Crisis in the Sky: A Case Study in Failed Communications at the Center for Disease Control (CDC)

Introduction

In May of 2007, Andrew Speaker, an American citizen who had been informed that he may have a drug resistant form of tuberculosis (XDR-TB) traveled abroad to Rome against the advice of his local health department and the Center for Disease Control and Prevention (CDC). During his travels and time abroad, Mr. Speaker had the potential to expose and potentially infect thousands of people with this strain of TB thus creating a public health crisis.

How is it that this crisis occurred? Where was the breakdown in communication? Did the agencies involved have the authority to keep Speaker from traveling and what influence could they use to keep the infection at bay?

Our analyses will explore the string of events in this case and will provide further recommendations for avoiding similar crises in the future.

Background Information on Tuberculosis and Air Travel

In the article *Diagnosis and Treatment of Drug-Resistant Tuberculosis*, Dr. Neil Schluger notes that tuberculosis (TB), primarily caused by a bacterium spread through airborne respiratory droplets, is a contagious disease that is so common that it is now considered a global pandemic. In fact, the author states that one third of the world's population is infected with TB primarily due to increase in Human Immunodeficiency Virus (HIV) cases, poverty and increased crowding. Because it takes prolonged exposure to contract the disease, many people are undiagnosed and can unknowingly expose others to it. Indeed, as the article *Dealing With Threat of Drug-Resistant Tuberculosis: Background Information for Interpreting the Andrew Speaker and Related Cases* reports, TB comes in after HIV as the second largest for adult mortality and accounts for two million deaths worldwide annually (Sampathkumar 2007).

Schluger further reports that although most cases of TB are pulmonary, TB can also infect any organ but is spread only when an individual has active pulmonary TB. Coughing, sneezing, and talking can aerosolize the bacterium placing others at risk of contacting the disease. Individuals with a healthy immune system can wall off the bacterium resulting in latent disease. If this happens they will not have symptoms and will not be contagious. There is the possibility that they can develop disease years later. However, individuals with active disease will develop symptoms.

In terms of treatments, Schluger notes that TB can be treated using multiple antibiotics. This is further supported with current estimates indicating that 95% of patients with drug-sensitive TB are cured. Despite this, there are increasing cases of drug resistant TB worldwide that fall into two main categories- -drug resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) – whose treatment of these types of TB should be managed by an expert in treating resistant TB (Sampathkumar 2007).

Since it has become a global pandemic, there is growing concern about the increasing spread of the drug resistant types of TB. The treatment of nonresistant TB is difficult at best requiring three medications for six to nine months given by direct observed therapy. It becomes more complex with MDR-TB and XDR-TB requiring four or more second line medications with treatment up to 2 years and possible surgery. These second-line drugs are inherently less effective, often poorly tolerated by patients, and much more expensive (Schluger 2008). The success rate in treating MDR-TB in clinical settings is around 50%. Her article indicates that out of the 49 XDR-TB patients treated in the United States between 1993 and 2006, 12 have died and 12 have been lost to follow up (Sampathkumar 2007).

MDR and XDR-TB are not more contagious than other types of TB. However, MDR and XDR-TB are more dangerous than other types of TB because there are few (or no) drugs that can successfully treat them. Further, resistant TB has higher complication rates and higher death rates than nonresistant TB. As a result, given that the disease has become a global pandemic with complicated treatments, when the risk of exposure and transmission among individuals becomes an important public health concern than federal and state governments have authority to intervene if an individual is felt to be a threat to others (Sampathkumar 2007).

According to the Public Health Service Act, the Center for Disease Control and Prevention (CDC) (acting as an agent of the Department of Health and Human Services) has the right to "apprehend, detain, and forcibly examine person to prevent certain communicable diseases (specified by the President) from entering the country or traveling across state lines." TB is one of the diseases covered in this act.

Given that TB is primarily spread through respiratory air droplets, the transmission of TB via air travel is thus an important public health concern. Because of reports of TB transmission, including MDR-TB aboard aircrafts, the World Health Organization republished *Tuberculosis and Air Travel: Guidelines for Prevention and Control* in 2006 to address current public health risks and reflect new changes in international collaboration for public health safety. In this document, WHO notes that while it is a common misperception by airline passengers that poor air quality on airplanes makes them breeding grounds for microorganisms; recirculation systems on airplanes, in fact, lead to air quality that is better than that of similarly closed-in spaces. While TB, including MDR-TB, has been shown to be spread on airplanes, in each case, spread occurred between passengers sitting within two rows of each other. Additionally, other factors also influence the risk of transmission including:

- The infectiousness of the TB patient;
- The length of exposure to the TB patient; and,
- Seating proximity to the TB patient

Given the concern of possible transmission of TB on airline flights, the 2006 guidelines published on TB and air travel, has also recommended that passengers who are later confirmed to have been seated next to an infected person on a long flight (such at the transatlantic flights that Mr. Andrew Speaker took) be contacted, notified, and screened for possible infection (WHO 2006).

In this case, Mr. Andrew Speaker, the passenger in discussion, took at total of seven transatlantic flights to reach his final destinations in Greece and North America, while diagnosed to be

infected with MDR-TB (Refer to Appendix 3). A recap of the events in the following section details Mr. Speaker's diagnosis and travels and the public health crisis he generated in exposing at the very least 500 passengers to MDR- TB.

