washington Dulles International Airport [IAD], 2009). The PHX (2009) plan was a two page insert within the overall pandemic plan for the City of Phoenix, so it was not counted as a formatted plan in determining the results for this question. Two different formats were used by six agencies: DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a) followed the CDC template (Appendix B); BOS (2008) and IAD (2009) used the FAA (2009b) *Airport Emergency Plan* format.

Commander K. Warwar (personal communication, December 4, 2009), was asked where the CDC template could be located for reference. She advised to her knowledge it was only available upon request, once the requestor was determined to be an appropriate recipient the document was provided. The CDC template (Appendix B) outlined the recommended contents to be part of the standard plan which consisted of; reviewer's signatory page, table of contents, purpose, legal authorities, definitions, abbreviations, background, emergency operations, assignment of responsibilities, and an appendix. The CDC template appendices consisted of: (a) agency notification list; (b) notification protocol; (c) port of entry quarantine response timeline; (d) cockpit card notifying public health officials; (e) public health announcement strips; (f) interim guidance for airline flight crews meeting passengers; (g) interim guidance for airline cleaning crews, maintenance, baggage, and cargo handlers; (h) interim guidance for cleaning aircraft after bird collisions; (i) standard precautions; and (j) droplet precautions.

All six of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) had the recommended categories shown in the CDC template (Appendix B) plus some additional components. The FAA certification inspector for MCO, Jack McSwain (personal communication, June 4, 2009), was asked what formats were used by the airports who submitted plans in reference to the Certalert 09-09 request. He advised there were several formats ranging from a couple page insert in the airport's existing Airport Emergency Plan, to in depth detailed plans; however, not many plans were received. A follow up question asked J. McSwain where he felt the draft *MCO Communicable Disease Emergency Response Plan* should be located once it is finalized. He stated, "in the AEP [Airport Emergency Plan] would be the logical location" (J. McSwain, personal communication, June 4, 2009).

The fourth and final research question asked: What information should be included in the Orlando International Airport (MCO) communicable disease response plan? The literature review of the *Airport Emergency Plan* (FAA, 2009b) showed several core functions were necessary within each hazard specific section, which indicated the need for a procedure to request medical staffing, supplies, and equipment. The Airports Council International (2009) stated coordination was the key to success in reducing risk during a communicable disease event, and to achieve that objective airport plans needed clear contact points. That position was echoed by International Civil Aviation Organization (2007) and WHO (2005), which included other key areas that needed to be addressed by conveyance operators. Additionally, Department of

Homeland Security (2008b) pointed out seven essential areas of vulnerability in aviation communicable disease events.

The FAA (2003a) provided rules for agencies involved with air travel within the US, whereas FAA (2003b) provided regulations for managing conveyances entering the US from foreign countries. They also provided information on isolation, quarantine, and surveillance of individuals or conveyances. The WHO (2009) offered guidance for the airline, air traffic control, crew members, and pilots, with International Air Transport Association (2009) having provided specific direction to the air carrier on handling aircraft disinfection, communications, ill travelers, managing family and friends, situation reporting, and tracking individuals. The WHO (2005) also provided information on inspecting cargo and disinfecting aircraft, and CDC (2007) gave recommendations for the travel industry.

The Department of Homeland Security (2008b) indicated screening was part of a multi-layered US government strategy for containing, mitigating, and managing a pandemic influenza event. The Department of Health and Human Services, Department of Transportation, and Department of Homeland Security developed operating procedures for screening passengers that arrived in the US on international flights (CDC, 2009). The procedures identified; the triggers for activation of the plan, what airports should have included in their local guidelines, and how to process passengers through primary and/or secondary screening. The WHO (2009) supported and enhanced that information for use on a global level. The *Airport Pandemic Status* survey asked each participant, “How many international passengers ARRIVE at your airport annually?” (Appendix C, question 2). The responses confirmed that all 18 airports received international passengers (Appendix E, question 2).

The State of Florida Department of Health (2009) outlined the approach to a communicable disease event, and listed trigger items for local public health under preparedness, response, and recovery activities. The Food and Drug Administration (2006), National Fire Protection Association (2007a), and Occupational Safety and Health Administration (2007, 2009) provided guidance for; health care workers, providing a clinical background, infection control, preparedness, and other special standards. D. Walsh stated Orlando Health and Florida Hospital health care systems were the designated medical facilities to receive patients potentially infected with a communicable disease (personal communications, October 5, 2009). In addition, proper decontamination of infected areas was addressed in (International Civil Aviation Organization, 2007). Detailed information was provided for airport operations during a communicable disease response that included; in-flight response, parking the aircraft, passive or active surveillance methods, and a concept of operations using incident command (Department of Transportation, 2006). That information also delineated the Division of Global Migration and Quarantine and local public health quarantine and isolation authority; including what was necessary when either was activated, along with the recovery efforts necessary when deactivated.

The best practices comparison of the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) and CDC template (Appendix B) provided details for specific information in several plan areas. A purpose, reviewer signatory page, definitions, background and overview, assignments of responsibilities, assumption of actions, parking and gate procedures, planeside response,

screening and detention, conditional release, surge capacity, and communications, section provided several considerations and ideas for inclusion in the MCO plan.

The *Airport Pandemic Status* survey (Appendix C, question 4) asked each participant, has your airport conducted a pandemic operation exercise? Responses showed 33.3% of the facilities had not completed an exercise, 44.4% were in the exercise planning process, and 22.2% had completed an exercise (Appendix E, question 4). The survey asked the respondents who indicated they had conducted an exercise to e-mail a copy of any lessons learned for a best practices comparison. After action reports were received from MIA (2008b) and PHX (2009), although four respondents indicated they had accomplished the objective. The PHX document encompassed a pandemic scenario for the city and was not specific to the airport operation, so it did not provide details relevant to this research (Phoenix Aviation Department [PHX], 2009).

The MIA exercise document delineated primary and secondary screening of passengers that arrived on an international flight. It provided detailed information on the screening process, as well as how to exercise the screening plan. A cohort was included to manage the processing of an entire flight and keep each flight separated until they were completely screened (Miami International Airport [MIA], 2008b). The MIA exercise process was supported by the information outlined in the CDC (2009) screening plan. The MIA (2007) communications plan specified the primary media point of contact was through the county Emergency Operations Center, and the secondary media point of contact would be through the MIA Joint Information Center. A concept of operations provided a single page flow chart for different benchmarks in the response process, and the appendices included; an emergency communications contact list, sample questions and answers for media responses, and communication scripts for various scenarios.

The E-net April 28, 2009, meeting synopsis detailed the activities of 12 departments that attended the conference call (Appendix A). The respondents showed various levels of activities during this stage: 11 of the 12 airports indicated they were continuing with normal operations; two-thirds of the participants planned to communicate and/or work with CDC; half of the participants indicated personal protective measures would be taken, and that there would be communications with local public health. Airport meetings with stakeholders was mentioned in 5 of the 12 responses, and training was only mentioned by MSP and BOS. BOS was the only facility to indicate signage was placed in restrooms, and that multi lingual fact sheets with contact numbers to tenants was distributed. DFW was the only agency to mention a change in emergency medical services response plan and creation of a pandemic steering committee.

Feedback received from nine of the agencies involved in the discussion based exercise of the revised draft *MCO Communicable Disease Emergency Response Plan*; Customs and Border Protection, FAA, MCO Landside Operations, MCO Airfield Operations, MCO Public Affairs, CDC Miami Division of Global Migration and Quarantine, Orange County Emergency Management, Orange County Health Department, and Transportation Security Administration, provided specific recommendations on their portion of the response. Those recommendations, as well as some additional items of interest, are covered in the discussion. The results to the research questions lead to the development of the *MCO Public Health Threat* (Appendix F). The information within the MCO plan was a concise, yet encompassing compilation of an extensive literature review, combined with interviews, survey, best practices comparison, and exercise feedback. The result of this action research project provided a game plan for all MCO departments and agencies to follow, which would logically increase the safety and security of the US at a major global gateway during a public health threat.

Discussion

The initial direction on the research assignment was to research how a new FAA Safety Management System would impact MCO. That intention changes when the H1N1 pandemic strikes the world screen. A draft *MCO Communicable Disease Emergency Response Plan* (Greater Orlando Aviation Authority, 2008b) exists, but needs to be updated and finalized. FAA issues CertAlerts that provide technical literature references to CDC, Department of Health and Human Services, Department of Homeland Security, Department of Transportation, Occupational Safety and Health Administration, and WHO publications. This wealth of references provides valuable literature review from authoritative sources. Additionally, the National Fire Academy (2009) shows the goal of the Executive Fire Officer, *Executive Analysis of Community Risk Reduction* course, is to develop leaders in community risk reduction with a primary focus on a local problem that has affected the community in the past or is a major emerging issue. Two of the United States Fire Administration five year operational goals are to: promote within communities a comprehensive, multi-hazard risk reduction plan led by the fire service organization; and respond appropriately in a timely manner to emerging issues (National Fire Academy, 2005). The direction and focus of this research is aligned with the specific Executive Fire Officer course goals, as well as the overall objectives of the United States Fire Administration.

The Federal Emergency Management Agency (2002) includes findings and recommendations on the fire service role in the prevention and control of risks in the US. The recommendation for Emergency Medical Services shows the Federal Emergency Management Agency should review federal support for the emergency medical services of community fire departments and facilitate the development of a working partnership that will enhance public

emergency medical services, and improve the efficiency and effectiveness of the health service industry. This study indicates emergency medical services are an area of focus in which fire departments and the Federal government play an important role, especially in building working partnerships.

