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Ebola Response: A Summary of Field Work Project

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ABSTRACT

While epidemics and disease outbreaks are not uncommon world wide, the most recent outbreak of Ebola Virus Disease (EVD) has been the largest outbreak of the disease and the most wide spread in history. The outbreak has caused international concern and was declared a public health emergency of international concern by the World Health Organization (WHO) in August of 2014. Since the outbreak started there have been a total of 15,351 confirmed, probable and suspected cases of EVD reported in six affected countries including Guinea, Liberia, Mali, Sierra Leone, Spain and the United States. There have been 5459 reported deaths associated with EVD worldwide.

In this paper, Ebola Response: A Summary of Field Work Project, Jeffrey Schmidt's fieldwork with San Francisco General Hospital and Trauma Center and the San Francisco Department of Public Health is summarized. The main objective of the fieldwork project was to assist with developing an Ebola response plan and then test the response plan through simulations.

Running head: EBOLA RESPONSE

Ebola Response: A Summary of Field Work Project

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DESCRIPTION OF PUBLIC HEALTH PROBLEM

While epidemics and disease outbreaks are not uncommon world wide, the most recent outbreak of Ebola Virus Disease (EVD) has been the largest outbreak of the disease and the most wide spread in history. The outbreak has caused international concern and was declared a public health emergency of international concern by the World Health Organization (WHO) in August of 2014 (WHO, 2014).

Ebola was first isolated in Africa in 1976 in the region of the Democratic Republic of Congo and southern Sudan. The virus is part of a family known as Filoviridae and has two genera, Ebola virus and Marburg virus (Mishra, 2014). These are zoonotic diseases, evidence suggests that the reservoir for both viruses are fruit bats. The virus is then introduced to human populations by infected bats or non-human primates. Once the virus is introduced to the human population, human-to-human transmission occurs with close contact of those infected with EVD or from a cadaver of an EVD victim. The virus is transmitted through blood or body fluid (Georges-Courbot, M. et al, 1997).

The current outbreak of EVD began in Guinea in December 2013. The index case was a 2-year old boy from a village in Gueckedou who died shortly after contracting EVD. Additionally, three of his family members and two healthcare workers who had contact with the index case contracted the virus and died from EVD in December (Baize et al, 2014). The disease then spread through nearby villages and eventually crossed into the

boarder of Guinea and subsequently reached Liberia, Sierra Leon, Nigeria and Sengal in March of 2014 (Mishra, 2014). This is the largest outbreak of Ebola that the world has known.

Since the outbreak started there have been a total of 15,351 confirmed, probable and suspected cases of EVD reported in six affected countries including Guinea, Liberia, Mali, Sierra Leone, Spain and the United States. There have been 5459 reported deaths associated with EVD world-wide (WHO, 2014). Transmission remains intense and widespread in the West African countries of Guinea, Liberia and Sierra Leon. The first laboratory confirmed case of EVD was diagnosed in a man who had traveled from Liberia to Texas on September 30, 2014. The index patient did not have symptoms when he left Liberia, but developed symptoms 4 days after arriving to the US (CDC, 2014).

Health care workers are at high risk of secondary exposure from EVD infected patients. A total of 570 health care workers are known to have been infected with EVD and a total of 324 have died from the disease (WHO, 2014). While there is focus on appropriate personal protective equipment (PPE) to protect health workers from becoming exposed to EVD, many of the exposures occurred due to improper doffing of the PPE.

DESCRIPTION OF THE AGENCY

San Francisco General Hospital (SFGH) is owned and operated by the City and County of San Francisco, San Francisco Department of Public Health (SFDPH), located in the

Mission district is the city and county's only Level 1 trauma center and safety net hospital. SFGH serves more than 100,000 patients each year, provides 20% of the city's inpatient care and receives 30% of the city's ambulance traffic.

Being a trauma center and safety net hospital, SFGH has a robust disaster management program. The Director of Disaster Management at SFGH is Lann Wilder, EMT-P. Lann has developed a comprehensive emergency management program that addresses most hazards that could occur in San Francisco. The hazard specific plans are derived from the Federal Emergency Management Agency (FEMA) National Incident Management System (NIMS). NIMS is a systematic, proactive approach to guide departments and agencies at the governmental level and private sector to work together seamlessly and manage incidents of all sizes in order to reduce loss of life, property and harm to the environment (FEMA, 2014). Within the hospital settings the Hospital Incident Command System (HICS) is used to manage incidents.