Key Players in the 2007 Tuberculosis Scare

The Centers for Disease Control and Prevention (CDC) as well as local and international public health organizations played important roles in the management of this crisis. We have focused on the role of the CDC because of their involvement at the local, national, and international levels. Given the CDC's relationship with public health agencies at every level of this crisis, they had the unique opportunity and responsibility to prevent and manage this crisis from beginning to end. Our specific focus is on the role of the CDC's communication with other agencies in the development and resolution of this crisis.

Centers for Disease Control and Prevention (CDC): www.cdc.gov

The Centers for Disease Control and Prevention (CDC) is a part of the United States Department of Health and Human Services and has been in existence for 60 years. The CDC's top organizational components include the Office of the Director, six Coordinating Centers and Offices and the National Institute for Occupational Safety and Health (Refer to Organizational Chart in appendix 1). Each of the center's 6 divisions works with internal and external partners to improve public health.

CCID—Coordinating Center for Infectious Diseases:

The Coordinating Center for Infectious Diseases (CCID) of the CDC was a key player in handling Andrew Speaker's tuberculosis case. The mission of the CCID is to "protect health and enhance the potential for full, satisfying and productive living across the lifespan of all people in all communities related to infectious diseases." The CCID's new structure was on approved March 23, 2007. One of the programs in this new structure is the National Center for Preparedness, Detection and Control of Infectious Diseases (NCPDCID).

One of the main focuses of the National Center for Preparedness, Detection and Control of Infectious Diseases (NCPDCID) is "improving preparedness and response capacity for new and complex infectious disease outbreaks." The NCPDCID works in collaboration with the Coordinating Center for Infectious Diseases (CCID), CDC, and the agency's national and global partners to conduct, coordinate, and support infectious disease surveillance, research, and prevention.

DTBE—Division of Tuberculosis Elimination

The Division of Tuberculosis Elimination (DTBE) also focuses on matters related to this case. Their mission is to "promote health and quality of life by preventing, controlling, and eventually eliminating tuberculosis from the United States, and by collaborating with other countries and international partners in controlling tuberculosis world-wide." This division is housed within the CCID, but under the National Center for HIV/AIDS, Viral Hepatitis, STD & TB Prevention.

World Health Organization (WHO): www. who.int
The World Health Organization, headquartered in Geneva, Switzerland, is an 8,000 member staff compromised of doctors, public health experts and administrators in over 147 country offices and six regional offices worldwide. It is the "directing and coordinating authority on international health within the United Nations' system." Among its many duties, WHO experts produce health guidelines and standards such as the International Health Regulations to improve health security and prevent the spread of infectious diseases like tuberculosis. The overall mission of the World Health Organization is for member nations and governments to cooperatively tackle global health problems to improve the well-being of the global population.

Public Health Crisis –Recap of the Actual Event

In a compiled account of news stories from www.cnn.com and www.nytimes.com, 31- year old Andrew Speaker embarked on a multiple country trip that could potentially have exposed a large number of people to a drug resistant strain of Tuberculosis in May 2007, approximately two months after the CCID was restructured. Mr. Speaker was first diagnosed with Tuberculosis in January of 2007. This initial diagnosis was based on a chest x-ray that was preformed for a rib injury he sustained from a fall. The x-ray showed an abnormality in his right lung suggestive of TB. Diagnosis of TB is generally based on cultures that take six to eight weeks to grow. In March 2007, Mr. Speaker's lab cultures revealed that he was in fact infected with TB. At the time of the initial diagnosis, Mr. Speaker did not have any symptoms. Mr. Speaker's personal physician contacted the local health department (Fulton County, Georgia) in April of 2007 to inform them of Mr. Speaker's diagnosis and that Mr. Speaker was prescribed standard drug treatment. In response, Fulton Country Health officials began the work up for Multiple Drug Resistant TB (MDR-TB). On April 25, 2007, Mr. Speaker advised his health department physician that he had plans to travel overseas though he did not give this physician specific details about his itinerary. Five days later (on April 30th, 2007), Mr. Speaker's preliminary lab cultures indicated MDR-TB. On May 10, 2007 Fulton County health officials determined that Mr. Speaker indeed likely had MDR-TB. That same day a private family meeting was held at Mr. Speaker's personal physician's office with Fulton County health officials present. At this point, Speaker was told to stop taking his medication since it was not effective against this type of TB and the CDC was contacted. (It is of note that the CDC timeline indicates that CDC was given a patient sample for susceptibility testing on April 27th.) There is some confusion about when Mr. Speaker was advised that he should not travel. According the CDC timeline, the advisement was given on May 10, 2007. However, the Congressional timeline indicates that Mr. Speaker was not given this information until May 11th.

After their May 10th, 2007 meeting with Andrew Speaker, the Fulton County Health Department began reviewing legal options for restricting patients' travel and consulted with the CDC about specific legal options pertaining to suspected MDR-TB.