The CDC Miami Division of Global Migration and Quarantine meeting at MCO on May 19, 2008, provides a basic starting point for the project. The meeting attendees were consistent with the agencies included in the *MCO Public Health Threat* plan (Appendix F). The meeting to initiate the development of a communicable disease emergency response plan for MCO ends with plans to schedule subsequent meetings. Unfortunately, several setbacks take place following this meeting. Both the Orange County Health Department and the MCO representative assigned this project are no longer with their organization. MCO and CDC Miami Division of Global Migration and Quarantine do not remain aggressive with their communications during this transition; however, MCO authorities and assigned Federal agencies, along with local public health, keep this issue moving forward.

The problem which spurs the development of the *MCO Public Health Threat* (Appendix F) is that many of the US airports within the FAA system, including MCO, do not have a plan to meet these evolving requirements. The need becomes even more important when a worldwide pandemic places the issue on center stage. The first objective of this research project is to determine who has authority and responsibilities at MCO during each phase of a communicable disease response. This information provides options in determining the best plan format, as well as indentifying the key information for inclusion in a response plan for MCO.

The *Airport Pandemic Status* survey asks each participant how many international passengers they receive annually (Appendix C, question 2), showing all 18 respondent airports

receive international passengers. Over 3 million international travelers travel through 38.9% of the respondent airports. Between 1 and 3 million international passengers go through 33.3% of the respondent facilities, and 27.8% of the respondents have less than 1 million international passengers annually (Appendix E, question 2). This question is asked to determine the level of impact, should entry or exit screening measures get implemented. The ranges are based off the approximate 2 million annual passengers MCO receives, to provide a snapshot of how many E-net facilities fall within a similar size scope. With no predetermined idea of what to expect, it is interesting to note an almost even one-third split between each level.

The *Airport Pandemic Status* survey shows 7 out of 18 respondents do not have a quarantine station on site (Appendix E, question 1), as is the situation at MCO. A quarantine station is identified at 11 of the respondent facilities, but there are only 5 who indicate they have a written plan (Appendix E, question 3). K. Warwar states all the airports with a quarantine station on site are suppose to have a written plan established (personal communications, December 4, 2009). This is significant in that over half the airports with CDC expertise on site have yet to establish a written plan, and the 7 facilities without a Division of Global Migration and Quarantine will have to manage a communicable disease event without staffing support or on scene expertise from CDC.

The FAA (2004) has responsibility over US airports, so the issuance of two CertAlert's (FAA, 2009a, 2009c) provides authoritative guidance on how to proceed with the plan development. An incongruity we find between the CertAlerts is the initial recommendation to consider a workforce reduction of 30%, increasing that number to 40% in the current version. This is not a conflict, as the number is just being updated; however, combined with the two CertAlerts being issued 2 months apart in 2009, it illustrates this research problem is a rapidly

evolving issue. The CDC (2000) is a mere 13 pages long, showing only 8 quarantine stations nationwide and providing no specific screening information. The updated CDC (2009) version has 48 pages, shows 19 airport quarantine stations, and provides detailed screening instructions. The new version has just been released, which further confirms this is a developing topic that affects MCO.

CertAlert 09-12 also confirms the problem theory indicating responses regarding communicable disease plans are limited (FAA, 2009c). J. McSwain advises the FAA receives approximately 17 plans in response to the CertAlert 09-09, with one of them being the updated draft *MCO Communicable Disease Emergency Response Plan*. He says this shows a small percentage of facilities actually have a written plan, indicating the assumption of the FAA appears to be correct. J. McSwain (personal communication, June 4, 2009) concludes by saying the airports have to establish a local plan for responding to this type of emergency, but most do not have dedicated resources to develop and implement such an intricate plan. The CertAlert's state airport's plans should consider best practices, in conjunction with guidance available from federal agencies and organizations in the aviation and medical industry (FAA, 2009a, 2009c). This provides a great basis for determining literature review materials. As the federal regulatory agency over US air transportation, the Department of Transportation (2006) offers thorough guidance for managing communicable diseases in air transportation. The information is not regulatory, but is developed and distributed by the agencies with direct oversight of national security, aviation, and health. The Department of Transportation confirms the problem theory as well, "Airlines already have their protocols and guidelines in place...However, most airports do not have a manual that reviews the total effort necessary for preventing widespread transmission of quarantinable diseases throughout the U.S." (p. 1).

Determining who has jurisdiction and responsibilities during a communicable disease response is a major component to ensuring a smooth operation. A large scale incident is applicable to HSPD-5 and HSPD-8 (Bush, 2003a, 2003b), which requires the use of National Incident Management System with activation of the *National Response Framework* (Department of Homeland Security, 2008a). The *National Response Framework* identifies the roles and responsibilities for federal agencies, and shows a Presidential Disaster Declaration triggers financial assistance and physical assets. This is an important funding process for large scale events, or situations that will take a period of time to mitigate. When the *National Response Framework* is activated by the Federal Emergency Management Agency, they become responsible for coordinating government relief efforts. Information from the Government Accountability Office (2007) shows that although this appears to be fairly straightforward, there needs to be more focus on clarifying leadership roles for the federal agencies. How this will actually play out may not be fully understood until there is a Presidential Disaster Declaration made for MCO. The Department of Homeland Security (2008a) indicates ESF-8 would be the lead support function, with Department of Health and Human Services being the primary agency with jurisdiction. According to the Department of Health and Human Services (2005) and the Homeland Security Council (2006), declaration of a public health emergency would provide potential funding and support, in addition to an avenue for Food and Drug Administration (2006) to approve emergency use authorizations. This is an important point for two reasons. First and foremost it answers the question of who is paying for the response effort; however, if the federal government is footing the bill, the mitigation of the incident will be under their direction following the National Incident Management System.

According to Department of Transportation (2006), everyone should be aware that Division of Global Migration and Quarantine is the lead at an international airport, and the initial response team should consist of airport police, Aircraft Rescue Firefighting, emergency medical services, local public health, and Customs and Border Protection, in consult with Division of Global Migration and Quarantine. The MCO *Public Health Threat* (Appendix F) identifies 21 different agencies with roles and responsibilities. The CDC Template (Appendix B) and all the E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Massachusetts Port Authority [BOS], 2008; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) include different combinations of 19 of the 21 agencies.

Maintenance and Telecommunications were two agencies listed in the MCO *Public Health Threat* (Appendix F) that are not shown in the CDC Template or E-net plans. The MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) includes both of these departments in other emergency response areas, and they each have duties that will assist during a communicable disease response. It is interesting that a security group is only delineated in DTW (2009), although it is an important area for US airports. It is also surprising that only IAD (2009) has a communications department with specific roles and responsibilities; although communications is as a priority with all E-net plans, including PHX's (2009) addendum. MIA (2007) is an entire communications plan that no other airport provides. MCO has a communications department, so because of the emphasis of importance in this area, the communications department is included with roles and responsibilities in the MCO *Public Health Threat* (Appendix F).

Determining an appropriate format is a key step in developing a written plan. The FAA (2009b) *Airport Emergency Plan* does not mandate a specific format, but it recommends basic content with a general outline. The current MCO (Greater Orlando Aviation Authority, 2009) *Airport Emergency Plan* uses the same content and outline FAA recommends. Each of the areas Department of Transportation (2006) recommends for the plan is encompassed in the *Airport Emergency Plan* (FAA, 2009b). The CDC template (Appendix B) outlines the contents to include in a standard plan, all of which are also part of the FAA criteria. The *Airport Pandemic Status* survey found less than half the airports have a written pandemic plan (Appendix E, question 3). The airports in the E-net are some of the largest in the US, and often among the more progressive facilities. This verifies the lack of written plans within the airport industry is not just a perception; however, the true value of this question is the acquisition of seven written communicable disease response plans for a best practices comparison. The *Airport Pandemic Status* survey (Appendix E, question 4) also shows only 22.2% of the airports have completed an exercise to test their plan, one-third have not completed an exercise, and the rest are in the planning process. The survey asks the respondents who indicated they had conducted an exercise to e-mail a copy of any lessons learned for a best practices comparison, which results in the acquisition of two plans. The results of both these survey questions indicates there are few written plans completed within the industry, and even less exercises conducted to test the plans.

Plans from 7 respondents show two different formats. DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a) use the CDC template outline (Appendix B), with BOS (2008) and IAD (2009) following the FAA (2009b) *Airport Emergency Plan* format. Although the PHX (2009) plan is not considered a comparable for format style, their information is still valuable to this project and referenced in other areas of this research. Since two-thirds of the plans are in the

CDC template format, this format approach seems reasonable from a best practices comparison standpoint. All six of the E-net plans have the recommended categories shown in the CDC template (Appendix B) with some minor exceptions. Most of the information is consistent, just categorized differently or delineated out for a more detailed approach.

The response from J. McSwain (personal communication, June 4, 2009) shows there are several formats currently in use. He indicates this procedure is an emergency response plan, so it would be logical to put it in the Airport Emergency Plan. With the FAA establishing the requirements for US airports and mandating the use of an Airport Emergency Plan, it is sound to assume this format is favored from a regulatory standpoint. It is apparent that either format will meet the need to cover all the pertinent information; however, it seems more appropriate to use the FAA's *Airport Emergency Plan* format. The MCO (Greater Orlando Aviation Authority, 2009) *Airport Emergency Plan* contains all the airport emergency response information, so the format is already recognized by personnel and is more consistent with local emergency response practices. Feedback from Miami Division of Global Migration and Quarantine states the format of the MCO *Public Health Threat* (Appendix F) is organized in a more easily flowing manner than the CDC template (K. Warwar, personal communication, February 5, 2010). An issue with this formatting approach is the appendices section will make the plan too large for insertion into the current MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009). Although this is the final portion of the response plan to be discussed later, it is a noted complication that needs to be addressed.