SFGH and SFDHP have managed large incidents in the past. Most recently was the Mass Casualty Incident (MCI) that resulted from the Asiana airliner crash in July of 2014 at San Francisco International Airport. This incident required a citywide response from all emergency response agencies to work together to manage the incident. While most of the efforts for preparedness focus on MCI scenarios, SFGH and SFDHP have also focused on being prepared for communicable disease outbreaks.

As a public hospital in a major port city and tourist center, SFGH is very likely to be affected by a communicable disease outbreak. With this in mind, SFGH has a hazard specific plan in the event that a disease outbreak should occur.

OVERALL PROJECT PLAN AND LEARNING OBJECTIVES

The initial plan that was developed with Lann was to develop a tsunami response plan for SFGH. However, with the outbreak of EVD, the project quickly changed to Ebola preparedness and response. After the index patient arrived in the US and two nurses became infected with EVD most health departments in the country activated teams to increase preparedness efforts in case additional patients contracted EVD.

The first objective was to develop an Ebola response plan for SFGH. As discussed earlier, SFGH has a communicable disease response plan, however a plan specific to Ebola was necessary to mitigate the risk of spreading the disease. The second objective was to test the plan to see how it worked in both the hospital setting and out patient clinic settings.

IMPLEMENTATION OF THE PROJECTS/METHODS USED

As stated, the first objective was to develop an Ebola infection prevention and control response plan. SFGH created a task force to address the Ebola epidemic. The task force is comprised of hospital leadership, clinical leadership, infection control staff, the hospital

epidemiologist, industrial hygienists, emergency management staff and representatives from all the ancillary departments in the hospital. The response plan was the first priority for the task force. Using elements from the SFGH Disease Outbreak Response Plan and guidance published by the CDC the Ebola Response Plan was created.

The response plan focuses on triage and quickly identifying patients presenting at an entry point at SFGH or a SFDPH clinic. The response plan starts with asking two screening questions that are related to travel history and clinical symptoms of EVD. If the patient has recently traveled from West Africa and symptomatic, the response plan is initiated. Once there is a suspect patient the main objectives of the response plan is to isolate the patient to decrease transmission of Ebola. Once the patient is isolated the plan calls for notification to the hospital Administrator on Duty, who will activate HICS and assume the role of Incident Commander. Once HICS has been activated the main objectives are to transport the patient from the point of entry to the inpatient unit.

The second part of the fieldwork and objectives was to test the response plan. The first test was a tabletop drill. The drill scenario was a patient with suspected EVD presented to the Urgent Care Clinic on the SFGH campus, who was symptomatic and needed admission to the inpatient unit. This drill was used to talk through the response plan and work out any problems with the plan. The next drill was a functional drill to simulate the transport of a suspected EVD patient from an off site SFDPH clinic to SFGH via EMS. This simulation involved staff from the Potrero Hill Health Center, American Medical Response (AMR) Ambulance and staff at SFGH. The simulation started at the clinic,

where staff screened and isolated the patient. The clinic staff then followed the Ambulatory Care Response Plan and called EMS dispatch and the Administrator on Duty at SFGH. The AMR crew arrived at the clinic donned PPE and transported the suspect patient to SFGH. Once the patient arrived at SFGH, trained staff in PPE met the crew in the ambulance bay and assumed care of the patient and transported directly to the inpatient unit.

The most recent test of the response plan included multiple emergency response agencies. The simulation included crews from San Francisco Fire Department (SFFD), San Francisco Police Department, HazMat crews and SFGH. This was a drill that was used to test multiple agencies preparedness for a suspected EVD patient. The drill started in the field where SFFD crews donned PPE and transported the patient to SFGH.

RESULTS/FINDINGS

From the simulations SFGH and SFDPH uncovered many learning opportunities and areas for improvement. The first and most important was that the PPE initially recommended by the CDC was not adequate to fully protect health care workers. The initial configuration of PPE that was used left parts of the neck and face exposed, increasing the risk to clinicians. After this drill the infection control team and industrial hygienists configured PPE that provided complete coverage.

Once the PPE was configured, the efforts focused on training staff in the donning and doffing procedures. While the use of PPE when caring for an EVD patient is essential, the most important aspect of the PPE is proper use. With recommendations from the CDC and lessons learned from centers that have cared for EVD patients, trained observers have been implemented to supervise the entire donning and doffing procedure to ensure that there is not a breach in protocol.

These simulations also made it very clear that should a patient present with EVD, it will require a network wide approach to manage the incident. While the clinical care of a patient with EVD will be challenging, there are many other aspects that need to be considered. The first being case contact surveillance. Those who have or had contact with an EVD patient will need to be monitored for symptoms for 21 days following exposure to ensure that they are not infected. In addition to contact surveillance, the simulations uncovered the need for revised procedures for diagnostic testing, environment of care procedures and medical waste management.