Andrew Speaker had plans to travel to Europe for his wedding prior to being diagnosed with TB. Upon being advised by health officials that they would prefer that he not travel, Mr. Speaker changed his travel plans and left for Europe on May 12th instead of his originally scheduled travel date of May 14th. On May 12th Speaker left Atlanta for Italy traveling on 5 flights. Some accounts of the time line differ. However, it appears that at the same time that Mr. Speaker was traveling, the CDC was attempting to formally contact him with written travel restrictions.

Fulton County Health Officials were also attempting to hand deliver a directive telling him not to travel.

On May 17th, 2007 samples previously taken from Speaker were tested for XDR-TB. Concurrently, the CDC was notified that Speaker had already begun his travels overseas. The preliminary tests came back positive for XDR-TB on May 21st or 22nd (timelines vary) 2007. On May 22nd the CDC division of Global Migration and Quarantine contacted the Atlanta office of Customs and Border Protection (CBP). CBP was advised that Speaker was a public health risk and a message was attached to Mr. Speaker's passport. On May 24th, TSA was advised to prevent Mr. Speaker from boarding any US bound flights. A CDC colleague working with the Ministry of Health in Rome was contacted on May 23rd to discuss isolation and treatment options for Mr. Speaker. The CDC contacted Speaker in Rome on May 23, 2007 and told him to return to the United States. Some accounts of this case indicate that Mr. Speaker was told to turn himself into Italian Health Authorities on May 23rd and be placed in isolation for treatment for an indefinite period of time. Mr. Speaker later indicated that he feared that he would not be treated successfully unless he was treated at the hospital in Denver.

Response Plan CDC Used in This Crisis

As reported in the New York Times article *Tangle of Conflicting Accounts in Patient's Odyssey*, there was confusion about what was exactly communicated to Speaker in Rome but it is clear that he was given conflicting information by CDC. It seems that Mr. Speaker was given at least 3 different messages:

- Tools are available to the CDC to keep him from flying into the US;
- He should turn himself into the Italian health authorities;
- A private jet into the US would cost $100,000 while CDC could arrange travel and charge Speaker $50,000.

Being told that he would have to pay for his own private travel back into the US was an error because in fact he would not have had to pay for the private jet as outlined in *Paragraph 1*, *Article 40* of the *International Health Regulations* which state that state parties should not be charging for appropriate isolate and quarantine requirements to protect public health (WHO 2005). We believe that in order to bypass the expense of chartering a private plane and fully aware that he had been placed on the "no-fly list", Mr. Speaker chose to enter the United States by way of Canada on May 24th, 2007. However, in fact, Mr. Speaker's name did not actually make it onto the no-fly list until 2 hours after he arrived in Canada.

According to the New York Times *Article Agent at Border, Let in TB Man*, the asymptomatic Andrew Speaker was not detained by the US border custom agents because he did not "look sick" despite his passport being flagged with isolation instructions (Altman 2007). The National Targeting Center sent notification that Mr. Speaker had arrived into New York to the CDC on May 25th, 2007. Speaker then checked himself in to a New York hospital where he was put in isolation. The CDC continued isolation, when he was flown by the CDC to Atlanta, and then to National Jewish Hospital in Denver. He was transferred to the National Jewish Hospital as it specializes in TB treatment, and he remained there in isolation while he received treatment for months.

The New York Times article *Tangle of Conflicting Accounts in Patient's Odyssey* also reports that that the Italian Ministry of Health and the World Health Organization were not notified about Mr. Speaker's case until May 24th- after Mr. Speaker had left Europe (Schwartz 2007) when in fact *Article 9* of the *2005 International Health Regulations* specifically indicate that States Parties shall, as far as practicable, inform WHO within 24 hours of receipt of evidence of a public health risk identified outside their territory that may cause international disease spread (WHO 2005)." Similarly, the Department of Health and Human Services did not provide formal International Health Regulations notification until May 25th.

Mr. Speaker created a public health crisis because he crossed international borders after being preliminarily diagnosed with MDR-TB. An examination of the outbreak of SARS offers an example of what a worst case scenario might have looked like in the Andrew Speaker case. The SARS virus, which is a non-typical pneumonia, was spread globally by airplane passengers who traveled while infected with the disease. A superspreading event occurred on at least one flight during the SARS outbreak. On this particular three hour flight from Hong Kong to Beijing, 22 passengers were infected with SARS. Estimates of the number of secondary SARS infections resulting from passengers on this flight are upwards of 300. This SARS case was particularly unique in that this was a relatively short flight and passengers seated as many as 7 rows away from the infected passenger contracted the virus. The article *Transmission of Infectious Disease during Air Travel* suggests that possible explanations for the widespread transmission on the flight include airborne (as opposed to direct contact) transmission, a faulty air circulation system, and transmission occurring before or after the actual exposure (Mangili and Gendreu 2005). Whatever the reason for widespread transmission in this particular case, it is a clear demonstration of the damage that one airline passenger traveling with an infectious disease can cause.

Mr. Speaker's extensive travel also had the potential to expose a large number of people to this infectious disease during his extensive international travel. Public Health Agencies, especially the CDC and Fulton County health officials, had the responsibility to ensure that everything possible was done to protect the public from such exposure. This incident later resulted in extensive public panic due to high media coverage and inconsistent government accounts. Our thesis is that the mishandling of this situation was due to communication problems between the CDC and other important partners (e.g., Mr. Speaker, local health department, other federal agencies, and international health organizations) as well as legal constraints restricting the CDC's ability to act in the best interest of the public.