Now that the format is determined there is a need to delve deeper into the contents of the plan. The literature review shows the FAA (2009b) *Airport Emergency Plan* indicating several core functions are necessary within each hazard specific section. The health and medical section

indicates the need to manage a communicable disease response with the capability to treat the amount of passengers carried on the largest aircraft using the facility. The Department of Transportation (2006) recommends incident management actions regarding (a) notification and assessment, (b) activation, (c) response, (d) recovery, and (e) mitigation, so these areas are reflected in the MCO plan (Appendix F). In-flight response begins the notification process with multiple layers of communications. The airlines are trained on in flight actions and notification procedures with built in redundancies (International Air Transport Association, 2009; International Civil Aviation Organization, 2007; WHO, 2009), so there should be not problems with appropriate agencies receiving the information. The initial response team is activated and the appropriate personal protective equipment for the suspected disease is utilized. According to the Department of Transportation (2006), each agency is advised to provide their own personal protective equipment, but this is an area of concern in both training and supply.

The FAA (2009b) *Airport Emergency Plan* specifically states the need for a procedure to request medical supplies and equipment. Unfortunately these supplies will take a while to get released and arrive on site, so personal protective equipment supplies will have to somehow be maintained. The United States Fire Administration (2006) and CDC (2007) indicate there should be an anticipated supply shortage, and responders will only have the items obtained prior to the event available for their use. The Occupational Safety and Health Administration (2009) and WHO (2009) provides important guidance for healthcare workers responding to pandemic influenza, especially with regards to infection control measures for the various means of transmission. Training for all responders dealing with patients who may be infected with a communicable disease is an important point that is easily overlooked. This may include non emergency medical services providers that are assisting with different tasks in the process, but

are exposed to individuals who may be infected. This includes operating procedures for disinfecting patient care equipment, treatment areas, and any other surfaces that can potentially be infected.

The FAA (2003b) advises a conveyance must be allowed to land due to free partique, but the conveyance movement is controlled by the airport after landing. The Department of Transportation (2006) shows Department of Homeland Security can divert a flight to a facility with a Division of Global Migration and Quarantine, if there is a public health threat. It also notes that determining the parking location for the aircraft has several considerations. This is an important point as to how the operation will progress, and the MCO *Public Health Threat* (Appendix F) shows an airside gate position as the primary location for an incident involving the largest aircraft using the facility. Utilizing a normal aircraft gate area to park the aircraft provides a more typical operation with easy access according to the Department of Transportation (2006), and portable units are already in place to provide auxiliary power to the aircraft. A discrete emergency frequency is designated for communications on the airfield radio between the FAA Air Traffic Control, aircraft pilot, and Incident Commander during emergency situations. The Memorandum of Understanding regarding this mode of communication is included in the MCO *Airport Emergency Plan* appendix (Greater Orlando Aviation Authority, 2009), as it is the method of choice for maintaining direct contact with the pilot.

The MCO Aircraft Rescue Firefighting Department has two airstair units to access and egress the aircraft, and there is an isolated holding room on ramp level at airside one. Airside one is 1 of 4 buildings used to connect the gateway to the aircraft for passenger disembarking, and transition of those travelers to the main terminal building. This location has direct access to restrooms, and a secure rear exit leading to the FIS area (Appendix F). These factors remove the

overriding disadvantage for choosing the gate area parking location, which is the potential contamination of the gate bridge and reception area (Department of Transportation, 2006). A problem with aircraft parking at MCO is less than desirable alternate locations, if the primary location is occupied, if multiple flights arrive with potential communicable disease patients, or if entry screening border protection measures are implemented.

The Department of Transportation (2006) indicates the Division of Global Migration and Quarantine or local public health utilizes proper personal protective equipment and boards the plane to assess ill persons. They warn being overdressed leads to undue anxiety to passengers and crew, so this must also be considered in what is appropriate personal protective equipment. An easily overlooked personal protective equipment is vaccination of health care workers who are among the high risk groups having priority in receiving immunization; however, only 40% of this group receive inoculation in 2003 (Occupational Safety and Health Administration, 2007). This is a concerning statistic, since immunizations are a valuable first line of defense. According to feedback from D. Walsh (personal interview, October 5, 2009), the Orange County Health Department does not usually respond to communicable disease incidents unless it is significant, they rely on the initial emergency medical services response team to assess and treat individuals. This indicates Aircraft Rescue Firefighting will be delegated to manage the emergency medical services portion of an incident at MCO. This initial determination plays a significant role in driving the future phases of the operation.

Passive or active surveillance are ways to identify potentially ill travelers. Passive surveillance obtains information without solicitation, usually conducted by Customs and Border Protection during the customs process. According to Department of Transportation (2006) and FAA (2003b), Customs and Border Protection contacts the Division of Global Migration and

Quarantine or local public health for further medical assessment. Both of these agencies are not immediately available at MCO, so Customs and Border Protection must activate the local emergency response system in addition to notifying Division of Global Migration and Quarantine or local public health. As an added measure to safeguard the MCO populace, several of the agencies included in the MCO plan (Appendix F) have responsibilities with passive surveillance.

Active surveillance measures are implemented during a communicable disease response, or for a breakout in a specific geographical area. Screening travelers departing from affected countries is more likely to produce a positive result, according to Airports Council International (2009). Travelers showing signs and symptoms in the affected area produce less false positives, and fewer travelers have to be screened. The Congressional Research Service (2009) provides legal information that indicates airlines are not obligated to provide transportation to a passenger with a ticket, because there are contract clauses that allow the airlines to deny travel. This is an important piece of information that will help ensure the health and welfare of the other traveling passengers. Exit screening creates many issues for MCO, mainly how to contain and screen everyone arriving at the various entrances throughout the airport facility. Airports Council International states, “exit screening should be undertaken as soon as possible after travelers have arrived at the airport, and before they pass through to airside” (p. 4). This leads us to think about the security checkpoints as a logical surveillance point, unfortunately this approach means the public areas prior to the checkpoints are exposed to contamination. There is no good place to conduct exit screening at MCO, according to T. Draper (personal communications, February 15, 2009), but the large open areas prior to the Transportation Security Administration security checkpoints would provide the least amount of negatives to this operation.

Entry screening at international borders is expensive, disruptive, and provides minimal impact on global disease spread. Brigantic et al. (2009) provides an international passenger model showing over 17 million passengers will be screened in the US during the first 100 days of a pandemic. Airport screening identifies approximately 50% of infected travelers and does not significantly delay the arrival of a pandemic influenza; however, there would be 800,000 to 1.8 million less pandemic cases and 16,000 to 35,000 fewer fatalities. According to Airports Council International (2009), if an authority determines screening activities are necessary, costs associated with the screening equipment, airport space, and infrastructure support, would normally be met by them. On the other hand FAA (2003b) points out each U.S. airport receiving international traffic will provide at no cost to the government agencies, suitable office space, isolation room, and other necessary areas for carrying out the responsibilities of the regulation. Additionally, the WHO (2005) advises a state party can not charge passengers for; medical examinations, vaccinations or prophylaxis, isolation or quarantine, and any documentation of these activities. It does state charges can be levied for baggage, cargo, and conveyances, as long as they do not exceed the actual cost and are consistent with all operators. This information contradicts FAA (2003a) stating, vaccinations or prophylaxis may be provided and the cost for administering them can be assessed in a fee to the traveler. This conflicting information does not provide clarity on the important point of who is paying for this undoubtedly high priced event.

The local public health prepares for the medical surge and provides guidance to medical professionals on clinical and diagnostic practices (Department of Transportation, 2006). Managing surge capacity is seen in the CDC template (Appendix B). E-net plans from FLL (2009) and DTW (2009) state anything beyond a 48 hour timeframe requires a federal response with assets. This shows local public health needs to provide training to initial response

emergency medical services for mitigating surge type events for the first 48 hours. D. Walsh (personal communications, October 5, 2009) states Orange County Health Department will most likely be able to accomplish this task. Although when asking about the availability of Orange County Health Department personnel to assist during the those 48 hours, she reflects back to her response early in the H1N1 outbreak of not having enough personnel to assign anyone to MCO (D. Walsh, personal communications, April 30, 2009). With Orange County Health Department unable to assist, MCO must prepare to manage surge situations for at least 48 hours with current resources.

Under the MCO *Public Health Threat* (Appendix F) surge capacity section, the emergency medical services transport agency, Orlando Fire Department, and Orange County Fire Rescue, are potential resources through mutual aid agreements that may be able to assist. This follows the recommendation of National Fire Protection Association (2004), but will depend on the availability of these agencies. An increase in emergency responses can be expected during a communicable disease or pandemic event causing a medical surge, so mutual aid resources may be unavailable or at least limited. The CDC Miami Division of Global Migration and Quarantine has a Memorandum of Understanding with Miami Dade County Health Department, because they both are located at MIA and can assist each other if necessary during surge situations. On the other hand there is no Memorandum of Understanding with Broward County Health Department who has jurisdiction for FLL (2009), because both agencies are not on site (K. Warwar, personal communications, December 4, 2009). This indicates relying on the CDC Miami Division of Global Migration and Quarantine as a resource during surge events at MCO is not a reliable option, so it is not included in the MCO plan (Appendix F).