APPLICATION OF RESULTS AND PUBLIC HEALTH SIGNIFICANCE

The public health significance of this project was vast. The most recent outbreak of Ebola is the largest the world has seen to date and has required an international public health response to control. While outbreaks in the past have been primarily contained to specific countries, the current outbreak is widespread and has crossed many borders. This wide

spread transmission of EVD has required public health departments around the world to work collectively to improve infection control practices to stop the transmission of EVD.

The impact on public health of EVD has been devastating. That is, what makes the current EVD outbreak different than outbreaks of infectious diseases in the past is the high mortality and case fatality rate. The average case fatality rate for EVD is 50%. In past outbreaks the case fatality rate has been anywhere from 25%-90% (WHO, 2014) In regions, such as West Africa, that do not have the resources to protect against secondary transmission or treatment facilities that can provide critical care, the case fatality rate is much higher. The West African regions of Sierra Leon, Liberia and Guinea have had the highest number of cases and fatalities of EVD and this has devastated their public health infrastructure.

Lessons learned from public health professionals and systems that have successfully cared for patients infected with EVD and stopped transmission of the disease were applied to the interventions used at SFGH and the SFDPH. As discussed earlier, the initial recommendations for PPE from the CDC did not seem to be sufficient to protect those individuals that would care for patients infected with EVD. With this in mind, the recommendations for PPE that Emory Healthcare developed was the configuration that is being used for the response plan at SFGH. Another important lesson learned during this project was that PPE is not enough to stop the transmission of an infectious disease.

While the equipment is important, proper use is vital. With this in mind, public health

officials should focus on stringent guidelines and education for the proper use of equipment during an infectious disease so that transmission of the disease is stopped.

COMPETENCIES ADDRESSED

During the 300 hours of this fieldwork experience the learning objectives were achieved. The first objective was to assist with the development of an Ebola response plan. The plan was developed, revised, approved and disseminated. To date, the plan has not needed to be implemented, however if needed it is in place. The second objective was to test the response plan. During the fieldwork experience, there were many simulations to test the response plan that uncovered both strengths and weaknesses. These simulations provided the opportunity to improve both the response plan and protocols that had been implemented.

Nearly all of the competencies as required by the USF MPH program and core knowledge areas were addressed during this fieldwork experience. In addition, the fieldwork experience addressed crosscutting competencies and interdisciplinary values. With any disease outbreak there is heavy focus on epidemiology. That is the case for the current Ebola outbreak. During this fieldwork experience the teams worked with were evaluating the epidemiology of the disease daily to monitor for changes and revising system wide protocols as needed. This project also required program planning and evaluation of health policy. The overall objective of this project was Ebola preparedness. This required evaluating existing health policies associated with infection control and

response, then developing a program to train personnel on how to protect themselves from secondary exposure.

Crosscutting interdisciplinary values that were applied during the project included communication and informatics. Once the response plan was developed, it then needed to be disseminated. This was achieved by mass emails, mass emails and the creation of an Ebola website with the most up to date information listed. In addition to communicating the plan to staff with the methods mentioned above, the Electronic Health Record (EHR) was modified to assist with screening. The EHR that is used in the entry points at SFGH and SFDPH clinics was modified to include the travel/exposure history and symptom based questions during triage.

OVERALL QUALITY OF FIELDWORK

The overall quality of this fieldwork experience was exceptional. While the threat of Ebola is ominous, being part of the planning and response has been fascinating. This project has given this student the opportunity to be directly involved and have a first hand look at how a local health department approaches a public health crisis. During this fieldwork experience this student has had the opportunity to be part of the Department Operations Center (DOC) at the SFDPH weekly meetings. The DOC is activated when there is an incident that could impact public health. The DOC consists of an Incident Management Team (IMT) that has leaders from all departments within SFDPH. It was truly fascinating and enlightens to see how a health department approaches a public health crisis and the enormous amount of work required to mitigate the incident.

As a public health professional, the opportunity that this fieldwork experience has been invaluable. It has provided first hand knowledge of how a local health department operationalizes a large-scale response to a public health crisis. SFGH and SFDPH are incredible organizations that are dedicated to improving health and health outcomes for all members of society. The dedication of all the professionals involved with this project has been truly impressive and admirable.

From a personal prospective, this experience has given this student a different view into the world of public health. Coming from a clinical background most of this authors experience has been focused on caring for patients. With this experience the author was exposed to the entire public health network and the efforts of all involved to combat a deadly disease outbreak.

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