Communication Challenges Faced During the Crisis

One of the major problems in this crisis was ineffective communication between the CDC and multiple stakeholders. Various accounts of the Speaker case indicate that the CDC was first notified about Mr. Speaker's case when they were contacted by the Fulton County Health department on May 10th, 2007. Given the fact that Andrew Speaker had plans to leave the country on May 14th (which he later moved up to May 12th), the CDC had very little time to act. Communication problems occurred on four critical levels during this crisis

Between health officials (CDC and Fulton County) and Mr. Speaker

As noted above, though Andrew Speaker was advised not to travel, all indications are that he was not expressly prohibited from travel. The Fulton County Health Department later attempted to hand deliver a written warning to Mr. Speaker out of concern that he would still leave the country. During their attempt to deliver the statement, the Fulton County Health Department learned that Mr. Speaker had moved up his travel plans and had already left the country. The urgency with which Fulton County Health officials originally communicated their concerns to Mr. Speaker around traveling by air remains unclear. Further, once Mr. Speaker was contacted in Rome, he was given conflicting (and inaccurate) information from the CDC about his options for treatment and travel back to the United States.

Between the CDC and the Fulton County Health Department

It is not clear whether the CDC and the Fulton County Health department worked to create a coordinated message to deliver to Mr. Speaker when he was visited by the Fulton County Health department. It is also unclear whether the Fulton County Health department knew that they had the authority to restrict air travel. The CDC timeline of the Speaker case indicates that the Fulton County Health Department began investigating options for travel restrictions and consulted with the CDC about this issue on May 10th. However, Mr. Speaker left the country on May 12th. The Fulton County Health Department should have immediately contacted the Georgia Division of Public Health and the Center for Disease control to clarify public health authority and determine a course of action.

Between the CDC and other federal partners;

It does not appear that the Department of Homeland Security (through Customs and Border Patrol) was contacted by CDC about this case until more than a week after the CDC became aware of Mr. Speaker's case. The Transportation Security Administration (TSA) was not contacted by CDC about restricting air travel until May 24th the same day he left Europe. Neither are there records that the CDC made an effort to contact the airlines and airports Mr. Speaker utilized. As reported in the New York Times article *Tangle of Conflicting Accounts in Patient's Odyssey*, congressional testimony offered by Dr. Julie Gerberding, the Director of the CDC at the time, gives some insight into the lack of urgency in contacting federal partners in an effort to restrict travel "the CDC's experience with TB patients suggested that in most cases, patients work cooperatively with the CDC to obtain treatment and that quarantine and isolation measures are rarely needed (Schwartz 2007). "

Between the CDC and international partners.

Once it was clear that Mr. Speaker had plans to travel abroad, there were several international public health partners that should have been contacted by the CDC and involved in the management of this crisis. However, the CDC timeline indicates that WHO and the Italian Ministry of Health were not contacted until after Mr. Speaker had already left Europe. Similarly, formal International Health Regulations notification was not made until after Mr. Speaker had returned to the United States.

Other Challenges Faced During the Crisis

Legal impediments to the effective management of the Andrew Speaker case

Travel by any person who has a contagious infectious disease is of concern not only for the passengers on the plane, train, or bus, but any individuals the infected person comes in contact with such as other passengers in terminals, taxi drivers, and staff of hotels and restaurants. Travel can create a vector for mass dissemination of a particular disease as was demonstrated with the SARS outbreak in 2003.

Each state has the authority to compel isolation and quarantine within that state's borders. This authority is a result of each state's "police power" which allows the state to create laws and regulations which protect the health, safety, and welfare of its residents. However, there is a great deal of variation among state and local laws regarding compelled quarantine and isolation. Thus, there is no standard method for restricting movement for patients with infectious disease at the state level.

The federal government also has the power to compel isolation and quarantine. The Public Health Service Act specifies that the Secretary of Health and Human Services is authorized by Congress to "prevent the introduction, transmission or spread of communicable diseases from foreign countries into the United States or possessions, or from one State or possession into any other State or possession." The Secretary may enforce this regulation through apprehending, detaining or conditionally releasing persons who may be infected by one of the communicable diseases covered under this act. TB is one of the diseases covered under the Public Health Service Act. As of the year 2000, some of this authority was given by the Secretary to the Director of the CDC (Swendiman and Jones 2008). Specifically, the authority to enforce interstate and foreign quarantine measures now belongs to the CDC's Division of Global Management.

The Department of Health and Human Services (DHHS) works with federal as well as state organizations to manage potential pubic health crises. For example, DHHS and the Department of Homeland Security (DHS) entered into a memorandum of agreement in 2005 that outlines specific measures of cooperation to be followed by both offices for matters concerning quarantine and other public health issues. In particular, three of DHS's agencies have been assigned the responsibility of assisting DHHS in enforcing quarantine rules. These agencies are Custom and Border Protection (CBP), US Immigration and Customs Enforcement, and the US Coast Guard. Similarly, while DHHS has some authority related to quarantine and isolation, it is understood that primary authority for these matters remains at the state level as a part of local police regulations.