Quarantine and Isolation is implemented by Division of Global Migration and Quarantine or local public health, and these authorities must provide adequate healthcare, food, water, and means of communicating. Planning is key in addressing location, staff, and the numerous logistical items necessary for managing these areas. Since MCO does not have facilities to meet the standards of a quarantine, if a quarantine order is issued it has to be at an off site location. The CDC (2009) and CDC Template (Appendix B) indicates a temporary quarantine facility may need to be established at the airport for a period less than 72 hours. The screening and detention area in all the E-net plans specifies locations for initial passenger screening and temporary holding. The timeframes for temporary holding facilities ranged from 8 hours at DTW (2009) to 72 hours at IAD (2009). MCO (2008b) did not specify a time; however, the revised draft *MCO Communicable Disease Emergency Response Plan* shows temporary holding of passengers for up to 12 hours, while Orange County Health Department works with Orange County Emergency Management to designate a quarantine or isolation site. Feedback from K. Warwar (personal communications, February 5, 2010) states the 12 hour timeframe in the revised draft *MCO Communicable Disease Emergency Response Plan* needs to be increased to 72 hours. This is consistent with the CDC template (Appendix B) recommendation, but is not a popular position at MCO. Efforts will be facilitated to move any temporary holding, quarantine, or isolation off MCO property as soon as possible; however, the MCO *Public Health Threat* (Appendix F) has a temporary holding for up to 72 hours.

The E-net plans provide good options for temporary holding facilities. IAD (2009) and MCO (2008b) specify a transit lounge for temporary holding, stating local public health is responsible for off site facilities. An aircraft hangar is identified for longer holding timeframes by BOS (2008) and DTW (2009). The PHX (2009) isolation procedures show a portion of the

terminal building is segregated, until off site facilities can be established by local public health. The primary location at MCO does not provide adequate space for this long of an operation; however, the aircraft hangar approach seems to be an appropriate fit for longer term operations. The plan for receiving Haitian relief flights was to use a hangar on the West ramp, according to T. Draper (personal communications, February 15, 2010), so this would be a logical approach as a temporary holding area for up to 72 hours. The MCO *Public Health Threat* (Appendix F) incorporates the use of a hangar for temporary holding of up to 72 hours.

Sensenig and Stambaugh (2008) estimate the cost for quarantine of 200 individuals for 2 weeks at over a quarter of a million dollars, and concur it is uncertain who would be financially responsible. The largest aircraft utilizing MCO holds twice this amount of passengers, so the anticipated cost for just 72 hours of quarantine is approximately \$100,000 dollars. CDC has the authority to impose a quarantine order, but may use voluntary home quarantine as another option to the more expensive and complex designated facility choice. D. Walsh points to self isolation through home quarantine as the most desirable option due to location of the site and cost issues, plus most individuals prefer to be in their known comfort area during this inevitably stressful time (personal communications, October 5, 2009).

Recovery from a quarantinable disease incident is an essential component in returning the airport to normal operations. The CDC template (Appendix B), along with DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a), indicate facilities or aircraft determined to be necessary for decontamination must be designated safe before they are used. None of the documentation states who will ultimately determine if decontamination is necessary, and if so, who will then deem it safe to use. This is a major question that no agency appears to want the liability for. The BOS (2008) plan recommends following CDC outlines for disinfecting

measures, and receiving technical support from state and local health agencies. This seems like a logical approach to this sensitive area, but it is not in concert with the recovery triggers showing no responsibility objectives for the local public health with regard to decontamination (State of Florida Department of Health, 2009). There is a guideline for decontaminating aircraft in the MCO *Public Health Threat* (Appendix F) developed by Division of Global Migration and Quarantine. Disposal of medical waste is emphasized as an important element of recovery by Department of Transportation (2006), which is easily accomplished at MCO through existing contracts with companies certified to handle biohazard materials. Recovery also entails restoring the infrastructure to normal operational capability, which involves the efforts of the MCO Maintenance Department to remove any items constructed during the initiation process. It also requires the removal of contaminated materials, so the area can be returned to its original condition.

The Homeland Security Council (2006) developed the US national plan for pandemic response with three main goals. It indicates the aviation sector has a role in each of the areas, as it involves aircraft that carry potentially sick individuals, while being a key component in the national economic engine. This is a huge factor in the recovery phase of a longer term communicable disease event. Turnbull (2007) indicates that during a pandemic, airlines going to vacation destinations would experience significant declines in passenger volume. It is also points out business travel would return before the leisure market. This is significant to MCO, since the vast majority of travelers utilizing the airport are tourists coming to the variety of area theme parks and attractions.

The appendix to the Department of Transportation (2006) includes 10 different reference items; while the CDC template (Appendix B) has 17 appendices, with 7 requiring specific

information to be completed. It is very surprising to find that none of the appendices in the CDC template match the Department of Transportation appendices, although there were similarities in the reference materials. The MCO *Public Health Threat* (Appendix F) includes 9 of the 10 CDC template appendices. The port of entry quarantine response timeline appendix is not applicable, since Division of Global Migration and Quarantine is not located at MCO. The seven CDC template appendices (Appendix B) requiring specific information are protocols for the airport authority, Customs and Border Protection, local hospitals, local public health, public affairs, and distribution lists. These items are specific to individual agency functions, so they are only necessary for reference in the MCO plan (Appendix F). This minimizes the size of the document, but makes it important that each group openly shares their detailed plans with all agencies involved in the response.

The MCO *Public Health Threat* (Appendix F) includes four appendices from the Department of Transportation (a) travel notices, (b) legal fact sheet, (c) quarantinable disease information, and (d) incident command structure. The Department of Transportation has six other appendix items; CDC quarantine stations, personal protective equipment, executive orders, quarantine plan example, abbreviations, and acknowledgements. These attachments are not in the MCO plan (Appendix F), because they are either delineated somewhere else in the document or are not necessary at MCO without an on site Division of Global Migration and Quarantine.

The appendix in five of the six E-net plans (Detroit Metropolitan Wayne County Airport [DTW], 2009; Fort Lauderdale/Hollywood International Airport [FLL], 2009; Greater Orlando Aviation Authority [MCO], 2008b; Miami International Airport [MIA], 2008a; Washington Dulles International Airport [IAD], 2009) have the same 10 attachments as the CDC template (Appendix B), with the exception being the BOS appendix consisting of roles and

responsibilities for participating agencies (Massachusetts Port Authority [BOS], 2008). There are four plans, FLL (2009), MCO (2008b), MIA (2008a), and IAD (2009), that include additional appendix information (a) Title 42 CFR Parts 70 and 71, (b) a reportable disease list, (c) CDC passenger locator form, (d) the CDC illness/death investigation of travelers form, and (e) possible exposure instructions. All of these items are included in the MCO *Public Health Threat* (Appendix F). The MIA plan has a memorandum of agreement with the local public health, infrastructure checklist for temporary quarantine facility, American Red Cross standard operating procedure, and American Red Cross responsibilities, as appendix information; DTW (2009) is the only plan to include a quarantine station surge plan, and Memorandum of Understanding between CDC and local medical facilities. It does not appear necessary to include the additional MIA and DTW information, as it is aimed towards their specific airport and Division of Global Migration and Quarantine facilities.

The MCO *Public Health Threat* (Appendix F) plan adds a staging map in the appendix, which is not shown in any of the research information. The staging map is a current map for use by mutual aid agencies when responding to MCO. The mutual aid agencies, Orange County Health Department, and other necessary community partners who do not have an MCO badge, need a common meeting point for escort into MCO's security sensitive areas. MCO already has four designated staging areas at strategic locations on airport property. These locations will also be effective for a communicable disease response, so consistency in this area is an added benefit. The obstacle of adding appendices to the already lengthy MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) is addressed by including electronic links to each of the documents at their applicable place in the plan. The MCO *Public Health Threat* (Appendix F)

includes some appendices; however, many of the originally identified appendices are incorporated as electronic links to save space in the overall MCO *Airport Emergency Plan*.

Multiple agencies have authority during a communicable disease event, so a reviewer's signatory page is included in the MCO plan (Appendix F). The agencies listed in the CDC template (Appendix B), as well as the DTW (2009), FLL (2009), MCO (2008b), and MIA (2008a) E-net plans, are designated as the entities requiring signatory approval in the MCO *Public Health Threat* (Appendix F) as well. BOS (2008) and IAD (2009) use the FAA (2009b) *Airport Emergency Plan* format, and they both do not include a signatory page. Although this item is not shown in the outline, it seems appropriate for inclusion. K. Warwar (personal communications, December 4, 2009) advises the MIA plan is still considered a draft, because they have not yet received an approval signature from a couple of agencies.

The Department of Transportation (2006) states everyone should understand how each department interacts to accomplish the requirements of a communicable disease response. The E-net synopsis (Appendix A) shows just half of the respondents indicate they will meet with local public health, and less than half plan to meet with stakeholders. This is a surprising gap that indicates a potential disconnect, if an event occurs. Training is only shown for MSP and BOS (2008); however, an assumption can be made that this, along with the interoperability piece, will adjust after an E-net meeting synopsis best practices review by all departments. Both of these areas follow the Department of Homeland Security (2008b) point of essential interdependencies being critical at airports, because there are several agencies having some level of responsibility during different phases of the travel process. K. Warwar (personal communications, December 4, 2009) stated Customs and Border Protection is the Miami Division of Global Migration and Quarantine main point of contact with MCO (2008b) and FLL

(2009). During the height of the H1N1 there are weekly teleconferences between the groups nationwide, but direct communications between Miami Division of Global Migration and Quarantine and MCO Customs and Border Protection are minimal at best. Since there is no MCO airport authorities involved in this line of communications, it is a gap airport officials are unaware of.

Howitt & Leonard (2005) indicate that along with the National Incident Management System implementation, organizations need to focus on educating individuals not accustom to emergency services operations. “Part of that effort must be devoted to the constructive redesign and adaptation of IMS principles and practices to fit the operating circumstances of professions that have not been among the original participants in the spread of IMS” (p. 42). This is a very good point for the MCO community, as many of the partners do not work regularly in emergency response situations. According to Delaney (2008), there are several variables that cause firefighters apprehension when participating in a pandemic scenario. These factors can be expected to increase with groups not accustom to emergency operations, not to mention the potential of already being short 40% of the workforce. This is a very important point that can be easily overlooked. Heifitz and Linsky (2002) write about the challenges of affording change within organizations. They state the single most common failure in leadership is treating adaptive change like a technical problem. The completion of the MCO plan (Appendix F) can easily be misunderstood as just a technical problem, but a more encompassing view shows this is just as much of a cultural change within the airport community. A clear plan, accompanied with the proper training, is an opportunity for Greater Orlando Aviation Authority to empower employees to make important decisions, which should also reflect positively in other facets of their work.

As a direct result of Kann (2008), most of the MCO partners receive National Incident Management System classroom training; however, practical experience is necessary to ensure a full operational understanding. The *Airport Emergency Plan* stipulates, “While response organizations can, and usually do, perform admirably in emergency responses, problems often arise in the overall management of the situation, i.e., the merging of varying disciplines, organizations, and agencies not accustomed to working together” (FAA, 2009b, p. 6-3). The United States Fire Administration (2006) indicates the key to success in communicable disease response is planning, training, and exercising, combined with proper implementation of a plan. The importance of updating plans through periodic reviews, and evaluating plans with exercises that provide a lessons learned follow-up approach, is a focus in National Fire Protection Association (2007b). This shows the need to conduct training exercises involving all the agencies that operate in key areas at MCO.

The Greater Orlando Aviation Authority (2008a), *Downcraft Exercise After Action Report*, indicates the departments not normally involved in emergency operations do not understand the National Incident Management System to the level necessary for optimal effectiveness. Results indicate the exercise is a success and continued improvement is likely, if National Incident Management System training and practical exercises are conducted with all the departments involved in MCO emergency response. Kann (2008) discusses the unexpected finding of a potential disconnect between law enforcement and fire rescue, since a lack in understanding of each others operations is noted in the after action report. This information is surprising, but on a positive note, communicable disease response training offers an opportunity for improvement with interoperability between the two agencies. The *Airport Pandemic Status* survey (Appendix E, question 4) shows one-third of the respondents have neither conducted, nor

plan on conducting, a communicable disease response exercise. Since all of the respondents receive international traffic (Appendix E, question 2), the lack of interest in this training shows a vulnerability in protecting the health and security of the US international gateways. Four respondents indicate they have conducted communicable disease related exercises (Appendix E, question 4), but only two provide lessons learned from their training.

The City of Phoenix provides information regarding a pandemic scenario for the entire city, not specific to the airport itself. Although the report is encompassing and well written, it is not a comparable for this research project aimed specifically for airport response (Phoenix Aviation Department [PHX], 2009). The MIA (2008b) *Risk Based Border Strategy Workshop*, is conducted at the airport by Miami Division of Global Migration and Quarantine, with focus on processing international passengers arriving on an inbound aircraft. It delineates primary and secondary screening duties, as well as the cohort out processing of passengers. This information is notably absent in the CDC template (Appendix B) and all of the E-net plans; however, this process is described in detail by CDC (2009), indicating the approach can be used for a single communicable disease response or with the implementation of the national border protection plan. Although not noted in any of the E-net plans or in CDC's own template, the information is pertinent and valuable in managing the response to a communicable disease incident; therefore, it is included in the MCO *Public Health Threat* (Appendix F). Without obtaining and reviewing the MIA (2008b) exercise lessons learned, this important piece of passenger processing information may be overlooked.

The revised draft *MCO Communicable Disease Emergency Response Plan* discussion based exercise is attended by 16 of the 21 departments and agencies that have a role or responsibility in the plan. During the discussion based exercise, each group is provided a hard

copy and electronic version of the revised draft *MCO Communicable Disease Emergency Response Plan*. An overview of the plan and walkthrough of a basic scenario is accomplished to provide a basic understanding to each of the participating agencies. Feedback from each agency regarding the plan, specifically their part in the plan, is requested at the conclusion of the meeting (D. Kann, personal communications, November 19, 2009). This provides additional training for each group as they review and discuss the plan amongst their staff, but more importantly presents them with an opportunity to comment on their specific areas to gain buy-in. Notably missing at the exercise are the Customs and Border Protection and Miami Division of Global Migration and Quarantine; since they each have important responsibilities and play a key role in this type of response. This also emphasizes the lack of engagement between these two entities, as discussed earlier regarding the minimal communications during the H1N1 pandemic. Also unable to attend the exercise is local emergency management, Immigrations and Customs Enforcement, and Federal Bureau of Investigation; however, all the agencies not in attendance for the exercise receive a copy of the plan to review and provide input.

Feedback from Orange County Emergency Management recommends delineating the reference to the Emergency Operations Center throughout the document as the MCO Emergency Operations Center, so it is not confused with the Orange County Emergency Operations Center. There is a concern that indicating the activation of the Emergency Operations Center may lead agencies to think it is the county not MCO (S. Detwiler, personal communications, December 1, 2009). The Emergency Operations Center verbiage is understood by MCO departments and agencies to mean the MCO Emergency Operations Center, and it is not delineated this way in all of the other *MCO Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) hazard sections; therefore, this recommendation is not taken for all Emergency Operations Center

references in the MCO plan (Appendix F). The roles and responsibilities section clarifies this area showing the Airport Operations Center activates the MCO Emergency Operations Center, and Orange County Emergency Management activates the county Emergency Operations Center, as necessary. S. Detwiler (personal communications, December 1, 2009) also recommends adding the Orange County Emergency Operations Center seeks assistance through the State of Florida Emergency Operations Center for resources beyond the local level. The recommendation of linking the Orange County and State of Florida Emergency Operations Center is appropriate, since this is the avenue for requesting state resources. This suggestion is much appreciated, as it is an important point that is overlooked in the revised draft, so it is added to the *MCO Public Health Threat* (Appendix F).

Feedback from Miami Division of Global Migration and Quarantine recommends the inclusion of a time frame for notification of primary response agencies (K. Warwar, personal communications, February 5, 2010). This was noted in the E-net plan appendices that have Division of Global Migration and Quarantine on site; however, MCO does not have this luxury, so all notifications are made through the standard 9-1-1 emergency system. This is an immediate notification to the MCO Communications Center, who has responsibilities in the MCO plan (Appendix F) to make dispatch notification to the primary response agencies. They also notify the Airport Operations Center, who shows responsibilities to make immediate notifications to additional agencies. Since the timeframe issue is addressed through standard emergency notification procedures, the timeframe suggestion is not delineated in the *MCO Public Health Threat* (Appendix F).

Feedback from Customs and Border Protection includes a copy of their local operating procedure for communicable and quarantinable diseases at MCO (E. Oliveros, personal

communications, December 4, 2009). The procedure is compared to their responsibilities in the revised draft *MCO Communicable Disease Emergency Response Plan* by Customs and Border Protection and the Greater Orlando Aviation Authority, with concurrence that the plans are compatible and no adjustment to either is necessary. The Customs and Border Protection operating procedure is referenced, but since it is specific to only their operation it is not included in the MCO plan (Appendix F). Updated contact information is also provided (E. Oliveros, personal communications, December 4, 2009) and included in the *MCO Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009) contact list.

Feedback from FAA Air Traffic Control, E. Donaldson (personal communications, December 2, 2009), shows no concern with their portion of the plan, confirming the functions for their agency are consistent with current practices. The information is shared with the air traffic controllers to ensure they understand why an aircraft may be diverted to a different parking location, and to ensure communications with the pilot was facilitated. M. Sweeny (personal communications, December 3, 2009) from Transportation Security Administration states their MCO specific plans for communicable disease functions are consistent with the MCO plan (Appendix F), but emphasizes a concern about training for personnel. This concern is legitimate, and is shared by most of the groups participating at any level in this operation. Orange County Health Department and the Aircraft Rescue Firefighting Health and Safety Officer have the expertise to perform the training, so this important function has avenues for being accomplished. Updated contact information from Transportation Security Administration and FAA is also provided during the feedback, and included in the *MCO Public Health Threat* (Appendix F).

The MCO Airfield Operations group expresses concerns about their role with passive surveillance. Discussion about what the process is, along with what their anticipated role will be,

eases the concerns and gains acceptance by the department. The term “coordinate” in their responsibilities for ensuring ground power equipment is attached to the aircraft to provide power and ventilation is asked to be changed to “assist” (B. White, personal communications, December 4, 2009). The reasoning is that the function to coordinate is the airlines, so Airfield Operations would merely ensure it is accomplished. This request is accepted and the change is made in the *MCO Public Health Threat* (Appendix F), in addition to adding this point to the airlines roles and responsibilities area.

In addition to the revised draft *MCO Communicable Disease Emergency Response Plan*, the MIA (2007) communication plan is shared with MCO Public Affairs, since it provides detailed information on media relations. Feedback from Public Affairs includes a designated media meeting location at the oversize parking area on the A-Side commercial lane, if the primary aircraft parking location at airside one is utilized. In the rare occurrence an aircraft hangar is used as the temporary holding location, the gold parking lot is the designated media staging area (R. Johnson, personal communications, December 1, 2009). There is little question this will be a media event, so coordinating the influx of these agencies is essential to ensuring a unified message is released to the community.

The findings obtained during this research project are very important to the US aviation industry and Greater Orlando Aviation Authority (MCO). Understanding how other similar sized facilities are addressing this important emerging issue, allows for a comprehensive approach to implementation of an encompassing communicable disease response plan at MCO. This action research project provides guidance towards developing a specific plan (Appendix F), while establishing a foundation for other US airports to follow. Through this research, all US airports can understand which agencies have responsibilities during a communicable disease

response, along with the items that should be included in their individual plans. It also considers how implementation of the plan requires training and exercises to be successful, allowing all participating agencies to gain confidence in their capabilities. The benefits of establishing and exercising the MCO plan (Appendix F) are numerous, and the rewards have already been experienced during its development phase. On the other hand the negative implications of not having a practiced emergency plan for MCO are even greater, especially in regards to public confidence in safety and security at Orlando International Airport (MCO).