Effective management of infectious disease spread requires a great deal of cooperation between state, local, and federal government. State and local governments retain the primary responsibility for enforcing isolation and quarantine measures within their boundaries. However, the federal government has responsibility to prevent spread between states and to prevent the introduction of infectious disease from foreign countries. In some instances, federal, state and local government have separate but concurrent legal isolation and quarantine authority.

The case of Andrew Speaker highlights the weaknesses of federal quarantine and regulation authority. As is specified above, the CDC has specific authority with respect to preventing communicable diseases from entering into the country. However, the law does not specify what

(if any) authority the CDC has with respect to preventing communicable diseases from leaving the country (Swendiman and Jones 2008). Related weaknesses were also apparent during the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak when CDC officials struggled to locate and contact airline passengers who might have been exposed to the virus while traveling. Moreover, given that Mr. Speaker was out of US borders at the time the isolation orders were issued, the Public Health Service Act does not indicate as to whether these federal laws remain applicable to US citizens outside of US boarders.

As was demonstrated in the CDC's response to this crisis, the CDC does have systems in place to help prevent individuals with specific infectious diseases from entering the country such as flagging passports and placing individuals on the "no fly list." However, the CDC has limited (if any) authority in preventing individuals with specific infectious diseases from entering into other countries and in enforcing US Public Health laws outside of the United States. Thus, the CDC's best chance at preventing spread once Mr. Speaker left the United States was to alert international partners and to include them early in the process as noted in the International Health Regulations. Unfortunately, this did not happen. Similarly, the lack of clarity about what travel restrictions were available to the Fulton County Health Department and confusion about jurisdiction between Fulton County and CDC as well as the lack of involvement by the State of Georgia health department prevented timely response to the initial crisis,

Flaws in International Public Health System

Following numerous reports of tuberculosis exposure on aircrafts and the emergence of multi-drug resistant TB in the early 1990's, The World Health Organization published the first set of international guidelines and recommendations on dealing with the risk of transmission of tuberculosis through air travel. These were revised by the World Health Organization, and provides "a legal framework for a more effective coordinated international response to emergencies caused by outbreaks of infectious diseases" including tuberculosis (WHO 2006). The guidelines were supposedly meant to strengthen the public health power of WHO and of national public health authorities in this domain and were scheduled to take effect on June 15, 2007, worldwide and July 17, 2007 in the US (Tannes 2007). Because the Speaker incident occurred two months prior to these regulations taking into effect in May 2007, CDC was unfamiliar with their isolation and quarantine authority and were in essence at a loss, in terms of dealing with the "operational logistics (Schwartz 2007)." These were the primary reasons that Dr. Julie Gerberding, director of the CDC, was cited in failing to immediately notify international partners including the World Health Organization of Mr. Speaker's case. Furthermore, in the June 9, 2007 issue of the British Medical Journal, Dr. Mario Raviglione, director of the Stop TB Programme at the World Health Organization, acknowledged the role that these regulations could have played in preventing Mr. Speaker's travels had they been in effect. At the time of this incident, the World Health Organization was held back by the lack of a coordinated information and communication system that was not yet in place.

Recommendations for the CDC

Given the challenges noted in the aforementioned section, we offer the following general recommendations to improve the CDC's response and to prevent cases like Andrew Speaker's from happening in the future:

1) Local health departments should start working with CDC as soon as drug resistant TB is suspected

The CDC timeline indicates that a patient sample was sent to the CDC for susceptibility testing on April 27th and that the Georgia Public Health Laboratory received preliminary results indicating Mr. Speaker may have MDR-TB on April 30th. However, the Fulton county health department did not start working with CDC to restrict Mr. Speaker's travel until May 10th. In the future, we suggest that the CDC and the local health department begin working together on issues related to protecting the public (e.g., isolation, travel restrictions and treatment) and in communicating with the patient as soon as MDR or XDR-TB is suspected (e.g., as soon as samples are sent for testing). In this case, had the CDC and Fulton county begun working together on April 30th, they would have had significantly more time to put systems in place to restrict Mr. Speaker's travel.

2) Once someone is suspected of being infected with drug resistant TB, travel restrictions should immediately be put into place and should not be lifted until the person is confirmed not to be contagious or to not have drug resistant TB

This case highlights the problems of waiting until test results are confirmed to put travel restrictions into place. In this instance, there was confusion among the CDC and Fulton County about what power each agency had to restrict travel and about who had jurisdiction when in fact, as noted in the article *TB Patient Travel May Have Been Illegal*, Georgia TB law had the authority to require that Speaker be confined for two weeks and only allowed travel for medical appointments. A court confinement order can isolate a patient only after the infected patient ignores medical advice but this method can be overridden by a declaration of public health emergency by the governor of Georgia (United Press International 2007)." During the time in which these matters were being sorted, Mr. Speaker changed his travel plans and snuck out of the country. In the future, we suggest that travel restrictions be put into place as soon as MDR or XDR-TB is suspected. Further, CDC should work with each state to determine the appropriate course of action (based on each state's laws and statutes) in the case that travel restrictions due to suspicion of infectious disease become necessary. We do not believe it is prudent to rely on patients to voluntarily submit to travel restrictions.