The CDC template (Appendix B) and MCO *Public Health Threat* (Appendix F) hazard specific section in the MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009), contain Sensitive Security Information that can not be made readily available in this document. If there is interest in either of these items they may be available upon request. Please send requests for the CDC Template to CDC Miami Division of Global Migration and Quarantine Commander, Kirstin Warwar, via telephone at (305) 526-2910, or electronically at kwarwar@cdc.gov. For a copy of the MCO *Public Health Threat* functional annex in the MCO *Airport Emergency Plan* (Greater Orlando Aviation Authority, 2009), contact Orlando International Airport Fire Chief, Duane Kann, via telephone at (407) 825-3022, or electronically at dkann@goaa.org.

Recommendations

The understanding gained from this research project should prove to be a valuable resource for any US airport to follow, but first they must be made aware of the information. The initial recommendation is to present this document to the American Association of Airport Executives, so the information can be disseminated to all FAA airports. The Aircraft Rescue Firefighting Working Group, an organization of airport firefighting professionals influential in

the aviation industry, should also be advised of the findings. A presentation should be made at one of the combined conferences these two groups host annually, to further emphasize the importance of this emerging issue. This action would afford positive change in mitigating public health threats at all FAA airports, and enhance public safety at all US international gateways. Providing this information to the airport industry would also gain further respect for the MCO as one of the leaders in emergency response.

At a local level, the signatory page must be completed to finalize the plan and ensure all the responsible agencies agree with the concept of operations. This would also place responsibility on the signatories to ensure their respective department personnel are aware of the plan, and that they would function within the parameters set for their group. The finalized copy of the *MCO Public Health Threat* (Appendix F) should be sent to the FAA to receive their stamp of approval, which is required on each page of an Airport Emergency Plan (FAA, 2004). It would then be added to the official *MCO Airport Emergency Plan* (Greater Orlando aviation Authority, 2009), and distributed to the MCO agencies authorized to receive the document. Agencies not included in the normal distribution list would be provided an individual copy of the *MCO Public Health Threat* (Appendix F) hazard specific section of the plan. If this is accomplished, MCO would have the foundation established to effectively mitigate a communicable disease emergency.

Additional research should be conducted to determine the necessary components for conducting table-top and full-scale exercises that are National Incident Management System compliant. This would include the completion of a Homeland Security Exercise Evaluation Program After Action Report to document the results of the exercise. Utilizing the Homeland Security Exercise Evaluation Program for planning and facilitating an exercise was also

recommended in the Greater Orlando Aviation Authority (2008a) *Downcraft Exercise AAR*, and following the completion of the National Incident Management System classroom training (Kann, 2008). Greater Orlando Aviation Authority should combine the information obtained from this action research with the previous recommendation, to conduct a table-top and full scale exercise that utilizes the MCO *Public Health Threat* (Appendix F). Having each of the departments and agencies trained to understand their role during a communicable disease emergency is a key element to ensuring the public health safety of everyone at MCO. This goal should be accomplished prior to the FAA triennial exercise required for MCO by March 2011. The exercise should meet all the requirements for the FAA triennial exercise, so completion of this recommendation will accomplish several important directives; MCO would meet the mandatory requirement for airport certification with FAA, enforce the need for National Incident Management System compliance by the entities involved with emergency response at MCO, provide valuable training to employees that will increase their confidence with the plan, and ensure the written plan can be practically applied during an emergency. The Airports Council International (2009), Department of Homeland Security (2008a), Department of Transportation (2006), FAA (2009b), and United States Fire Administration (2006) advise airport operators to test preparedness through drills or exercises. This is an overwhelming recommendation that Greater Orlando Aviation Authority would be remiss not to follow.

The appropriate personal protective equipment for the suspected disease would be provided by each agency (Department of Transportation, 2006). This may be an area of concern in both training and supply. MCO should plan for having additional personal protective equipment supplies readily available to outfit all agency personnel who may be involved in a communicable disease event. The United States Fire Administration (2006) indicates to

anticipate a shortage of supplies, and the available resources will most likely be those obtained prior to the event. The MCO material control warehouse has adequate room to stock supplemental personal protective equipment, so this valuable commodity should be obtained and made available to all MCO agencies.

The level of analysis in the quarantine facility area was minimal due to the already hefty size and scope of this project. Further research in this area is necessary to ensure the Orange County Health Department and Orange County Emergency Management have predetermined locations ready to activate should the need to quarantine arise. The airport is not an appropriate location for quarantine and should be avoided as an alternative. This was supported by Airports Council International (2009) and CDC (2009), which indicated quarantine should be accomplished away from the airport.

Sensenig and Stambaugh (2008) stated counseling should be provided to individuals being temporarily held or quarantined, as well as for the workers involved in the event. National Fire Protection Association (2007a) indicated the fire department shall provide medical guidance in the management of a critical incident stress program. It should include personnel who have received training in stress relief counseling. The National Fire Protection Association (2007a) identified the fire department needed to assign a Health and Safety Officer to oversee the infectious disease program, and according to National Fire Protection Association (2005), to include personnel who had training on various areas related to a communicable disease response. To accomplish these objectives Aircraft Rescue Firefighting should provide training to specific personnel who would be able to provide these important services. A written guideline on how these activities would be accomplished is also recommended to ensure Greater Orlando Aviation

Authority has the capability to manage infectious diseases, and provide critical incident stress debriefing capabilities to those in need.

The information in this study provides a foundation for discussion on whether MCO should consider becoming a “plus six” facility. Further investigation needs to be accomplished with the border protection plan in order to determine if it is the right approach for MCO. Lines of communication will have to flow more freely between MCO and CDC Miami Division of Global Migration and Quarantine, since they are the reporting station for MCO during activation of the border protection plan. This will assist the Greater Orlando Aviation Authority in making the proper determination, as well as enhance communications between MCO and CDC Miami Division of Global Migration and Quarantine for future operations. With the development of a written public health response plan for MCO (Appendix F), the product of this action research paper would promote local risk reduction for travelers, first responders, and other required MCO personnel. Implementation of the plan would reach beyond the fire service, involving numerous airport departments and community partners, as well as state and Federal agencies. More importantly it would strengthen a key link in the national plan to protect the US population from a public health threat.

Future readers will have to weed through a plethora of information to determine what is necessary for their respective plan. This may be the most difficult part of the process, as there continues to be new literature put out on this subject. The information continues to evolve, so ensuring the most up to date information is reviewed would also be a consideration to focus on. The best practices review and personal communications provides great insight into the details of any plan, so this is certainly an approach that is highly encouraged and provided a lot of value in this research. A final recommendation for future researchers is to prepare for the unexpected,

which will ultimately disrupt work on the project. Two major hurdles were encountered during this applied research project. The Fire Chief retired during difficult financial times, so the researcher was tasked to perform as the Deputy Fire Chief and Interim Fire Chief for the entire length of the project. Then tragedy struck the department when a popular Lieutenant committed suicide; which required attention for conducting an active duty funeral, along with addressing the emotional needs of the officer's family and department members.

References

- Airports Council International. (2009, April). *Airport preparedness guidelines for outbreaks of communicable disease*. Retrieved June 1, 2009, from http://www.airports.org/aci/aci/file/ACI_Priorities/Health/Airport%20preparedness%20guidelines.pdf
- Brigantic, R., Delp, W., Gadgil A., Kulesz, J., Lee, R., Malone, J.D. (2009, April). *U.S. airport entry screening in response to pandemic influenza: Modeling and analysis*. Retrieved May 26, 2009, from http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B7578-4W2M6SG-1&_user=10843&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000000150&_version=1&_urlVersion=0&_userid=10843&md5=44685b11dd53d74a8ef85a4f03e185f2
- Bush, George W. (2003a, February). *Homeland security presidential directive – 5: Management of domestic incidents*. Retrieved electronically on April 15, 2008 from <http://www.whitehouse.gov/news/releases/2003/02/20030228-9.html>.
- Bush, George W. (2003b, December). *Homeland security presidential directive – 8: National preparedness*. Retrieved electronically on April 15, 2008 from <http://www.whitehouse.gov/news/releases/2003/12/20031217-6.html>.
- Centers for Disease Control. (2000). *US public health entry screening of arriving international travelers at airports during an influenza pandemic*. Retrieved on June 3, 2009, from <http://www.cdc.gov/tw/public/Data/9111917301071.pdf>

- Centers for Disease Control. (2007, March). *Travel industry pandemic influenza planning checklist*. Retrieved on June 3, 2009, from <http://www.flu.gov/professional/business/travelchecklistpdf.pdf>
- Centers for Disease Control. (2009, March). *US public health entry screening of arriving international travelers at airports during an influenza pandemic*. Retrieved on June 3, 2009, from http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title42/42cfr71_main_02.tpl
- Congressional Research Service. (2009, May 4). *The 2009 influenza a (h1n1) outbreak: Selected legal issues*. Washington, DC: Government Printing Office. (NTIS No. PB2009110329)
- Delaney, J., Jr. (2008, March). *Fire fighters' ability and willingness to participate in a pandemic*. Monterey, CA: Naval Postgraduate School. (NTIS No. ADA479677)
- Department of Health and Human Services. (2005, November). *Pandemic influenza plan*. Washington, DC: Government Printing Office. (NTIS No. PB2006100788)
- Department of Homeland Security. (2008a, January). *National response framework* (FEMA Publication No. P-682). Washington, DC: U.S. Government Printing Office.
- Department of Homeland Security. (2008b, March). *Pandemic influenza preparedness, response, and recovery: Guide for critical infrastructure and key resources*. Washington, DC: U.S. Government Printing Office. (NTIS No. PB2007103646)
- Department of Transportation. (2006, December). *National aviation resource manual for quarantinable diseases*. Washington, DC: U.S. Government Printing Office.
- Detroit Metropolitan Wayne County Airport (DTW). (2009, March). *Communicable disease emergency response plan*. Detroit, MI: Author.