3) Federal partners (e.g. DHS and TSA) including airline and airports should be contacted as soon as MDR or XDR-TB is suspected so that travel restrictions can be immediately enforced

Mr. Speaker was able to leave and re-enter the country, in part, because CDC did not involve federal partners nor the airlines and airports in the process early. In fact, though a message was placed on Mr. Speaker's passport, he was not placed on the no-fly list until after he returned to North America. We suggest that relevant federal partners including airlines and airports be contacted and provided with the patient's itinerary as soon as a patient is suspected to have MDR or XDR-TB so that travel restrictions can be immediately put into place and enforced by federal law enforcement. Further, we suggest that CDC put considerable effort into training federal partners about infectious disease and the importance of isolating patients who are identified at federal check points.

4) The CDC must implement and adhere to the procedural guidelines outlined in the International Health Regulations and immediately notify the World Health Organization and other International public health partners as soon as it is believed that a person suspected to have MDR or XCR-TB or any other infectious disease may have plans to travel internationally

As noted in the September 2007 report by the Committee on Homeland Security, CDC did not comply with the requirements set forth by the International Health Regulations. It appears, from the timelines of this event, that the World Health Organization and the Italian Ministry of Health were not notified about Mr. Speaker's case until he had already returned to North America – almost two weeks after they were aware of Mr. Speaker's case. These international partners, had they been notified as soon as Mr. Speaker was suspected of having MDR-TB, could have helped in locating and isolating Mr. Speaker once he entered Europe. Further, they may have been able to work with foreign airlines and customs offices to prevent Mr. Speaker from entering into Europe. We suggest that the CDC follow the procedural guidelines outlined in the IHR and contact WHO and relevant IHR focal points as soon as they are aware that an infected person has plans to travel internationally.

5) The CDC should put considerable research dollars into investigating whether rapid MDR and XDR-TB testing should be implemented in the United States

In compliance with *Article 13, Paragraph 1* entitled *Public Health Response* of the *International Health Regulations*, CDC must put forth every effort to "maintain and strengthen response capacities" in preventing the spread of infectious diseases which include improving testing capabilities for these diseases (WHO 2005). The standard testing for TB is a long process due to the need to take and grow cultures for this slow growing microbacteria. The process can take up to a few months and in practice is technically challenging. In the case of Mr. Speaker, this contributed to the length of time between his initial diagnosis and the confirmation of drug resistant TB. Recent research has discovered diagnostic tools that can identify drug-resistant TB in as short as a few days. We suggest that the CDC spend significant time and research dollars investigating whether these rapid TB tests can be used effectively in the United States.

6) United States embassies worldwide should train employees to become health ambassadors for American citizens living or traveling abroad

We suggest that the CDC invest money in training employees of United States embassies worldwide to understand international health policies and infectious disease. These employees can serve as health ambassadors between affected United States citizens, the CDC, foreign health ministries and the World Health Organization. Since these individuals are already on-site in foreign countries and are under the jurisdiction of the government of the United States, they are uniquely qualified to serve as liaisons to all of the affected stakeholders in the case of international transmission of infectious disease.

7) The CDC should assume the role of lead agency in cases involving drug resistant TB

As was mentioned in an earlier section of this report, confusion about jurisdiction between local health officials and the CDC led to some of the confusion in the handling of this case. We suggest that the CDC assume the role of lead agency in cases involving drug resistant TB. The CDC should work closely with local health departments and the local health departments should stay heavily involved once they report suspected drug resistant TB to the CDC. However, the CDC, since they are already responsible for responding to inter-state and international transmission as well as treatment should assume the role of lead agency.

8) The World Health Organization should work on creating an automated and coordinated communications and information sharing system for increased communication among its member states

As it stands, the revised 2005 International Health Regulations put forth by the World Health Organization relies on "IHR Focal Points" to send urgent communications to other member states and their relevant partners. Although it is commendable that a communications system like this is now in place, we recommend that WHO work on utilizing information technology to improve urgent communications to different ports of entry of member states like airports, piers, etc. so as to increase the speed of urgent communication that consequently results in immediate action and prevention of the spread of infectious disease.

Benchmark Practices

The case of Andrew Speaker was one in a string of recent public health crises that highlighted the need for improved communication between local health departments and the CDC. Comparable recent outbreaks included:

- West Nile (1999),
- SARS (2003),
- Hepatitis A (2003), and,
- Monkey Pox (2003).

A review of these cases indicates that two lessons that apply to the Andrew Speaker case were apparent in these previous crises. First, effective and timely response to these crises is highly dependent on effective communication between local health departments and the CDC. Both agencies need to be involved in the crisis early and relevant staff from each agency need to be in constant communication throughout the life of the crisis. Second, staff and agency roles and responsibilities need to be clarified prior to an emergency happening. A great deal of the chaos in these crises is a result of lack of clarity about who is responsible for what (RAND 2005).

For SARS in particular, a report to the CDC regarding lessons learned and recommendations offered several suggestions that might have been helpful in managing the Andrew Speaker situation. These recommendations included the following:

- "Clear delineation of authority and responsibility for the various public health functions in an epidemic needs to be undertaken among federal, state, and local officials.
- Because political boundaries are not barriers to infections, regional coordination should be supported and increased among all agencies with public health functions, including departments of public health, health care providers and hospitals, law enforcement, federal and state emergency preparedness officials, and the legal system.
- Signing comprehensive international agreements for cooperation on public health and developing public health infrastructure should be a high priority for U.S. foreign policy. International agreements must be sufficiently flexible to permit a quick response to emerging infections and other public health emergencies.

- Public health laws need to be flexible enough to permit appropriate responses to new epidemics and new circumstances, and public health officials and professionals need to be familiar with the statutory and regulatory procedures for invoking their (or the governor's) authority for quarantine and isolation as well as the mechanisms to enforce directives.
- As noted in the report *Quarantine and Isolation: Lessons Learned from SARS* issued to the CDC, legal authority and public health strategies need to be in place for dealing with individuals who violate the law, and judges and law enforcement officials should be educated about the relevant enforcement provisions of public health laws. Studies need to be undertaken to determine if incentives or penalties promote compliance with quarantine (Institute for Bioethics, Health Policy and Law 2007).

Using past public health crises and lessons learned offers a template for improved response to any public health crisis that may occur. The details of the health issue may vary but the general plan should remain the same. A comprehensive plan will decrease errors and improve the overall response.

Summary

The Speaker case demonstrates the difficulties that can occur with unclear communication not only between individuals but in terms of who is responsible for what. This is complicated by the inherent difficulties that can occur with inter and extra agency coordination, unclear legal boundaries and the challenges of human behavior. It is important to take all of the lessons learned from this case and similar ones in order to implement a cohesive, well coordinated plan for responding to public health emergencies whether National or international. Plans for public health emergencies should be based on best practices, well-trained public health leaders and a public plan that that includes not only health organizations that may be affected but encompasses numerous agencies such as airlines, customs and border patrol. This plan should have appropriate laws in place to enable organizations to respond but also protect individual legal rights. Risks of public health issues will continue to occur due to globalization and this incident should be viewed a an opportunity to further develop a coordinated approach to public health issues. We are confident every effort to implement the aforementioned recommendations at the local, state, federal and international levels will lead to a more timely and coordinated response in future cases that will protect public health in the United States and abroad.

References

1. Altman, L (2007). Agent at border, let in man with TB. *The New York Times*. Retrieved from http://www.nytimes.com/2007/06/01/health/01tb.html?_r=1 on October 30, 2008.

2. Center for Disease Control (2004). Fact sheet on legal authorities for isolation and quarantine. Retrieved from http://www.cdc.gov/ncidod/sars/factsheetlegal.htm on January 29, 2009.

3. Center for Disease Control and Preparation (2007). Flight itinerary of US traveler with extensively drug resistant tuberculosis (XDR –TB). Retrieved from http://www.cdc.gov/tb/xdrtb/caseflighthistory.htm on January 26, 2009.

4. Committee on Homeland Security (2007). The 2007 XDR-TB incident: A breakdown at the intersection of Homeland Security and public health.

5. Institute for Bioethics, Health Policy and Law (2003). Quarantine and isolation: lessons learned from SARS- a report for the CDC.

6. Mangili, A. & Gendreau, M. (2005). Transmission of infectious disease during air travel. *The Lancet, 385,* 989-996.

7. RAND (2005). Learning from experience: the public health response to West Nile Virus, SARS, Monkey Pox, and Hepatitis A, prepared by the RAND corporation for the Department of Health and Human Services.

8. Sampathkumar, P. (2007). Dealing with the threat of Drug-Resistant Tuberculosis: background information for interpreting the Andrew Speaker and related cases. Mayo Clinic Proceedings, 82(7), 799-802.

9. Schluger, N. (2008). Diagnosis and treatment of drug-resistant tuberculosis. Retrieved from http://www.uptodate.com/patients/content/topic.do?topicKey=~yZAZX6R0W.PReA on October 2008.

10. Schwartz, J (2007). Tangle of conflicting accounts in TB patient's odyssey. *The New York Times*. Retrieved from http://travel.nytimes.com/2007/06/02/health/02tick.html?scp=4&sq=andrew%20speaker&st=cse on Oct. 30, 2008.

11. Swendiman, K. & Jones, N. (2008). Extensively drug-resistant tuberculosis (XDR-TB): emerging public health threats and quarantine and isolation. Congressional Research Service Report prepared for Members and Committees of Congress.

12. Tanne, J, (2007). Tuberculosis cases shows flaws in international public health. Hopkins British *Medical Journal, 334, pg 1887*. Retrieved from www.bmj.com on September 19, 2008.

13. United Press International (2007). TB patient travel may have been illegal. Retried from http://www.physorg.com/news103981421.html on January 27, 2009.