Federal Aviation Administration. (2003a, October). *Code of federal regulations title 42 part 70: Interstate quarantine*. Retrieved April 24, 2009, from

http://www.access.gpo.gov/nara/cfr/waisidx_03/42cfr70_03.html

Federal Aviation Administration. (2003b, October). *Code of federal regulations title 42 part 71: Foreign quarantine*. Retrieved April 24, 2009, from

http://www.access.gpo.gov/nara/cfr/waisidx_03/42cfr71_03.html

Federal Aviation Administration. (2004, May). *Code of federal regulations title 14 part 139: Certification of airports*. Retrieved April 24, 2009, from

<http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr;rgn=div5;view=text;node=14%>

Federal Aviation Administration. (2009a, May). *Airport planning for pandemic flu including h1n1*. Retrieved May 30, 2009, from

http://www.faa.gov/airports/airport_safety/certalerts/media/cert0912.pdf

Federal Aviation Administration. (2009b, June). *Airport emergency plan* (DOT Publication No. TD 4.8/5:150/5200-31 A). Washington, DC: U.S. Government Printing Office.

Federal Aviation Administration. (2009c, July). *Airport planning for pandemic flu including h1n1 update*. Retrieved July 28, 2009, from

http://www.faa.gov/airports/airport_safety/certalerts/media/cert0912.pdf

Federal Emergency Management Agency. (2002, June). *America at risk: America burning recommissioned*. Retrieved December 15, 2008, from

<http://www.usfa.dhs.gov/downloads/pdf/publications/fa-223-508.pdf>

Food and Drug Administration. (2006, May). *FDA's role in regulating ppe*. Retrieved August 23, 2009, from <http://www.fda.gov/cdrh/pppe/fdarole.html>

- Fort Lauderdale / Hollywood International Airport (FLL). (2009, June). *Communicable disease emergency response plan*. Hollywood, FL: Author.
- Government Accountability Office. (2007, August). *Influenza pandemic: Further efforts are needed to ensure clearer federal leadership roles and an effective national strategy*. Washington, DC: Government Printing Office. (NTIS No. PB2007112731)
- Greater Orlando Aviation Authority. (2008a). *GOAA downcraft exercise after action report*. Orlando, FL: Author.
- Greater Orlando Aviation Authority (MCO). (2008b). *MCO communicable disease emergency response plan*. Orlando, FL: Author
- Greater Orlando Aviation Authority. (2009). *Airport emergency plan*. Orlando, FL: Author.
- Heifetz, R. A., & Linsky, M. (2002). *Leadership on the line*. Boston, MA. Harvard Business School.
- Homeland Security Council. (2006, May). *National strategy for pandemic influenza implementation plan* (DHS Publication No. ADA447939). Washington, DC: U.S. Government Printing Office.
- Howitt, A. M., & Leonard, H. B. (2005). A command system for all agencies. *Crisis Response Journal, 1*, 40-42.
- International Air Transport Association. (2009, May). *Emergency response plan*. Retrieved May 31, 2009, from http://www.iata.org/NR/rdonlyres/1D412DF9-289B-4508-BE9D-A57C4A84F103/0/airlines_erp_checklist_v2.pdf

- International Civil Aviation Organization. (2007). *Guidelines for states concerning the management of communicable disease posing a serious public health threat*. Retrieved May 26, 2009, from http://www.icao.int/cgi/goto_m_med.pl?icao/en/med/avmedavianinfluenza.htm
- Kann, D. (2008). *Landing nims compliance at FAA class one airports*. Emmitsburg, Maryland: National Fire Academy, Learning Resource Center.
- Massachusetts Port Authority (BOS). (2008, December). *Communicable disease response plan*. Boston, MA: Author.
- Miami International Airport (MIA). (2007, December). *Public health communication response plan*. Miami, FL: Author.
- Miami International Airport (MIA). (2008a, February). *Communicable disease emergency response plan*. Miami, FL: Author.
- Miami International Airport (MIA). (2008b, October). *Risk-based border strategy dgmq aviation entry screening workshop*. Miami, FL: Author.
- National Fire Academy. (2005, October). *Executive development: Applied research self-study guide*. Emmitsburg, MD.
- National Fire Academy. (2009, January). *Executive analysis of community risk reduction student manual*. Emmitsburg, MD.
- National Fire Protection Association. (2004). *NFPA-1201: Standard for providing emergency services to the public*. Quincy, MA: Author.
- National Fire Protection Association. (2005). *NFPA-1581: Standard on fire department infection control program*. Quincy, MA: Author.

- National Fire Protection Association. (2007a). *NFPA-1500: Standard on fire department occupational safety and health programs*. Quincy, MA: Author.
- National Fire Protection Association. (2007b). *NFPA-1600: Standard on disaster emergency management and business continuity programs*. Quincy, MA: Author.
- Occupational Safety and Health Administration. (2007). *Guidance on preparing workplaces for an influenza pandemic* (OSHA Publication No. 3327-02N 2007). Retrieved on June 15, 2009, from http://www.osha.gov/Publications/influenza_pandemic.html
- Occupational Safety and Health Administration. (2009, May). *Pandemic influenza preparedness and response guidance for health care workers and health care employers* (OSHA Publication No. 3328-05R). Retrieved on June 15, 2009, from http://www.osha.gov/Publications/OSHA_pandemic_health.pdf
- Phoenix Aviation Department (PHX). (2009, May). *Isolation procedures*. Phoenix, AZ: Author.
- Sensenig, D., & Stambaugh, H. (2008). *Quarantine facilities for arriving air travelers: Identification of planning needs and costs*. Washington, DC: Transportation Research Board. (NTIS No. PB2008112846)
- State of Florida Department of Health. (2009, March). *Pandemic influenza appendix*. Retrieved on May 26, 2009, from http://www.doh.state.fl.us/rw_Bulletins/flpanfluv104final.pdf
- Turnbull, K. F. (2007, September 5-7). *Interagency-aviation industry collaboration on planning for pandemic outbreaks*. Washington, DC: Transportation Research Board. (NTIS No. PB2008112901)

- United States Fire Administration. (2006, December). *Pandemic influenza: Planning and preparation best practices model*. Retrieved electronically from http://www.health.gov.on.ca/en/public/programs/emu/pub/pan_flu/bp_us_fire_panflu.pdf
- Washington Dulles International Airport (IAD). (2009, April). *Communicable disease emergency response plan*. Washington, DC: Author.
- World Health Organization. (2005). *International health regulations*. Retrieved electronically on May 26, 2009, from http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf
- World Health Organization. (May, 2009) *Technical advice for case management of influenza a (h1n1) in air transport*. Retrieved electronically on May 26, 2009, from http://www.emro.who.int/csr/h1n1/pdf/air_transport_guidance.pdf

Appendix A

E-NET meeting synopsis - 04.28.09**1. DFW –**

- Changed EMS response procedures to international terminal
- EOC at Level 1
- 11:00 a.m. daily conference calls w/CDC & stakeholders – department responses
- Established Pandemic Steering Committee
 - Internal communications
 - External communications
- Conference calls
 - TSA
 - CDC
 - Airlines
 - Public Health
- Passing out fliers to PAX
- Updating DFW website & intranet site
- Communication Plan
 - Monitoring the situation (local, national, & international)
 - News Outlets
 - ALEAN
 - ENET
 - Processes in place (contingencies)
 - Ready to respond (first responders are trained to respond & handle)

2. BOS –

- Boston is working routinely, including medical responses unless triggered otherwise.
- Implemented a "Communicable Disease Response Plan"
- Airport community (stakeholders, etc.) meeting held daily
- Designated PFO from FEMA
- Public Health Task Force meetings held to raise awareness & synchronize preparedness actions
- Testing all systems and taking inventory
- Signage in restrooms as reminders
- Meetings with tenant cargo carriers, chief pilots, and cruise ship operators
- Boston Emergency Medical System Medical Intelligence Center provides daily information and a 24/7 medical command center
- State Emergency Management meetings to review action plans
- Multi lingual fact sheets and contact numbers are being distributed to tenants
- Fully integrated response system
- Unified command concept - identify, treat & transport
- Designated quarantine facility is an old terminal
- Cruise ships are quarantine facilities should there be a situation on the ship

3. SLC –

- Observing situation and operating "business as usual"
- Meeting with stakeholders
- Patient tracking through health department
- Looking to medical director for directions

4. HOU –

- Observing situation and operating "business as usual"
- Same processes utilized as those for SARS, Ebola, etc.
- Inbound international flights (with medical response call) - hold PAX and remove ill off aircraft to interview; if patient fits "profile" a CDC passenger locator form is distributed to all PAX
- CDC has jurisdiction on international PAX
- Domestic flights follow same; however, local public health officials have jurisdiction on PAX
- Decided against thermo imagers

5. SEA -

- Observing situation and operating "business as usual"
- Communicating information and PIO is managing information
- 24 hr. line with CDC
- Meeting with Operations group
- Draft response still pending

6. MSP -

- Observing situation and operating "business as usual"
- Quarantine station
- CDC to provide training
- Questions referred to state health website
- No reported cases in MSP

7. DTW -

- Observing situation and operating "business as usual"
- Quarantine station
- County has local protocol response for domestic flights
- Following CDC and county leads
- No symptomatic PAX