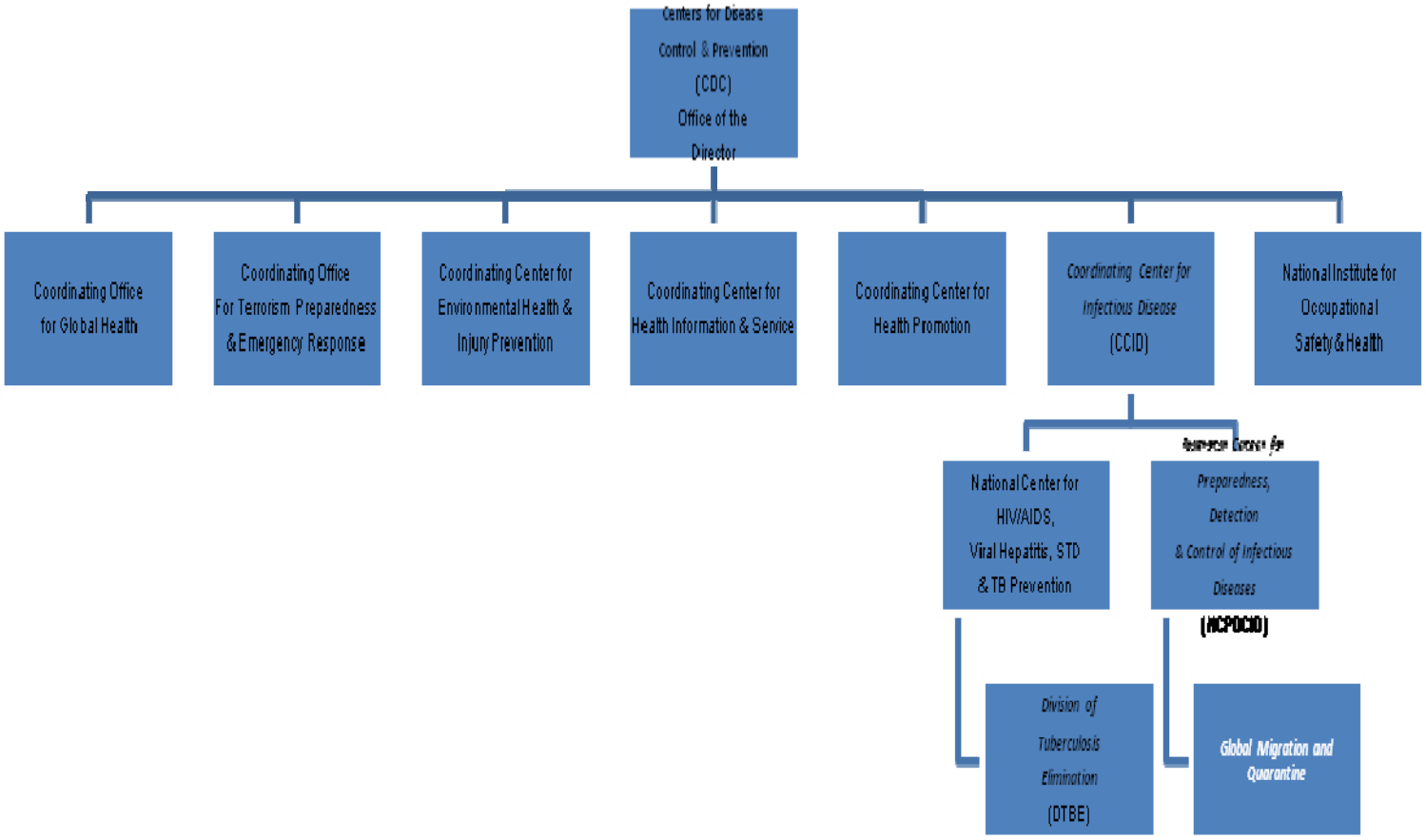
14. Wikipedia. 2007 Tuberculosis scare. Retrieved from http://en.wikipedia.org/wiki/Andrew_Speaker on September 2008.

15. World Health Organization (2005). International Health Regulations 2005.

16. World Health Organization (2006). Tuberculosis and air travel: guidelines for prevention and control (second edition).

17. World Health Organization (2007). Working for health: an introduction to the World Health Organization.

Appendix #1: Center for Disease Control and Preparation Organizational Chart



Appendix #3: Flight Itinerary of U.S. Traveler with Extensively Drug–Resistant Tuberculosis (XDR TB) (May 30, 2007)

Airlines	Flight#	Date	Departing	Scheduled Departure	Calculated Scheduled Duration	Arriving	Total Number of Passengers	Patient Seat Row Number
Air France/Delta	385/8517	5/12/2007	Atlanta, Georgia	8:45 PM Local	8 Hr 27 Min	Paris, France	433	30
Air France	1232	5/14/2007	Paris, France	07:35 AM Local	3 Hr 11 Min	Athens, Greece	unknown	unknown
Olympic Air	560	5/16/2007	Athens, Greece	7:25 PM Local	0 Hr 40 Min	Thira Island, Greece	unknown	unknown
Olympic Air	655	5/21/2007	Mykonos Island, Greece	1:45 PM Local	0 Hr 40 Min	Athens, Greece	unknown	unknown
Olympic Air	239	5/21/2007	Athens, Greece	5:30 PM Local	2 Hr 05 Min	Rome, Italy	unknown	unknown
Czech Airlines	727	5/24/2007	Rome, Italy	8:50 AM Local	1 Hr 55 Min	Prague, Czech Republic	unknown	unknown
Czech Airlines	0104	5/24/2007	Prague, Czech Republic	12:25 PM Local	8 Hr 25 Min	Montreal, Canada	191	12