8. MIA -

- Observing situation and operating "business as usual"
- Pandemic response policy with CDC
- Respond with full PPE & masks when boarding aircraft

9. POP -

- Observing situation and operating "business as usual"
- Following county emergency management protocols
- Enforce PPE
- No symptomatic PAX

10. ORD -

- Observing situation and operating "business as usual"
- Notify CDC if suspected illness
- Connecting flights are a concern
- No symptomatic PAX

11. DIA -

- Observing situation and operating "business as usual"
- 2 tiered response with private hospitals
- Meetings every morning
- Stressing hygiene awareness
- Eye protections and masks utilized
- 6 ft. distance established until situation with patient is assessed
- 2 flights yesterday from Mexico; 1 incorrectly identified as H1N1

12. LAS –

- Observing situation and operating "business as usual"
- Experienced call from pilot on flight from HI yesterday that became out of control
 - TSA asking questions

Appendix B

Centers For Disease Control Communicable Disease Emergency Response Plan Template

Guidelines for Preventing the Introduction, Transmission, and Spread of Communicable Diseases from Foreign Countries into the United States

Due to the sensitive nature of this information a copy of the CDC Communicable Disease Emergency Response Template can not be made readily available in this document. If you would like to obtain a copy, please send requests to CDC Miami Division of Global Migration and Quarantine Commander, Kirstin Warwar via telephone at (305) 526-2910, or electronically at kwarwar@cdc.gov. For additional assistance you can also contact Orlando International Airport Fire Chief, Duane Kann, at (407) 825-3022, or via electronic mail at dkann@goaa.org.



This guide provides general advice, sample information, and recommended planning elements for developing a port communicable disease emergency response plan. Quarantine Stations are encouraged to plan above and beyond these basic standard elements and to tailor port plans to local protocols and requirements.

Appendix C

Airport Pandemic Status

This survey is designed to obtain a general overview of the E-Net airports' status during a pandemic, and to collect existing plans regarding pandemic operations designed specifically for an E-Net facility.

1. Is there a Center For Disease Control (CDC) quarantine station located at your airport?

- No
 Yes

2. How many international passengers ARRIVE at your airport annually?

- Do not receive international passengers directly
 Less than 1 Million
 1 Million to 3 Million
 Over 3 Million

3. Does your airport currently have an written Pandemic Plan?

- No
 In Progress
 Yes - If yes, please provide a copy to dkann@goaa.org

4. Has your airport conducted a pandemic operation exercise?

- No
 In Planning
 Yes - If yes, please provide any After Action Reports to dkann@goaa.org

Appendix D

E-NET
Index E Airport Network

Airport	Name	City	State	Phone	E-mail
ATL	Slaughter, Randall (Dep. Fire Chief)	Atlanta	GA	(404) 559-6161	Randall.Slaughter@atlanta-airport.com
BOS	Donahue, Robert	Boston	MA	(617) 561-3403	rdonahue@massport.com
DFW	McKinney, Brian (Fire Chief)	DFW Airport	TX	(972) 574-5560	bmckinney@dfwairport.com
DEN	Cook, Angela (ARFF Div. Chief)	Denver	CO	(303) 342-4349	angela.cook@flydenver.com
DTW	Carnell, Craig	Detroit	MI	(734) 247-7089	craig.carnell@wcaa.us
FLL	Kronheim, Kenneth (Dist. Fire Chief)	Fort Lauderdale	FL	(954) 635-3301	kenneth_kronheim@sheriff.org
IAD/DCA	Waddy, Malcolm (AFC)	Washington	DC	(703) 417-8573	malcolm.waddy@mwaa.com
IAD/DCA	Mesaris, Gary (Fire Chief)	Washington	DC	(703) 417-8237	gary.mesaris@mwaa.com
IAH	McAteer, George	Houston	TX	(281) 233-7939	george.mcateer@cityofhouston.net
IAH	Krusleski, Ron (Asst. ARFF Coord.)	Houston	TX	(281) 233-7935	Ronald.krusleski@cityofhouston.net
LAS	Hutfilz, William (ARFF TO)	Las Vegas	NV	(702) 261-5353	billh@mccarran.com
LAX	Greenup, Michael (Battalion Chief)	Los Angeles	CA	(213) 485-6274	michael.greenup@lacity.org
MIA	Bas, Pedro (ARFF Chief)	Miami	FL	(305) 876-7575	bas@miamidade.gov
MCO	Kann, Duane (Deputy Chief)	Orlando	FL	(407) 825-3022	dkann@qoaa.org
MSP	Burke, Dave (Fire Chief)	Minneapolis	MN	(612) 726-5435	david.burke@mspmac.org
ORD	McNicholas, John (District FC)	Chicago	IL		John.McNicholas@cityofchicago.org
ORD	Wagner, Tom (Training Officer)	Chicago	IL	(773) 894-5060	twagner@ohare.com
PDX	Callicotte, Craig	Portland	OR	(503) 460-4631	craig.callicotte@portofportland.com
PHL	Flanagan, Paul (Deputy Chief)	Philadelphia	PA	(215) 937-7930	paul.flanagan@phl.org
PHX	Hendel, Elizabeth (Deputy Chief)	Phoenix	AZ	(602) 534-9999	elizabeth.hendel@phoenix.gov
SEA-TAC	Krause, Randy (Fire Chief)	Seattle	WA	(206) 787-7399	krause_r@portseattle.org
SFO	Sullivan, Dave	San Francisco	CA		dsullivan@sfgov.com
SLC	Thomas, Jeffrey (Fire Chief)	Salt Lake City	UT	(801) 531-4515	jeffrey.thomas@slcgov.com

Appendix E

Airport Pandemic Status

1. Is there a Center For Disease Control (CDC) quarantine station located at your airport?

	Response Percent	Response Count
No <input type="checkbox"/>	38.9%	7
Yes <input type="checkbox"/>	61.1%	11
answered question		18
skipped question		0

2. How many international passengers ARRIVE at your airport annually?

	Response Percent	Response Count
Do not receive international passengers directly	0.0%	0
Less than 1 Million <input type="checkbox"/>	27.8%	5
1 Million to 3 Million <input type="checkbox"/>	33.3%	6
Over 3 Million <input type="checkbox"/>	38.9%	7
answered question		18
skipped question		0

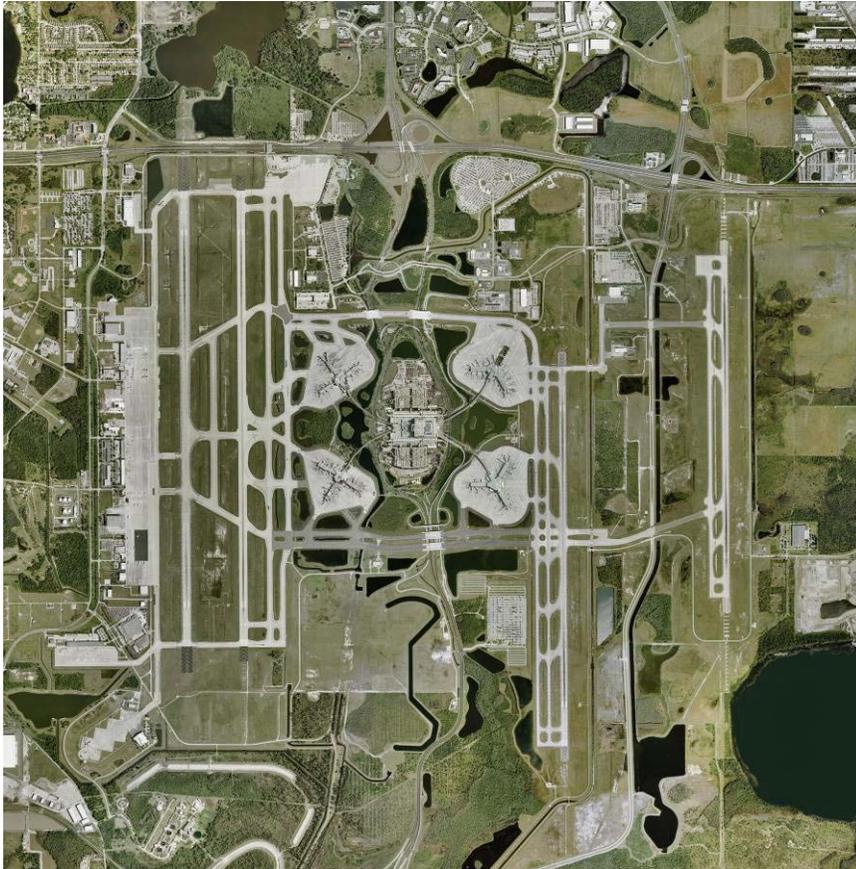
3. Does your airport currently have an written Pandemic Plan?

	Response Percent	Response Count
No <input type="checkbox"/>	5.6%	1
In Progress <input type="checkbox"/>	55.6%	10
Yes - If yes, please provide a copy to dkann@goaa.org <input type="checkbox"/>	38.9%	7
answered question		18
skipped question		0

4. Has your airport conducted a pandemic operation exercise?		Response Percent	Response Count
No	<input type="text"/>	33.3%	6
In Planning	<input type="text"/>	44.4%	8
Yes - If yes, please provide any After Action Reports to dkann@goaa.org	<input type="text"/>	22.2%	4
answered question			18
skipped question			0

Appendix F

ORLANDO INTERNATIONAL AIRPORT(MCO)
AIRPORT EMERGENCY PLAN(AEP)
HAZARD SPECIFIC SECTION
PUBLIC HEALTH THREAT



This plan contains Sensitive Security Information that can not be made readily available in this document. If you wish to obtain a copy of the MCO AEP *Public Health Threat*, contact Orlando

International Airport Fire Chief Duane Kann at (407) 825-3022, or dkann@goaa.org.